



Original article

Mammographic Breast Density as a Risk Factor for Breast Cancer: Awareness in a Recently Screened Clinical Sample



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ABSTRACT

Background: Breast density is an established, independent risk factor for breast cancer. Despite this, density has not been included in standard risk models or routinely disclosed to patients. However, this is changing in the face of legal mandates and advocacy efforts. Little information exists regarding women's awareness of density as a risk factor, their personal risk, and risk management options.

Methods: We assessed awareness of density as a risk factor and whether sociodemographic variables, breast cancer risk factors, and perceived breast cancer risk were associated with awareness in 344 women with a recent screening mammogram at a tertiary care center.

Findings: Overall, 62% of women had heard about density as a risk factor and 33% had spoken to a provider about breast density. Of the sample, 18% reported that their provider indicated that they had high breast density. Awareness of density as a risk factor was greater among White women and those with other breast cancer risk factors.

Conclusion: Our results suggest that although a growing number of women are aware of breast density as a risk factor, this awareness varies. Growing mandates for disclosure suggest the need for patient education interventions for women at increased risk for the disease and to ensure all women are equally aware of their risks.

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In 2013, an estimated 232,340 women in the United States were diagnosed with invasive breast cancer (American Cancer Society, 2013). Many of these women were unaware of disease risk factors, their own personal risk, and risk management strategies (Cummings et al., 2009). Several models use prevalent risk factors to estimate breast cancer risk, with the Gail model being most widely used (Chlebowski et al., 2007; Costantino

et al., 1999; Gail et al., 1989; Gail et al., 2007). Several risk factors are not included in the Gail model, most notably mammographic breast density (noted as breast density from here forward). Breast density is a strong, independent breast cancer risk factor (Boyd et al., 2010; Tamimi, Byrne, Colditz, & Hankinson, 2007; Vachon et al., 2007). Women with extremely dense breasts have at least a four-fold greater breast cancer risk than women with the least density (Cummings et al., 2009; McCormack & dos Santos Silva, 2006). High breast density also decreases the sensitivity of mammography (van Gils, Otten, Verbeek, & Hendriks, 1998). The Breast Cancer Surveillance Consortium's (BCSC) validated model incorporates density as it is typically measured clinically (BI-RADS; Tice et al., 2008). A recent, systematic review argued that the combination of standard risk factors with density is the best approach for estimating risk while also acknowledging challenges in wide implementation within clinical settings (Cummings et al., 2009).

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Despite this known risk, density has not been routinely communicated to patients (Colin & Schott, 2011; Vachon et al., 2007). This is owing to insufficient discriminatory power and lack of independent validation (Barlow et al., 2006; Chen et al., 2006; Tice et al., 2008). Despite these concerns, rates of disclosure likely are increasing owing to legal mandates in several states requiring women to be informed of their density status (Brower, 2013; Hall, 2013). These laws are heterogeneous regarding the level of detail communicated to patients and whether further discussion with a provider is suggested (Hall, 2013). Discussions with a provider, or another means of patient education, could place this health information in the context of a woman's overall breast health. For instance, a woman with high breast density, but no other risk factors, would not face substantially elevated breast cancer risks (Chen et al. 2006). In contrast, women with extremely dense breasts and other risk factors, such as an affected first-degree relative and history of previous biopsy, would be at clinically elevated risk that would suggest consideration of risk management strategies. Therefore, this information could be incorporated into decisions about screening and risk reduction (National Comprehensive Cancer Network, 2013; U.S. Preventive Services Task Force, 2002; Visvanathan et al., 2013). Currently, we do not know rates of women's awareness of breast density and whether awareness varies by sociodemographics, breast cancer risk factors or women's perceived risk of the disease. To our knowledge, only one previous study has assessed awareness of breast density (Manning et al., 2013). This study was conducted within the context of a larger study of the use of a novel ultrasound technology for women returning for additional screening after a diagnostic mammogram. As a result, study results might not reflect women having routine screening mammography.

We assessed awareness of breast density as a risk factor and awareness of personal risk in a large, diverse sample of women who received a recent screening mammogram with benign results. We determined how this awareness varied by sociodemographics, breast cancer risk factors, and perceived risk for breast cancer.

Methods

Participants

Female participants were recruited from 2011 to 2013 after a normal mammogram examination (BI-RADS Category 1) at the Ourisman Center for Breast Health at Georgetown University Medical Center. Eligibility criteria included being aged 35 to 50, English speaking, with no history of previous cancer or abnormality, including ductal or lobular carcinoma in situ or atypical ductal hyperplasia. Although population guidelines do not recommend routine screening until aged 40 (Saslow et al., 2007) or 50 (U.S. Preventive Services Task Force, 2009), we approached younger women in an effort to recruit women who might be receiving screening mammography at this age owing to heightened breast cancer risk. With that said, we did not know the a priori risk of the sample or whether they were being screened as a result of risk factors known to them, such as a strong family history. The study was approved by the Institutional Review Board of Georgetown University. All participants provided written, informed consent.

Eligible women received a mailed survey, written consent and HIPAA documents, a letter of invitation from the study principal investigator (S.C.O.) and the medical director of Ourisman

(S.C.W.), and a self-addressed stamped envelope to return study documents. We also included a self-addressed stamped postcard by which participants could decline the study. A total of 822 packets were sent to eligible patients. Of these, 453 (55%) refused participation (113 active and 340 passive refusals). Twenty-five women were determined ineligible upon return of their survey. Our final sample of 344 women who completed questionnaires and consents represents 43% of the eligible sample. Our respondents did not differ from non-respondents on age (45.7 vs. 45.2; $t = 1.84$; $p = .07$). We did not assess differences by race because chart data are known to be less reliable for this variable than patient self-report (Gomez & Glaser, 2006; Maizlish & Herrera, 2006; West et al., 2005). Participants received a \$20 gift card to thank them for their time.

Measures

Sociodemographic and medical variables

We assessed age, race, ethnicity, marital status, education, and income, as well as known breast cancer risk factors, such as number of affected first-degree relatives and number of breast biopsies.

Breast density classification

We used the American College of Radiology BI-RADS to classify density. BI-RADS classification consists of four categories: 1) Almost entirely fat, 2) scattered fibroglandular densities, 3) heterogeneously dense, and 4) extremely dense. The most recent mammogram available in the electronic medical record maintained by MedStar Health, the health system to which the Ourisman Center and GUMC belong, was used. Two board-certified radiologists (E.M. and E.P.) independently classified each participant. Consensus was met in an iterative fashion, continuing independent ratings to full consensus.

Risk classification

We used Gail and BCSC risk models to calculate 5-year breast cancer risk estimates and Gail model lifetime risk (BCSC, 2013; National Cancer Institute, 2011).

Perceived breast cancer risk

We assessed perceived lifetime risk for developing a breast cancer by asking participants to rate their risk from 0 (no chance) to 100 (definitely will; Graves et al., 2012; Schwartz et al., 2012). We assessed comparative risk with the item, "Compared to the average women your age, would you say that you are more likely to get breast cancer, less likely or about as likely?" (Orom, Kiviniemi, Shavers, Ross, & Underwood, 2013).

Outcomes: awareness of breast density

After a description of density as provided on the National Cancer Institute website (National Cancer Institute, 2012), we asked the following questions to assess awareness: If the participants had heard of breast density as a risk factor, if their health providers had spoken to them about breast density, and whether they were informed that they had extremely dense breasts.

Data analyses

We generated descriptive statistics to characterize the sample. We conducted a series of point-biserial correlations to determine whether sociodemographic variables, breast cancer risk factors, or breast cancer perceived risk were associated with

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