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Factors Associated with Adherence to Mammography Screening Among Insured Women Differ by Income Levels

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A B S T R A C T

Background: Breast cancer is the second leading cause of cancer mortality, yet mammography screening rates remain less than optimal and differ by income levels. The purpose of this study was to compare factors predicting mammography adherence across income groups.
Methods: Women 41 to 75 years of age ($N = 1,681$) with health insurance and with no mammogram in the last 15 months were enrolled to participate in an interventional study. Binary logistic regression was used to estimate multivariable-adjusted odds ratios (ORs) for demographic and health belief factors predicting mammography adherence for each income group: 1) low, less than $30,000, 2) middle, $30,000 to 75,000, and 3) high, greater than $75,000 per year.
Results: Being in the contemplation stage (vs. precontemplation) of obtaining a mammogram predicted mammography adherence across all income groups and was the only predictor in the middle-income group (OR, 3.9; 95% CI, 2.61–5.89). Increase in age was associated with 5% increase (per year increase in age) in mammography adherence for low-income (OR, 1.05; 95% CI, 1.01–1.09) and high-income (OR, 1.05; 95% CI, 1.02–1.08) women. Having a doctor recommendation predicted mammography adherence only in low-income women (OR, 10.6; 95% CI, 2.33–48.26), whereas an increase in perceived barriers predicted mammography adherence only among high-income women (OR, 0.96; 95% CI, 0.94–0.99). In a post hoc analysis, high-income women reported difficulty in remembering appointments (53%) and lack of time to get a mammogram (24%) as key barriers.
Conclusions: For all income groups, being in contemplation of obtaining a mammogram predicted mammography adherence; however, age predicted mammography adherence for low- and high-income groups, whereas doctor recommendation and perceived barriers were unique predictors for low- and high-income women, respectively. Health care providers should be aware of differences in factors and emphasize strategies that increase mammography adherence for each income group.

Conflict of Interest: The authors declare there is no conflict of interest.

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In 2017, it was estimated that 252,710 new cases of breast cancer and 40,610 breast cancer deaths would occur in the United States (Siegel, Miller, & Jemal, 2017). Screening for breast cancer and early detection has been associated with decreased breast cancer mortality among women (Njor, Schwartz, Blichert-Toft, & Lynge, 2015; Weedon-Fekjaer, Romundstad, & Vatten, 2014); however, only 69% of women in the United States aged 50 years and older are adherent to breast cancer screening guidelines (National Center for Health Statistics, 2016). Before October 2015, the American Cancer Society recommended annual mammograms for women 40 years and older. The current guidelines revised in 2015 recommend annual mammograms for women 45 to 54 years, and biennial mammograms for women 55 and older (Oeffinger et al., 2015). Furthermore, mammography screening disparities exist among income groups. Low-income women, regardless of race, ethnicity, and insurance status, have the lowest rates of breast cancer screening (Peek & Han, 2004).

Multiple factors affect mammography adherence. Economic factors such as cost of mammograms and lack of insurance are identified as key barriers to accessing mammograms and adhering to mammography screening guidelines (Graves et al., 2008; Juon, Kim, Shankar, & Han, 2004; Komenaka et al., 2015; Mack, Pavao, Tabnak, Knutson, & Kimerling, 2009; Rahman, Dignan, & Shelton, 2003; Vyas et al., 2014). In addition to economic factors (Rahman et al., 2003; Rahman, Dignan, & Shelton, 2005), several demographic factors and health beliefs affect adherence to mammography screening. Overall, women who adhere to mammography are likely to be older (Graves et al., 2008; Juon et al., 2004; Mack et al., 2009; Rahman et al., 2003, 2005; Vyas et al., 2014; Vyas et al., 2012), be more highly educated (Hubbard et al., 2016; Rahman et al., 2003, 2005), have a family history of breast cancer (Rahman et al., 2003, 2005), have a regular health care provider (Mack et al., 2009), and have a recommendation for a mammogram by a health care provider (Juon et al., 2004). Knowledge and health beliefs such as worry and perceived susceptibility are also associated with mammography adherence (Calvocoressi, Stolar, Kasl, Claus, & Jones, 2005; Graves et al., 2008; Komenaka et al., 2015; Vyas et al., 2012). Women in lower income groups have lower adherence rates compared with the high-income groups (Champion et al., 2016; Gathirua-Mwangi et al., 2016; Peek & Han, 2004) and this disparity can be partially explained by the inability to cover mammography expenses, a predominant barrier to mammography screening (Graves et al., 2008; Juon et al., 2004; Komenaka et al., 2015; Mack et al., 2009; Rahman et al., 2003; Vyas et al., 2014). Whereas women with health insurance have no-cost to mammography screening, our previous work showed that intervention effectiveness varied by income groups. Tailored intervention was effective for women in low-income groups (<$75,000), but inversely associated with mammography adherence for women with incomes greater than $75,000 (Champion et al., 2016; Gathirua-Mwangi et al., 2016). If cost is not a barrier to receipt of mammography in low-income groups and intervention effectiveness varies by income groups, what demographic or health belief variables account for income disparities?

The purpose of the current study was to compare the predictors of mammography adherence across three income groups among women with health insurance. The findings of this study will inform health care providers and researchers about factors that most predict mammography adherence among all income groups of insured women. Moreover, health professionals who develop interventions will find the information useful when designing interventions that address barriers to mammography adherence for a population with a range of incomes.

Methods

This study used data from a randomized, controlled, interventional study promoting mammography adherence among nonadherent women. This study was conducted from 2006 to 2012 when annual mammography screening for women 40 years and older was recommended by the American Cancer Society (Oeffinger et al., 2015). The women were recruited from two locations: a large health maintenance organization (health care insurance plan) in the Midwest and a large insurance plan in North Carolina. The health plans do not recommend mammography at specific ages or intervals; rather, individual doctors recommend mammography to their patients. The study was approved by institutional review boards at Duke and Indiana Universities. This controlled study was registered in a public registry (clinicaltrials.gov, registration number NCT00287040).

Women were included in the study based on the following criteria: 1) no mammogram in the past 15 months, 2) between 41 and 75 years of age, 3) member of a large health maintenance organization or a statewide insurance plan, and 4) no previous breast cancer diagnosis. Mammography cost was covered with no out-of-pocket expenses to members.

In brief, eligible participants completed baseline information that included demographic factors and their health beliefs about breast cancer and mammography. For completing the surveys, each participant received a $20 incentive. Participants were then randomized into one of three groups: 1) tailored DVD intervention, 2) tailored telephone intervention, or 3) usual care group where no intervention was administered. The study design and intervention have been described in detail elsewhere (Champion et al., 2016; Gathirua-Mwangi et al., 2016).

Demographics and family history were assessed using standard questions at baseline. Belief scales included perceived susceptibility, perceived benefits, perceived barriers, self-efficacy, breast cancer fear, and fatalism. All scales had been previously tested and found to be both reliable and valid (Champion et al., 2008). All items were scored on a 5-point scale (strongly disagree, disagree, neutral, agree, and strongly agree), then a score of all items for each scale was summed to give a total individual score. The scores were assessed as continuous variables and a total mean score based on individual scores for each scale derived. Based on previous work, total household income was categorized into 3 levels: 1) less than $30,000, 2) $30,000 to $75,000, and 3) greater than $75,000 (Champion et al., 2016; Gathirua-Mwangi et al., 2016). To assess readiness for a mammogram, the transtheoretical model of change was used and included precontemplation (women who were not ready to get a mammogram) and contemplation (women who were getting ready to get a mammogram in the foreseeable future; Champion et al., 2008).

Mammography adherence was computed with both 6-month self-reported data and medical records data. If either self-report or medical records indicated that women had a mammogram between baseline and 6 months, the mammography adherence outcome variable was scored yes. Of the 1,681 women with baseline interviews, 2.3% were missing information on mammography adherence. Therefore, 1,642 women were analyzed in this article. Use of both self-report and medical record data served to decrease potential bias owing to missing data in either interview or medical record information. The kappa