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## Influence of Demographic Factors, Knowledge, and Beliefs on Jordanian Women's Intention to Undergo Mammography Screening

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### Abstract

**Purpose**—The purpose of this study was to determine the influence of demographic characteristics, breast cancer knowledge, fatalistic beliefs, health beliefs, and subjective norms on Jordanian women's intention to participate in mammography screening.

**Design**—A cross-sectional survey was used to collect data at 14 comprehensive healthcare centers in Amman and Zarqa, Jordan. A convenience sample of 142 Jordanian women 40 years of age or older with no history of breast cancer and able to read and write in Arabic participated.

**Methods**—Self-report surveys included a combination of researcher-designed and existing instruments to measure the study variables. Data were analyzed using descriptive statistics, Pearson's correlation, *t* tests, and multiple logistic regression.

**Findings**—Jordanian women surveyed lacked knowledge about breast cancer. Social norms and self-efficacy highly influenced these women's intention to engage in mammography screening. Younger women were more willing to indicate intention to engage in mammographic screening.

**Conclusions**—Self-efficacy and the social connectedness of Jordanian society, but not religious beliefs or perceived barriers to screening, influence Jordanian women's intention to undergo mammography. Future research should examine cultural influences, rather than religious beliefs, and investigate Jordanian women's potentially unique perspectives on barriers to actual mammography screening behavior.

**Clinical Relevance**—The prevalence of mammography screening may be enhanced by focusing interventions on Jordanian women's support systems and empowering women by providing knowledge and skills needed to engage in the procedure.

## Keywords

Women's health; survey methodology; breast cancer; health promotion

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Breast cancer is the leading cause of cancer death among Jordanian women, accounting for 22.3% of total cancer deaths (Jordan Ministry of Health [MOH], 2008). Among female cancers, breast cancer ranks first, accounting for 36.7% of female cancer cases (MOH, 2008). The median age at diagnosis of breast cancer in Jordanian woman is 51 years. Only about 3.2% of breast cancers in Jordan are diagnosed in the earliest stage (in situ) (MOH, 2008), where mammography is a highly effective screening modality.

National efforts to promote universal screening for Jordanian women are underway. The Jordan Breast Cancer Program (JBCP) is a nationwide initiative that promotes the development and provision of comprehensive services for early detection and screening of breast cancer. The purposes of the JBCP are to reduce mortality from breast cancer by early detection and screening and to shift the timing of diagnosis from its late to earlier stages. The JBCP recommends mammography every 2 years for women in their forties, and annually for women 50 years of age and older (JBCP, 2011).

The limited available literature indicates that Jordanian women's awareness of breast cancer risks and screening practices is minimal. Thus, it is important to investigate Jordanian women's knowledge about breast cancer and determine the factors contributing to their willingness to participate in mammography screening. Such findings may lead to educational interventions and promotion of utilization of mammography screening services.

## Background

### Breast Cancer Screening Behavior

Behaviors influencing breast cancer screening adoption have been extensively studied in many parts of the world. Many studies have identified that perceiving fewer barriers to mammography is the most significant predictor of adherence to mammography screening (Eun, Lee, Kim & Fogg, 2009; Ho et al., 2005; Lee-Lin et al., 2007; Russell, Champion, & Skinner, 2006; Russell, Perkins, Zollinger, & Champion, 2006; Soskolne, Marie, & Manor, 2007; Yu & Wu, 2005). A variety of other factors have been found to contribute to mammography screening as well, such as self-efficacy (Ham, 2006) and perceived susceptibility (Soskolne et al., 2007). Perceived seriousness of the disease also contributes to screening behavior, but may have mixed effects on behavior (Eun et al., 2009; Secginli & Nahcivan, 2006). Age (Ham, 2006; Rutledge, Barsevick, Knobf, & Bookbinder, 2001; Somanchi, Juon, & Rimal, 2010; Soskolne et al., 2007) and other demographic factors such as education (Pivot et al., 2011; Soskolne et al., 2007), marital status (Pakenham, Pruss, & Clutton, 2000; Somanchi et al., 2010), insurance coverage (Lee-Lin et al., 2007; Nuno, Castle, Harris, Estrada, & Garcia, 2011; Secginli & Nahcivan, 2006; Somanchi et al., 2010), and family history (Lee-Lin et al., 2007; Pivot et al., 2011) all have been found to play a role in women's adoption of mammography. Finally, support from women's health care providers, family, and friends (Pivot et al., 2011; Russell, Champion, & Skinner, 2006; Somanchi et al., 2010; Soskolne et al., 2007) also influence mammography behavior.

### Breast Cancer Screening Behavior of Jordanian Women

The literature pertaining to breast cancer screening in Jordanian women is limited, and most studies have focused on breast self-examination (BSE). Only one study has investigated factors that contribute to the performance of mammography in this population (Petro-Nustas, 2001a). This study found that perceiving fewer barriers was strongly correlated to

undergoing mammography. Older age, personal history of breast cancer, family history, knowledge about breast cancer, and friends or family as a source of information also correlated significantly to current mammogram practice (Petro-Nustas, 2001a).

A decade has passed since the Petro-Nustas (2001a) study. Since that time, efforts have been made in Jordan to increase the availability of mammographic screening and to educate women about the benefits of screening. The current study was undertaken to determine Jordanian women's current beliefs and knowledge regarding mammography in order to guide future intervention.

## Theoretical Framework

The Health Belief Model (HBM) has been used extensively to examine mammography screening behavior worldwide. The HBM postulates that individual health beliefs influence the likelihood of practicing a preventive health behavior. These beliefs are perceived susceptibility, seriousness, benefits, barriers, and self-efficacy (Rosenstock, 1974; Rosenstock, Strecher, & Becker, 1988). This study examined the influence of each HBM construct on intentions to engage in screening. In addition to the HBM constructs, one construct from the Theory of Reasoned Action (TRA; Fishbein & Ajzen, 1975), subjective norms, was also explored in this study. Subjective norms refer to one's perceptions of how other important members of one's social network believe one should behave. Norms are a known influence on screening behaviors (e.g., Montano & Taplin, 1991).

Consideration was given to the cultural differences between Jordanian women and the populations among whom the HBM and TRA were previously developed and tested. As the study population consisted of women of primarily Islamic faith, the concept of fatalistic beliefs was also incorporated into the study's theoretical model as a concept that may affect mammography screening behavior among women in Jordan.

The purpose of this study was to determine the influence of demographic characteristics, breast cancer knowledge, fatalistic beliefs, health beliefs, and subjective norms on Jordanian women's intention to participate in mammography screening. Intention to undergo mammography was chosen as the outcome, rather than actual screening behavior, since it was known that insufficient availability of mammography facilities in Jordan was a current physical barrier. Understanding factors that might influence Jordanian women's mammography screening practices, once facilities became more widely available, was desired. Additionally, focus on intention to undergo mammography allowed assessment of screening intentions among women in their forties who were just entering eligible screening age but may not have actually undergone screening at the time of the survey. Based on this framework, we hypothesized that women's perceived beliefs about breast cancer (perceived susceptibility and seriousness), mammography (perceived benefits and barriers), self (self-efficacy), fate (fatalistic beliefs), and other referent people (subjective norms) are the direct determinant of intention to engage in mammography screening. Factors that influence women's perceptions were hypothesized to be age, education, family history of breast cancer, healthcare insurance coverage, and knowledge about breast cancer, screening recommendations, and procedures for obtaining a mammogram.

## Methods

A cross-sectional survey design was used to identify factors influencing Jordanian women's intention to engage in mammography screening.

## Sample and Setting

Eligible women were Jordanian and 40 years of age and older, able to read and write in Arabic, and had no personal history of breast cancer. Convenience sampling was used to recruit women presenting at all nine comprehensive public health centers in Amman and the five centers in Zarqa (MOH, 2007). These cities were selected to represent the urban areas of Jordan, where approximately 53.7% of the total population of Jordan lives (Jordan Department of Statistics, 2006) and from which the majority of new breast cancer cases are reported (72%; MOH, 2008). Women presented at these centers for care either for themselves or their children, but not to undergo mammography. Snowball sampling was also used to recruit women from the community to expand recruitment beyond those seeking care. This method of sampling was used because word of mouth through personal networks is an essential element of communication in Jordanian culture. The first author's personal network of friends and relatives distributed approved flyers to women with whom they came in contact in Amman and Zarqa. Friends and family of the first author did not participate in providing or collecting data.

Sample size was calculated by using G\*Power 3.0 software (Faul, Erdfelder, Lang, & Buchner, 2007) based on a conventional standard, power estimate of 0.80 with Type I error rate of 0.05, and medium effect size. It was estimated that, for a multiple linear regression analysis with 12 predictors, the required sample size was 127 women. Additional women were recruited due to anticipated nonresponses and to enhance the power of the study, resulting in a sample of 142 women.

## Data Collection Procedure

Approval from the first author's then affiliated university institutional review board was obtained. Permission from the MOH in Jordan and the Amman and Zarqa health directorates was also obtained, as was local approval from health centers.

At health centers, women were approached in the waiting room either individually or in small groups by the first author or her research assistant and informed about the study purpose and procedure and provided with an approved information sheet describing what they would be asked to do. Women who verbally agreed to participate were seated in a specific room within each clinic for completion of the anonymous paper-and-pencil survey. The required time for completing the self-report survey ranged from 20 to 30 min.

Women recruited in the community were invited to meet with the first author in either the participant's or the recruiter's home. They were informed about the study and independently completed the anonymous survey.

## Instruments

**Behavioral intention**—Behavioral intention is defined as the likelihood of performing the behavior (Ajzen & Fishbein, 1980). In this study, behavioral intention was measured with the statement "I believe that I intend to have a mammography in the future" presented in Arabic and measured on a 5-point Likert scale ranging from strongly agree to strongly disagree.

**Demographic factors**—Age, education, family history of breast cancer, and healthcare insurance coverage were collected on a researcher-designed form.

**Breast cancer knowledge**—Breast cancer knowledge was defined as possession of certain factual data about breast cancer, screening recommendations, and the procedure for obtaining a mammogram. The Breast Cancer Knowledge Survey (Madanat & Merrill,

2002), originally developed in Arabic, was modified by removing questions such as those related to BSE and treatment. Scores ranged from 0 to 22, with higher scores indicating greater knowledge about breast cancer and screening. The Cronbach  $\alpha$  for the modified scale in this study was 0.68.

**Health beliefs**—Health beliefs of perceived susceptibility, seriousness, benefits, and barriers were measured using two Arabic translated versions of the Champion Revised Health Belief Model Scales (Mikhail & Petro-Nustas, 2001; Petro-Nustas, 2001b).

No modifications were made to the Arabic versions of the health belief scales for this study. Responses were measured on a 5-point Likert scale, with responses ranging from *strongly disagree* = 0 to *strongly agree* = 4. In this study, the internal consistency reliability coefficients for the health belief constructs were as follows: 0.87 for the perceived susceptibility, 0.77 for the seriousness, 0.68 for the benefits, and 0.49 for the barriers scale.

**Self-efficacy**—A translated version of the Self-Efficacy Scale for Mammography, originally developed in English and found to be valid and reliable (Champion, Skinner, & Menon, 2005) was used to measure self-efficacy. The scale was translated from English to Arabic using translation and back-translation techniques (Chapman & Carter, 1979; Jones, Lee, Philips, Zhang, & Jaceldo, 2001; Weidmer, Brown, & Garcia, 1999). Initially, the scale was translated by one bilingual (Arabic and English) doctorally prepared faculty member and then back-translated to English, blindly, by two independent bilingual experts. The two back-translated versions were contrasted to the source language scale. Translation was verified by a native English speaker for equivalence between the original and the back-translated instruments. The translated version of the scale was reviewed by another Jordanian faculty member for proper language use and cultural appropriateness. The final scale was piloted with 30 Jordanian women to determine reliability. Those women met the inclusion criteria of the study but were excluded from this study sample. The Arabic scale had a Cronbach  $\alpha$  of 0.81. Among the study sample the Cronbach  $\alpha$  was 0.83.

**Subjective norms**—Subjective norms are an individual's perceptions that most people who are important to them think she or he should or should not perform the behavior in question (Ajzen & Fishbein, 1980). Subjective norms were measured by a translated version of the Subjective Norms Scale (Tiro et al., 2005). The Arabic version developed for this study consisted of four items, with responses ranging from strongly agree to strongly disagree. Scores ranged from 0 to 32, with higher scores indicating higher perception of the influence of perceived norms. Transcultural adaptation of this scale followed the same steps of translating and testing as the Self-Efficacy for Mammography Scale described above. The Arabic translated scale had a Cronbach  $\alpha$  of 0.87 in pilot testing and 0.85 in this study.

**Fatalistic beliefs**—Fatalistic beliefs are the beliefs that “laws, regulations, systems, functions and operations have been laid down by the Almighty for this universe. Every movement and non-movement of all that exists in this universe has been predestined since eternity” (Tantawi, 2000, p. 168). In this study, fatalistic beliefs were measured using the Fatalistic Scale developed in Arabic by Al-Khasawneh (2002). The scale was modified for this study and consisted of four attitudinal items. A higher score indicates greater belief in predestination. In this study the Cronbach  $\alpha$  was calculated to be 0.63.

## Statistical Analysis

Data were analyzed using SPSS 17.0 for Windows (SPSS, Inc., Chicago, IL, USA). Descriptive statistics were calculated to report sample characteristics. Pearson's correlation coefficient was used to find the correlation between continuous demographic variables and

health beliefs, knowledge, fatalistic beliefs, subjective norms, and behavioral intention. Independent *t* tests were performed to assess the relationship between categorical demographic variables and women's beliefs and intention to undergo mammography. Intention was converted to two dichotomous categories of "agree" versus "disagree" in order to perform multiple logistic regression. Seven women who were "undecided" with regard to their intention to undergo mammography were excluded from that analysis ( $n = 135$ ).

## Results

### Sample Characteristics

The 142 women surveyed ranged in age from 40 to 74 years (mean = 47.8,  $SD = 7.1$ ). Average years of education were 12.1 ( $SD = 2.9$ ). One hundred sixteen (81.7%) women were married, 7 (4.9%) were single, 5 (3.5%) were divorced, and 14 (9.9%) were widowed. Eleven (7.7%) had a first- or second-degree relative with breast cancer. Finally, 101 (71.1%) women reported having health insurance.

No significant differences were found among women recruited from the public health centers ( $n = 70$ ) compared with those recruited through the community network ( $n = 72$ ) with respect to age, family history of breast cancer, and knowledge about breast cancer or mammography performance. However, women recruited from healthcare centers had higher rates of health insurance ( $p = .04$ ) and significantly lower education levels ( $p = .02$ ) than those recruited from the community.

Only 30 (21.1%) women reported ever having a mammogram. Among these, only 5 (16.7%) women had had a mammogram within the last year. Most of the women who had ever had a mammogram were referred by their obstetrician (36.7%). Thirty-three percent of the women reported that having a mammogram was a self-made decision, 20% followed their general practitioner's recommendations, and 10% followed family and friends' recommendations. Women who underwent mammography had significantly higher breast cancer knowledge than those who did not ( $t(139) = 3.4, p < .01$ ). Those who had ever had a mammogram had significantly higher rates of health insurance than nonperformers ( $p = .04$ ). No significant differences were found with regard to age, education, marital status, and family history of breast cancer with regard to mammography screening behavior.

### Knowledge About Breast Cancer

Women's total scores on breast cancer knowledge ranged from 4.6% to 86.4% (mean = 53.7%,  $SD = 14.3\%$ ). Over half (59.2%,  $n = 84$ ) reported that they knew where to obtain a mammogram and 66.9% ( $n = 95$ ) said that they knew which healthcare providers may refer them for screening.

### Relationship of Demographic Characteristics, Breast Cancer Knowledge, and Health Beliefs

The strongest correlations were found between women's perceptions of self-efficacy and the benefits of mammography ( $r = 0.61, p < .01$ ); and perception of seriousness of the disease and barriers to undergo mammography ( $r = -0.60, p < .01$ ). Women who perceived themselves as being more susceptible to developing breast cancer had significantly higher perception of the benefits of mammography ( $r = 0.29, p < .01$ ). Moreover, they displayed greater self-efficacy ( $r = 0.28, p < .01$ ) and increased influence of subjective norms ( $r = 0.26, p < .01$ ). Increased influence of subjective norms as well as fatalistic belief in predestination were found to correlate with increased women's perception of the benefits of mammography ( $r = 0.32, p < .01$  and  $r = 0.24, p < .01$  respectively). Subjective norms ( $r =$



0.35,  $p < .01$ ) and fatalistic beliefs ( $r = 0.33$ ,  $p < .01$ ) were significantly correlated with women's perception of self-efficacy to undergo mammography screening.

Age had no significant relationship with any of the women's health beliefs fatalistic beliefs or subjective norms. Years of education had a significant negative correlation with women's perception of barriers to obtaining a mammogram ( $r = -0.25$ ,  $p < .001$ ), and a significantly positive correlation with women's level of self-efficacy to undergo a mammogram ( $r = 0.2$ ,  $p < .01$ ). No significant relationships were found between education level and other beliefs. Women with a positive family history of breast cancer had a significantly higher perception of susceptibility to the disease ( $t = 3.27$ ,  $p < .01$ ). Furthermore, women with health insurance coverage had a significantly higher perception of self-efficacy to undergo mammography ( $t = 2.5$ ,  $p < .05$ ). Finally, women's knowledge about breast cancer and screening recommendations were positively correlated with their perception of susceptibility to breast cancer ( $r = 0.27$ ,  $p < .01$ ). Moreover, women's knowledge scores were significantly correlated with women's perception of benefits ( $r = 0.28$ ,  $p < .01$ ) and self-efficacy to mammography screening ( $r = 0.33$ ,  $p < .01$ ).

### Relationship of Variables With Intention to Engage in Mammography Screening

Age was significantly negatively correlated with intention to obtain a mammogram ( $r = -0.18$ ,  $p < .05$ ). Perception of susceptibility to breast cancer ( $r = 0.27$ ,  $p < .01$ ), identification of benefits to mammography ( $r = 0.42$ ,  $p < .01$ ), perception of self-efficacy ( $r = 0.52$ ,  $p < .01$ ), and the influence of subjective norms ( $r = 0.50$ ,  $p < .01$ ) correlated significantly with women's intention to undergo mammography.

### Intention to Engage in Mammography Screening Predicted by All Other Variables

Results of multiple logistic regression revealed that the combination of demographic characteristics, knowledge, health beliefs, subjective norms, and fatalistic beliefs contributed significantly to intention to undergo mammography, explaining 32% ( $p < .001$ ) of the variance. The odds ratio for subjective norms was 1.24, followed by 1.20 for self-efficacy and 0.92 for age.

The unique contribution of each block of variables was investigated. Those blocks were demographic factors, breast cancer knowledge, health beliefs, subjective norms, and fatalistic beliefs. This analysis was carried out through a series of multiple regression tests, with each block entered last to the regression equation. The analysis was repeated five times to report the chi-square for each block over and above the other blocks. Results showed that higher belief in predestination (fatalistic beliefs) and demographic factors had no significant unique contribution to women's intention to have a mammogram. Other factors showed varied unique contributions to mammography intention.

## Discussion

This study surveyed 142 Jordanian women to determine the influence of demographic characteristics, breast cancer knowledge, health beliefs, fatalistic beliefs, and social norms on their intention to engage in mammography screening. As hypothesized, self-efficacy and social norms contributed significantly in the sample to intention to undergo mammography screening.

The significant contribution of perceived self-efficacy to the women's intention to engage in mammography is consistent with earlier studies (Ham, 2005; Tolma, Reininger, Ureda, & Evans, 2003). Other studies, however, demonstrated negligible influence of self-efficacy on women's actual mammography screening behavior (Ham, 2006; Russell, Champion, & Skinner, 2006; Russell, Perkins, et al., 2006; Rutledge et al., 2001; Secginli & Nahcivan,

2006; Soskolne et al., 2007). Perhaps self-efficacy, while contributing to women's intention to have a mammogram, may have minimal influence on their actual behavior.

Jordanian women in this study acknowledged the influence of significant others on their intention to engage in mammography screening. This is consistent with other cultures where the influence of normative beliefs associated with family and friends predicted women's intention to undergo mammography (Ham, 2005; Tolma et al., 2003). In Jordan, kinship remains the principal unit of social and economic organization and therefore, as expected, our findings supported that subjective norms made the greatest contribution to women's intention to undergo mammography.

In addition to social norms, it was hypothesized that fatalistic beliefs, one of the five Islamic pillars, may influence Jordanian women's mammography intentions. Fatalistic beliefs acknowledge God's will over humans and that God may alter our destiny in response to our conduct; however, intellectual freedom makes humans accountable before God for their actions (Tantawi, 2000). In the present study, belief in predestination made no significant contribution to women's intention to undergo mammography nor was there a significant difference between women who had ever undergone mammography and those who had not. Analysis of individual items of the fatalistic beliefs scale revealed that 92% of the sample agreed that believing in fate did not preclude the ability to avoid illness and holds human beings responsible for their actions and freedom to avoid causes of illness. Since culture shapes women's beliefs and healthcare practices and has been found to significantly predict mammography in other studies (Russell, Perkins, et al., 2006) we recommend exploration of culture rather than religious beliefs as predictors of mammography practice among Muslim women in future studies.

Perceived barriers to obtaining a mammogram were also hypothesized to influence Jordanian women's screening intentions as in previous studies in other cultures. (Eun et al, 2009; Ho et al., 2005; Lee-Lin et al., 2007; Russell, Champion, & Skinner, 2006; Russell, Perkins, et al., 2006; Soskolne et al., 2007; Yu & Wu, 2005). This hypothesis was not supported in that barriers were not associated with women's intention to have a mammogram in this study. We speculate that perhaps the barriers scale contained items that did not seem relevant to these women, since most women were under the assumption that screening was only needed in the presence of symptoms, which they did not have.

Demographic characteristics and knowledge about breast cancer screening were hypothesized to influence Jordanian women's mammography intentions. Age was negatively correlated with intention to have a mammogram in this study. This contradicts other studies in which women's mammography screening practices increased as they became older (Ham, 2006; Pakenham et al., 2000; Petro-Nustas, 2001a; Rutledge et al., 2001; Soskolne et al., 2007). The influence of age on women's intention to engage in mammography should be interpreted cautiously in this study. Although this finding may reflect changing attitudes among the relatively young sample (mean = 47.8 [ $SD = 7.1$ ] years), additional regression analyses excluding outliers showed that the influence of age vanished while that of subjective norms and self-efficacy remained. Thus, a firm conclusion about the relationship of age and intention in this sample cannot be drawn.

Unfortunately, this study's findings were consistent with earlier reports showing Jordanian women's limited knowledge regarding breast cancer (Al-Khasawneh, 2002, 2007; Madanat & Merrill, 2002), despite national efforts to promote public awareness. This finding is particularly concerning since the current results indicated a significant relationship between women's knowledge and their perceived susceptibility to breast cancer, benefits of mammography, and self-efficacy to obtain a mammogram.



## Limitations

Findings from this study may support breast cancer screening initiatives in Jordan; however, the findings may not be generalizable to all Jordanian women. The study relied on self-report, and although it was guided by well-respected theories of health behavior, potential factors influencing intentions may have been overlooked or not completely captured in the scales used. Finally, due to the developing nature of Jordan's cancer screening programs, women's intentions for mammography were examined, and thus comment on their actual behavior cannot be made.

## Implications for Nursing Practice and Research

The findings of this study may be used to guide nursing practice and research. This study demonstrated that Jordanian women have a significant knowledge deficit pertaining to breast cancer and mammography. Therefore, nurses in Jordan need to invite women to screening and educate women regarding the importance of mammography for early detection. Furthermore, in light of the finding that women's perception of self-efficacy enhances their intention to participate in mammogram screening, nurses can serve as powerful empowerment resources by helping women evaluate self-potentials and increase their self-confidence through providing adequate information and support. The importance of social norms should also be recognized and thus include friends or family members in screening education. Prevalence of mammography screening might be enhanced with the use of women's support systems, such as local women's societies, clubs, or work settings.

Future research should continue to examine the effect of interventions intended to increase Jordanian women's knowledge about breast cancer and screening as well as focus on culturally relevant exploration of their perceptions and how these perceptions affect their actual screening behaviors.

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### Clinical Resources

- American Cancer Society cancer screening recommendations: [www.cancer.org](http://www.cancer.org)
- Jordan Breast Cancer Program: [www.jbcp.jo/](http://www.jbcp.jo/)