

# Women's Health Beliefs and Intention to Use Chemoprevention for Breast Cancer

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**OBJECTIVES:** To investigate the associations between women's health beliefs and their intention to use chemoprevention.

**SAMPLE & SETTING:** Participants were postmenopausal women (N = 400) aged 50–64 years who were recruited for a study on mammographic breast density.

**METHODS & VARIABLES:** Participants completed a screening mammogram and breast cancer health belief questionnaires. The authors regressed intention to use chemoprevention onto health belief scores (breast cancer fatalism, fear, perceived threat, perceived benefits, barriers, and self-efficacy).

**RESULTS:** Nearly half of the participants indicated that they would be interested in using chemoprevention if they were found to be at high risk for developing breast cancer. Women who reported higher perceived benefits of chemoprevention, higher perceptions of their ability to use chemoprevention (self-efficacy), and fewer logistic barriers to seeking health care had significantly higher intention to use chemoprevention.

**IMPLICATIONS FOR NURSING:** Interventions aimed at reducing logistic barriers to health care may increase the uptake of chemoprevention among at-risk women. In addition, women at the time of mammography and women with higher levels of education may be motivated to consider using chemoprevention.

**KEYWORDS** breast cancer; chemoprevention; health beliefs; mammography

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**B**reast cancer presents a major health challenge worldwide. It is the most diagnosed cancer in women. Of all new cancer cases, 25% are breast cancer, and an estimated one out of every eight women (12.4%) will be diagnosed with breast cancer during their life span (Howlader et al., 2020). In addition, the incidence of breast cancer has been steadily increasing since 2005 (American Cancer Society, 2023). Although advances in treatment and early detection undoubtedly contribute to the long-term survival of people with breast cancer, the key to decreasing the incidence of breast cancer is primary prevention (Thorat & Balasubramanian, 2020).

Researchers have estimated that 15% of women in the United States are eligible to use chemoprevention because risk factors place them at increased risk for developing breast cancer (DeCensi et al., 2015). Women who have been determined to have a 20%–25% chance of developing breast cancer based on cancer risk assessment tools are considered to be at high risk. A family history of first-degree relatives with breast cancer, known or suspected *BRCA1* or *BRCA2* variants, familial hereditary cancer syndromes (e.g., Li–Fraumeni), and prior radiation to the chest wall increase women's lifetime risk of developing breast cancer (American Cancer Society, 2022; Thorat & Balasubramanian, 2020; Visvanathan et al., 2013).

Treatment options for women who are considered to have an elevated risk of developing breast cancer include lifestyle modification, genetic counseling, magnetic resonance imaging surveillance beginning at age 20–30 years, and risk-reducing surgeries (bilateral risk-reducing mastectomy, bilateral risk-reducing salpingo-oophorectomy) (Thorat & Balasubramanian, 2020). In addition, some women elect to use chemoprevention as a risk-reducing strategy.

The U.S. Preventive Services Task Force (2019) recommends that clinicians offer risk-reducing medications such as tamoxifen, raloxifene, or aromatase inhibitors to women who have an increased risk of developing breast cancer and a low risk of experiencing medication side effects. Aromatase inhibitors such as exemestane and anastrozole decrease the amount of available estrogen, and selective estrogen receptor modulators (tamoxifen, raloxifene) block estrogen receptors in breast tissue to prevent tumorigenesis (National Comprehensive Cancer Network, 2022; Thorat & Balasubramanian, 2020). These medications are estimated to reduce the incidence of breast cancer by 43%–65% in high-risk women when taken for five years (Cuzick et al., 2014, 2015; Goss et al., 2011). However, research indicates that the uptake of antiestrogens among eligible women ranges from 5% to 16.3% (Aktas et al., 2016; Crew, 2015; Donnelly et al., 2014; Ropka et al., 2010; Smith et al., 2016) because of concerns about adverse events, side effects, and symptom burden, which may include vasomotor symptoms, weight gain, sexual dysfunction, depression, and increased risk of clot formation and endometrial cancer (Hamer et al., 2017). Because antiestrogen medications are administered daily, they serve as a constant reminder of breast cancer risk, which may contribute to low uptake among high-risk women (Donnelly et al., 2014).

Denosumab, a fully humanized monoclonal antibody that binds to receptor activator of nuclear factor kappa-B ligand, has a potential role in the prevention of breast cancers that are estrogen receptor-, progesterone receptor-, and HER2 protein-negative (i.e., triple-negative breast cancers), for which there are currently no effective chemoprevention methods (Crew, 2015; Evans et al., 2018; Hwang et al., 2019; Toriola et al., 2017, 2018). In addition, denosumab can be given as a depot subcutaneous injection once every six months (Scott & Muir, 2011) and has infrequent side effects (Gnant et al., 2016; Kendler et al., 2011), features that may result in better rates of uptake among at-risk women than have been observed with antiestrogen therapy.

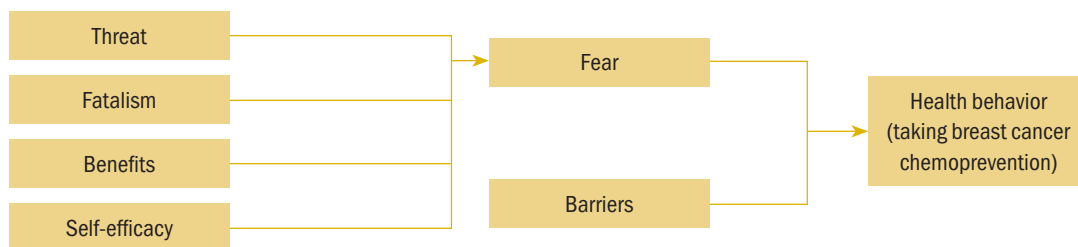
Based on the low rates of at-risk women taking antiestrogen therapy and the investigation of novel breast cancer chemoprevention agents such as denosumab, it is clear that determining the factors that promote the uptake of chemoprevention among eligible women is key to ensuring that they receive the ongoing benefits of chemoprevention. Understanding the health beliefs of women who are at high risk for breast cancer and delineating the barriers to the uptake of chemoprevention are high-priority research goals that will ultimately improve women's health. Therefore, the purpose of this study was to examine the relationship between women's health beliefs and their intention to take

**TABLE 1. Conceptual Definitions**

Term	Definition
Barriers	The costs of engaging in a health behavior (e.g., mammography) that deter participation in that behavior (e.g., pain associated with mammography, fear of cancer treatment, anxiety regarding finding breast cancer)
Benefits	The belief that a course of action (e.g., mammography) will decrease one's risk of breast cancer
Fatalism	The belief that breast cancer outcomes are predetermined, accompanied by feelings of helplessness, hopelessness, and pessimism, and that one cannot take action to change these outcomes
Fear	An emotion with a negative tone in which people experience a high level of physiologic arousal caused by a significant threat; breast cancer fear is specific to the threat of breast cancer.
Intention	The degree to which a woman would intend to take breast cancer chemoprevention if she were told by her physician that based on an assessment of risk factors she was at high risk for developing breast cancer
Self-efficacy	The belief that one is able to take action to decrease one's risk of breast cancer
Threat	Feeling personally susceptible to breast cancer and believing that harms from breast cancer may have severe consequences

**Note.** Based on information from Champion et al., 2004; Powe, 1995; Witte, 1992.

**FIGURE 1. Integrated Model**



**Note.** From “A Breast Cancer Fear Scale: Psychometric Development,” by V.L. Champion, C.S. Skinner, U. Menon, S. Rawl, R.B. Giesler, P. Monahan, & J. Dagg, 2004, *Journal of Health Psychology*, 9(6), p. 755 (<https://doi.org/10.1177/1359105304045383>). Copyright 2004 by Sage Journals. Adapted with permission.

breast cancer chemoprevention. Specifically, the authors aimed to analyze the relationships between women’s reported levels of breast cancer fatalism, fear, perceived threat, benefits, barriers, and self-efficacy and women’s intention to take breast cancer chemoprevention.

### Theoretical Framework

The theoretical framework that guided this research was proposed by Champion et al. (2004). This framework combines concepts of self-efficacy, perceived threat, benefits, and barriers from the Health Belief Model (Strecher & Rosenstock, 1997) with fear from the extended parallel process model (Witte, 1992) and cancer fatalism (Powe, 1995) to predict engagement in mammography screening. The integrated model proposes that fear of breast cancer and barriers to action (e.g., burdens of taking medications) can explain health behaviors (e.g., mammography uptake) (see Table 1 and Figure 1).

Health Belief Model concepts have been widely applied in the field of breast cancer research to explain the factors that lead women to adopt healthy behaviors surrounding breast cancer screening and prevention. Researchers have found that higher degrees of self-efficacy, greater perceived benefits of screening, and more severe perceived threat of breast cancer, as well as fewer barriers to seeking health care, confer better engagement in mammography screening (Bennett et al., 2010; Champion, 1999; Champion et al., 2005; Laing & Makambi, 2008; VanDyke & Shell, 2017), breast self-examination (Al-Sakkaf & Basaleem, 2016; Champion & Scott, 1997), clinical breast examination (Lee et al., 2015), *BRCA* gene variant testing (Manchanda et al., 2019), and risk-reducing surgical interventions such as mastectomy and oophorectomy (Ladd

et al., 2020). Other researchers have evaluated the role that breast cancer fear (Ackerson & Preston, 2009; Champion et al., 2004) and cancer fatalism (Lopez-McKee et al., 2008; Mayo et al., 2001) play in the uptake of breast cancer screening. However, little research has been conducted to determine whether these health beliefs, which are salient to the uptake of other breast cancer preventive behaviors, could also explain the uptake of breast cancer chemoprevention.

### Sample and Setting

Postmenopausal women ( $N = 400$ ) were recruited from the Joanne Knight Breast Health Center at the Siteman Cancer Center at the Washington University School of Medicine in St. Louis, Missouri, between October 2017 and September 2018 for a study on mammographic breast density (R21 CA216515). Women who were aged 50–64 years and had no prior history of cancer were contacted before their routine screening mammography appointment to determine their interest in participating in this study. Women with a history of breast augmentation, reduction, or implants were ineligible. In addition, women who had taken medication to reduce their risk of breast cancer in the past six months or who were taking hormone replacement therapy were excluded.

### Methods and Variables

All study protocols and procedures were approved by the Washington University Institutional Review Board. Women who agreed to participate in the mammographic breast density study completed the informed consent process upon arriving at their routine mammography appointment. Women who wanted to proceed with the study completed a mammogram and questionnaires to collect demographic

**TABLE 2. Psychometric Evaluation of Instruments**

Instrument	Number of Items	Factor Loadings	Reliability ( $\alpha$ )	Range	$\bar{X}$
<b>Barriers</b>					
Adapted Champion, 1999 (logistics)	9	0.415-0.816	0.87	9-45	21.4
Adapted Champion, 1999 (side effects)	4	0.468-0.916	0.85	4-20	11.4
<b>Benefits</b>					
Adapted Champion, 1999	4	0.774-0.861	0.9	4-20	14.5
<b>Fatalism</b>					
Powe Fatalism Inventory (pessimism)	9	0.625-0.777	0.89	9-45	16.3
Powe Fatalism Inventory (predetermination)	6	0.59-0.831	0.89	6-30	12.7
<b>Fear</b>					
Champion Breast Cancer Fear Scale	8	0.534-0.873	0.93	8-40	21.4
<b>Intention</b>					
Developed for this study	3	0.73-1	0.88	0-30	25.1
<b>Self-efficacy</b>					
Adapted Champion et al., 2005 (able)	7	0.239-0.752	0.75	7-35	26.2
Adapted Champion et al., 2005 (willing)	5	0.466-0.856	0.86	5-25	14.8
<b>Threat</b>					
Adapted Champion, 1999	5	0.945-0.78	0.94	4-20	9.4

**Note.** Possible scores for barriers range from 13 to 65, with higher scores indicating that a respondent perceives more barriers to taking breast cancer chemoprevention. Possible scores for benefits range from 4 to 20, with higher scores indicating higher degrees of perceived benefits of using chemoprevention. Possible total scores for fatalism range from 15 to 75, with higher scores indicating higher degrees of cancer fatalism. Possible scores for fear range from 8 to 40, with higher scores indicating higher degrees of breast cancer fear. Possible scores for intention range from 0 to 30, with higher scores indicating greater intention to use chemoprevention. Possible total scores for self-efficacy range from 12 to 60, with higher scores indicating higher self-efficacy. Possible scores for threat range from 4 to 20, with higher scores indicating higher perceived threat of breast cancer.

data and data regarding breast cancer health beliefs. All study procedures took about 45–60 minutes to complete. Once the women had completed the study, they were given a \$30 gift card.

### Instruments

To operationalize the health beliefs that theoretically influence women's intention to use breast cancer chemoprevention (breast cancer fatalism, fear, perceived threat, benefits, barriers, and self-efficacy), the authors used established measures and adapted existing measures. To the authors' knowledge, there are no instruments available to measure health beliefs specifically regarding breast cancer chemoprevention. Although many of these scales have been evaluated previously in the context of mammography (Champion, 1999; Champion et al., 2004, 2005; Lopez-McKee et al., 2008; Mayo et al., 2001), they

have never been evaluated in reference to chemoprevention. Thus, the authors have adapted many of the scales and included novel items to make them relevant to this study. In addition, the authors conducted preliminary psychometric evaluations of the adapted instruments to determine reliability and dimensionality (see Table 2).

**Powe Fatalism Inventory:** The Powe Fatalism Inventory is a 15-item instrument used to operationalize cancer fatalism (Powe, 1995). Respondents are instructed to identify the degree to which they agree or disagree with statements such as "I often feel helpless dealing with the problems of life." Although the original scoring method for this instrument was dichotomous, the authors scored the items on a five-point Likert-type scale, with possible scores for items ranging from 1 (strongly disagree) to 5 (strongly agree), which is a scoring method that has

been used and tested by other researchers (Cobran et al., 2014; Lee & Lee, 2018; Shen et al., 2009). In addition, researchers have used the Powe Fatalism Inventory with this scoring method to assess breast cancer fatalism (Lopez-McKee et al., 2008; Mayo et al., 2001). Using the five-point scoring method, total scores can range from 15 to 75, with higher scores indicating higher degrees of cancer fatalism.

**Champion Breast Cancer Fear Scale:** Women in this sample also completed the Champion Breast Cancer Fear Scale (Champion et al., 2004). This scale has eight items, which include statements such as “The thought of breast cancer scares me.” Items are scored on a five-point Likert-type scale, and possible answers range from 1 (strongly disagree) to 5 (strongly agree). None of the items are reverse scored. Possible scores range from 8 to 40, with higher scores indicating higher degrees of breast cancer fear.

**Threat:** Perceived threat of breast cancer was measured using an adaption of Champion’s (1999) revised susceptibility, benefits, and barriers scale for mammography screening. Three items are the same as Champion’s original items, but the authors added one novel item to make this scale relevant to chemoprevention, which states, “I have risk factors that make it likely that I will get breast cancer.” Respondents were asked to indicate the degree to which they believe they are susceptible to getting breast cancer on a scale from 1 (strongly disagree) to 5 (strongly agree). Possible scores range from 4 to 20, with higher scores indicating higher perceived threat of breast cancer.

**Benefits:** The benefits scale was adapted from Champion’s (1999) revised susceptibility, benefits, and barriers scale for mammography screening. The original benefits subscale contained five items, but the current authors’ adaptation included four items. The authors also adapted items to address taking medication to reduce the risk of breast cancer. Benefits were operationalized by asking participants to indicate the degree to which they agree or disagree with statements such as “If I could use a medicine, it would be an easy way to prevent breast cancer.” The authors scored the items on a five-point Likert-type scale from 1 (strongly disagree) to 5 (strongly agree). Possible scores range from 4 to 20, with higher scores indicating higher degrees of perceived benefits of using chemoprevention.

**Barriers:** The barriers scale was adapted from Champion’s (1999) revised susceptibility, benefits, and barriers scale for mammography screening. Because many of the original items were specific to mammography, the authors changed the wording of 6 items and

created 7 novel items, resulting in a total of 13 items. The authors operationalized barriers by asking respondents to indicate the degree to which they agreed or disagreed with statements such as “Medicines are too expensive to take for prevention.” Other items on the scale pertain to logistic barriers such as transportation, making appointments, and being able to get medications. Items are scored on a five-point Likert-type scale from 1 (strongly disagree) to 5 (strongly agree). Possible scores range from 13 to 65, with higher scores indicating that a respondent perceives more barriers to taking breast cancer chemoprevention.

**Self-efficacy:** The self-efficacy scale was adapted from a self-efficacy scale for mammography described by Champion et al. (2005). The original scale consisted of 10 items. The authors’ adaptation resulted in 12 items, 9 of which are similar in language to the original scale, with appropriate revisions to support the change in target behavior to using chemoprevention. The authors operationalized self-efficacy by asking respondents to indicate the degree to which they agree or disagree with statements such as “You would find a way to pay for a breast cancer prevention medicine.” Possible scores range from 12 to 60, with higher scores indicating higher self-efficacy.

**Intention:** The authors generated three novel items to operationalize women’s intention to use breast cancer chemoprevention. In each item, respondents were asked to indicate their level of interest in taking a medicine to prevent breast cancer on a scale from 0 (not at all interested) to 10 (extremely interested). Scores could range from 0–30, with higher scores indicating greater intention.

### Data Analysis

After ensuring that the data met statistical assumptions, the authors regressed intention to take breast cancer chemoprevention (the outcome variable) onto the health belief scores (breast cancer fatalism, fear, perceived threat, benefits, barriers, and self-efficacy; the predictor variables). The authors used two-sided statistical tests with  $\alpha$  level set to 0.05 for determining statistical significance. Slope coefficients (unstandardized B and  $\beta$ ) and confidence intervals (CIs) were examined to determine whether the independent variables in the study’s model significantly predicted the outcome variable. IBM SPSS, version 26.0, was used to conduct all statistical analyses.

### Results

The mean age of study participants ( $N = 400$ ) was 57.5 years ( $SD = 3.8$ ). Most participants were

**TABLE 3. Demographic Characteristics and Health Beliefs (N = 400)**

Demographic Characteristic	$\bar{X}$	SD
Age (years)	57.5	3.8
Demographic Characteristic	n	%
<b>First-degree relative with breast cancer</b>		
No	290	72.5
Yes	109	27.3
<b>Highest level of education</b>		
Less than 8th grade	1	0.3
8th-11th grade	15	3.8
High school	56	14
Post-high school training	21	5.3
Some college	93	23.3
College graduate	116	29
Postgraduate	97	24.3
<b>History of benign breast disease</b>		
No	243	60.8
Yes	157	39.3
<b>Parous</b>		
Yes	333	83.3
No	67	16.8
<b>Race or ethnicity</b>		
Non-Hispanic White	244	61
African American	146	36.5
Asian	1	0.3
Hispanic	5	1.3
Other	4	1
Health Belief	n	%
<b>Breast cancer fear</b>		
High	129	32.7
Low	265	67.3
<b>Cancer fatalism</b>		
Low	377	95.7
High	17	4.3
<b>Intention to take chemoprevention if at high risk</b>		
Extremely interested	183	45.8
Interested	152	38
Neutral	37	9.3
Not interested	21	5.3
<b>Perceived barriers to using chemoprevention</b>		
High	90	22.8

*Continued in the next column*

**TABLE 3. Demographic Characteristics and Health Beliefs (N = 400) (Continued)**

Health Belief	n	%
<b>Perceived barriers to using chemoprevention (continued)</b>		
Low	304	77.2
<b>Perceived benefits of chemoprevention</b>		
High	295	74.9
Low	99	25.1
<b>Perceived self-efficacy</b>		
High	292	74.3
Low	101	25.7
<b>Perceived threat of breast cancer</b>		
Low	322	81.9
High	71	18.1

**Note.** Not all participants answered all survey questions, so n values for each characteristic may not add up to the total N.

non-Hispanic White women (61%) who had graduated from college (53%); 243 women (61%) had no history of benign breast disease. Nearly half (n = 183, 46%) indicated that they would be extremely interested in using chemoprevention, and only a few (n = 21, 5%) indicated that they would not be interested in taking breast cancer chemoprevention (see Table 3).

The authors found that women who reported higher perceived benefits of chemoprevention (unstandardized B = 0.32;  $\beta$  = 0.129; p = 0.009; 95% CI [0.078, 0.559]), higher perceptions of their ability to use chemoprevention (self-efficacy; unstandardized B = 0.56;  $\beta$  = 0.17; p = 0.003; 95% CI [0.185, 0.93]), and fewer logistic barriers to seeking health care (unstandardized B = -0.5;  $\beta$  = -0.182; p < 0.001; 95% CI [-0.785, -0.21]) had significantly higher intention to use chemoprevention if they were found to be at high risk for developing breast cancer (F = 11.391, adjusted R<sup>2</sup> = 0.193, p < 0.001). The authors found a relationship between barriers resulting from concerns about side effects and intention; however, this relationship was not statistically significant (p = 0.05) (see Table 4). Breast cancer fear, fatalism, and perceived threat were not significantly related to women's intention to take breast cancer chemoprevention.

## Discussion

Logistic barriers, self-efficacy to overcome barriers to seeking health care, and perceived benefits of chemoprevention were strongly related to women's intention to use chemoprevention. Specifically, logistic barriers (e.g., transportation, routine, cost, insurance, scheduling, navigating the healthcare system, competing demands) were negatively related to intention to use chemoprevention. Self-efficacy (e.g., ability to get transportation, schedule appointments, navigate the healthcare system, and pay for and get medication) was positively related to intention to use chemoprevention. In addition, perceived benefits of using chemoprevention (i.e., the perception that breast cancer risk is effectively reduced by using chemoprevention) were positively related to intention to use chemoprevention. Thus, practical issues that prevent (barriers) or promote (self-efficacy) women's uptake of chemoprevention and women's perception that chemoprevention will help reduce their risk of breast cancer (benefits) are salient to its uptake.

The few researchers who have analyzed the barriers to using chemoprevention have found that lack of information regarding chemoprevention; uncertainty regarding taking a medication when one is in generally good health; and concerns regarding the cost of treatment, side effects, adverse events, competing demands, and inconveniences of taking medication impeded women's intention to use chemoprevention (Bober et al., 2004; Brewster et al., 2012; Cyrus-David & Strom, 2001; Heisey et al., 2006). In addition, researchers have demonstrated that women with lower incomes and lower levels of education are less likely to take breast cancer chemoprevention (Fasching et al., 2007; Melnikow et al., 2005; Tija et al., 2008). Similarly, acceptance of chemoprevention among low-income women was related to the cost of and insurance coverage for the medication (Cyrus-David & Strom, 2001; Salant et al., 2006). Sometimes women confuse chemoprevention with chemotherapy (Cyrus-David & Strom, 2001), indicating that the term "chemoprevention" itself may serve as a barrier to its uptake (Crew, 2015; Cuzick et al., 2011; Heisey et al., 2006).

The authors found evidence that as the perceived benefits of using chemoprevention increased, there was a statistically significant increase in women's intention to use chemoprevention. Other researchers similarly have found that greater perceived benefits were associated with greater intention to use chemoprevention (Conley et al., 2019; Ralph et al., 2014). In addition, in a sample of high-risk women, Bober et al.

(2004) found that those who declined tamoxifen felt more strongly that the medication would not prevent cancer than women who decided to take tamoxifen. This suggests that measures to enhance women's education regarding chemoprevention effectiveness could help increase its uptake among at-risk women. Evidence-based, accurate information about the efficacy of chemoprevention based on risk stratification is critical for women when deciding on a risk management option (Ralph et al., 2014).

Selecting a breast cancer risk management option is challenging for patients and healthcare providers alike. Because there are no biomarkers available to demonstrate that chemoprevention is reducing a woman's risk of developing breast cancer, it is difficult to demonstrate that chemoprevention measures are having an effect (Crew, 2015). For example, patients who take medications to lower their cholesterol levels can see that their cholesterol decreases over time. However, there is no comparable laboratory value to demonstrate to at-risk women that chemoprevention is having an effect (DeCensi et al., 2015). In addition, risk prediction models are not always accurate; it is possible that women who would have never developed breast cancer in the first place could use chemoprevention. Although chemoprevention reduces the risk of developing breast cancer, there is no evidence suggesting that there is a mortality benefit for high-risk women using chemoprevention (DeCensi et al., 2015). Putting women at risk for complications from chemoprevention that may be unnecessary further obscures the perception that it is beneficial.

Because it is challenging to ascertain whether risk reduction is occurring when using chemoprevention, many researchers have found that recommendations and communication from healthcare providers are influential factors in women's decisions to start chemoprevention (Bober et al., 2004; Crew, 2015; Cyrus-David & Strom, 2001; Heisey et al., 2006). Research has found that decision aids are not helpful to women weighing the pros and cons of using chemoprevention and deciding between risk modification strategies (Brewster et al., 2012). In one sample, 40% of women reported that having a provider recommend chemoprevention was influential in their decision to use it (Bober et al., 2004). Many providers report that they wait for women to ask about chemoprevention (Keogh et al., 2009). However, breast cancer pathogenesis, the mechanism of action of chemoprevention, and breast cancer risk stratification are not concepts about which laywomen can be expected to

have common knowledge, making a provider's recommendation for chemoprevention a crucial part of the decision to start.

Interestingly, nearly 84% of women in this study's sample (who were at average risk for breast cancer) indicated that they would use chemoprevention if a physician told them they were at high risk for developing breast cancer. However, other researchers have reported that 12%–45% of women with known risk factors stated they would be willing to use chemoprevention if indicated (Cyrus-David & Strom, 2001; Meiser et al., 2003; Ralph et al., 2014). This study's finding is unexpected, given that women at higher risk for breast cancer might be more intentional about using chemoprevention.

The authors posit that mammography screening appointments may be the ideal encounter to discuss chemoprevention. Women in this study's sample who were seeking mammography tended to have high self-efficacy and fewer barriers to health care and to perceive high benefits of using chemoprevention.

Women may demonstrate more readiness to engage in conversations about chemoprevention at their breast health or obstetric/gynecologic appointments because they may be optimally motivated to prevent breast cancer. In addition, obstetric/gynecologic providers may have more experience

prescribing chemoprevention than individuals working in family medicine or internal medicine (Kaplan et al., 2005), so they may be the ideal providers to oversee these patient encounters. Another explanation for women's high intention to use chemoprevention may be that women in this study's sample tended to have high levels of education. More than half (n = 213) of participants indicated that they had a college degree or had completed postgraduate education. Other researchers have reported that mammography nonadherence is positively related to lower levels of education (Dailey et al., 2007). There are no research findings to suggest a relationship between the level of education and uptake of chemoprevention. However, the health beliefs that are related to intention to use chemoprevention in this study's sample (self-efficacy, logistic barriers, and perceived benefit) have been linked to level of education by other researchers (Champion & Menon, 1997). Thus, women with higher education levels might be more motivated to take breast cancer chemoprevention if recommended by their healthcare provider.

#### Limitations

Limitations of this study include having a homogeneous sample of women who tended to be well educated and who were already engaged in breast

**TABLE 4. Linear Regression of Intention to Take Breast Cancer Chemoprevention on Fatalism, Fear, Perceived Threat, Benefits, Barriers, and Self-Efficacy<sup>a</sup>**

Variable	$\beta$	p	Unstandardized Coefficients		
			Standard Error	B	95% Confidence Interval for B
Able (self-efficacy)	0.17	0.003*	0.189	0.558	[0.185, 0.93]
Fear	0.01	0.838	0.112	0.023	[-0.197, 0.243]
Logistics (barriers)	-0.182	< 0.001**	0.146	-0.497	[-0.785, -0.21]
Perceived benefits	0.129	0.009*	0.122	0.319	[0.078, 0.559]
Perceived susceptibility	-0.022	0.64	0.097	-0.045	[-0.236, 0.145]
Pessimism (fatalism)	-0.909	0.118	0.169	-0.264	[-0.596, -0.068]
Predetermination (fatalism)	-0.036	0.505	0.133	-0.089	[-0.351, 0.173]
Side effects (barriers)	-0.109	0.05	0.125	-0.246	[-0.492, 0]
Willing (self-efficacy)	0.04	0.483	0.14	0.098	[-0.176, 0.372]

\* p < 0.01; \*\* p < 0.001

<sup>a</sup> Model: F = 11.391, R = 0.46, R<sup>2</sup> = 0.21, adjusted R<sup>2</sup> = 0.19,  $\Delta R^2$  = 0.21, p < 0.001

B—unstandardized beta coefficient



health maintenance (mammography). Thus, future researchers might consider sampling women with more heterogeneity regarding their adherence to mammography screening recommendations. Another limitation is that the authors asked women to hypothetically consider whether they would intend to use chemoprevention if they were determined to be at high risk. However, women in the study sample were considered to have an average risk of developing breast cancer. Intentions are antecedent to behavior change, but it cannot be extrapolated that women would elect to use chemoprevention in a real-world scenario. Future researchers might consider measuring the actual uptake of chemoprevention as an outcome, rather than merely intention to use chemoprevention. In addition, this study only considers women's intention to use chemoprevention for breast cancer. Yet there are many options for risk management, including risk-reducing surgeries and frequent surveillance. Therefore, the authors are unable to offer a comprehensive view of women's intentions to engage in all breast cancer risk-reducing behaviors, which is a limitation of this study. In addition, women at high risk for breast cancer can be as young as 35 years, so the age range of women in this study (50–64 years) may limit the generalizability of the current findings to younger women who are eligible to take breast cancer chemoprevention. This study's findings should be considered within the context of these limitations.

### Strengths

The strengths of the current study include that it provides preliminary evidence of the theoretical propositions that apply specifically to the health behavior of taking breast cancer chemoprevention. The importance of this research is underscored by the fact that the uptake of chemoprevention has been reported to be quite low in the past (Crew, 2015; Donnelly et al., 2014; Ropka et al., 2010). Limited use of chemoprevention agents, in turn, jeopardizes future research and new developments in the field of chemoprevention, including further study of novel agents such as denosumab and other anti-estrogens with more favorable side effect profiles than current U.S. Food and Drug Administration–approved options for preventive therapy. Further research is needed to adequately delineate the health beliefs that influence the uptake of chemoprevention because this knowledge can guide the development of interventions designed to optimize its use. To the authors' knowledge, this study is the first of its kind

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### KNOWLEDGE TRANSLATION

- Interventions aimed at minimizing logistic barriers to health care, such as providing transportation to appointments, on-site pharmacies, and nurse navigators, may increase the uptake of breast cancer chemoprevention among eligible women.
  - Healthcare providers should be well educated about the risks and benefits of chemoprevention and have adequate time for appointments to thoroughly assess each patient's risk of breast cancer and help them determine the best options for prevention.
  - Because women at routine screening mammogram appointments appear to be optimally motivated to address breast health issues, a routine screening mammogram may be the best time for healthcare providers to perform risk stratification and discuss breast cancer chemoprevention with women who may benefit from it.
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to provide preliminary evidence that women at their routine screening mammography appointments are receptive to the possibility of taking breast cancer chemoprevention if they are found to be at high risk for breast cancer.

### Implications for Nursing

Barriers to navigating the healthcare system, such as transportation, cost of medication, and scheduling medical appointments, are ubiquitous impediments to seeking health care in general and seem to be a substantial determinant of using chemoprevention. Efforts to reduce these barriers will likely require healthcare systems to strengthen their patient navigation programs. Patient navigators are an effective means to help patients schedule appointments, get medications, and follow up to assess for the occurrence of side effects and continue medication teaching as needed. Patients with cancer who are placed with nurse navigators report higher quality of life and have fewer hospitalizations than those without nurse navigators (Lee et al., 2011). Other ways to reduce patient barriers to health care could include interventions as simple as offering free parking or shuttle services (Solomon et al., 2020). On-site pharmacies reduce the need for patients to make an additional trip to get medications after seeing a provider, thereby facilitating the process of procuring medications and often reducing their cost (Wright et al., 2016). The barriers to seeking health care are extensive and will require healthcare systems to invest in programs to make navigating easier, ultimately reducing the public health burden of breast cancer. In addition, a more comprehensive strategy

for educating women about their breast cancer risk and weighing the risks and benefits of treatment may be accomplished through delegating risk stratification and decisions regarding chemoprevention to healthcare providers working in breast health clinics or obstetric/gynecologic clinics.

In addition, the authors' findings indicate that women may be optimally motivated to learn about and consider using chemoprevention during their routine mammography screening. Screening mammography does not often include physician consultation. However, restructuring routine screening mammography encounters to include a brief screening tool for determining risk and, if indicated, counseling regarding the risks and benefits of using chemoprevention could be beneficial. Suboptimal insurance reimbursement for breast cancer chemoprevention counseling has been identified as an impediment to educating women (Ralph et al., 2014); ensuring better coverage for counseling services is essential to providing women with the opportunity to learn about their options for breast cancer risk reduction.

## Conclusion

The uptake of chemoprevention among women at risk for breast cancer is suboptimal, and little research has been done to determine the factors that influence it. The authors found that barriers to seeking health care and self-efficacy to cope with those barriers strongly predicted women's intention to take breast cancer chemoprevention. Perceived benefits of using chemoprevention were also positively related to intention to use chemoprevention. Thus, interventions aimed at reducing barriers to health care and enabling ample provider time and resources to educate patients about chemoprevention stand to increase its uptake among at-risk women. In addition, women at the time of mammography and women with higher levels of education may be motivated to consider using chemoprevention. Future research endeavors and the development of interventions aimed at decreasing barriers to using chemoprevention, improving women's self-efficacy to overcome those barriers, increasing their perception that chemoprevention will be beneficial, and determining the optimum timing of these interventions can positively influence women's intention to take breast cancer chemoprevention.

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