



Explaining between-race differences in African-American and European-American women's responses to breast density notification

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ABSTRACT

Background: Prior research shows between-race differences in women's knowledge and emotions related to having dense breasts, thus suggesting that between-race differences in behavioral decision-making following receipt of breast density (BD) notifications are likely. Guided by the theory of planned behavior, this study examined differences in emotion-related responses (i.e., anxiety, worry, confusion) and behavioral cognition (e.g., intentions, behavioral attitudes) following receipt of BD notifications among African American (AA) and European American (EA) women. This study also examined whether race-related perceptions (i.e., discrimination, group-based medical mistrust), relevant knowledge and socioeconomic status (SES) explained the between race differences.

Method: Michigan women ($N = 457$) who presented for routine screening mammogram and had dense breasts, no prior breast cancer diagnoses, and had screen-negative mammograms were recruited from July, 2015 to March 2016. MANOVA was used to examine between race differences in psychological responses (i.e., emotional responses and behavioral cognition), and a multi-group structural regression model was used to examine whether race-related constructs, knowledge and SES mediated the effect of race on emotional responses and behavioral cognition. Prior awareness of BD was accounted for in all analyses.

Results: AA women generally reported more negative psychological responses to receiving BD notifications regardless of prior BD awareness. AA women had more favorable perceptions related to talking to their physicians about the BD notifications. Generally, race-related perceptions, SES, and related knowledge partially accounted for the effect of race on psychological response. Race-related perceptions and SES partially accounted for the differences in behavioral intentions. Between-race differences in emotional responses to BD notifications did not explain differences in women's intentions to discuss BD notifications with their physicians.

Conclusions: Future examinations are warranted to examine whether there are between-race differences in actual post-BD notification behaviors and whether similar race-related variables account for differences.

1. Introduction

Having dense breasts (i.e., more fibro-glandular relative to fatty breast tissue) increases women's breast cancer (BC) risk up to 4.5-fold (Barlow et al., 2006; Boyd et al., 2011; McCormack & dos Santos Silva, 2006); however, many women are often unaware of their own breast density (BD) and the associated increased BC risk (Manning et al., 2013; O'Neill et al., 2014; Rhodes et al., 2015; Trinh et al., 2015). Consequently, BD notification laws, which mandate that mammogram reports disclose when a patient has dense breasts, have been adopted in 27 states in the United States thus far (Are You Dense Advocacy Inc, 2016). These laws have been passed with little scientific consensus regarding

appropriate follow-up screening recommendations (Haas and Kaplan, 2015; Ray et al., 2015), presenting significant challenges when it comes to advising women who receive the notifications (Brower, 2013; Smith, 2013). These challenges are particularly concerning because of their potential contribution to BC incidence and mortality disparities which disadvantage African American (AA) women compared to European American (EA) women (DeSantis et al., 2016a, 2016b). Between-race differences in women's BD-related cognition and emotion (Manning et al., 2016a) suggest downstream differences in supplemental BC screening decision-making following receipt of BD notification – differences which would likely continue to disadvantage AA women (e.g., Curtis et al., 2008; Press et al., 2008). However, such differences have

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not yet been examined. Thus, the purpose of the current analysis is to examine differences in, and predictors of, psychological responses and behavioral decision-making following receipt of BD notifications among AA and EA women.

1.1. Barriers that influence BC screening and decision-making

Barriers that hinder BC screening among AA women and that contribute to racial disparities in BC screening behaviors may also contribute to between-race differences in behavioral decision-making following receipt of BD notifications. Such barriers are particularly important given their contribution to racial disparities in BC mortality. AA women are more likely to present with later stage disease, have lower survival rates at each stage of disease, and have a 42% higher BC mortality rate overall compared to EA women (DeSantis et al., 2016a), and these disparities are related to differences in BC screening behaviors. Disparities in mortality have been attributed to inadequate mammography screening among AA women (Curtis et al., 2008; Smith-Bindman et al., 2006) and to between-race differences in time to follow-up screening after an abnormal screening mammogram (Jones et al., 2005; Press et al., 2008). Socioeconomic barriers such as low income and lack of transportation; psychological barriers such as poor knowledge about breast cancer screening and lack of medical trust; and systemic barriers such as lack of physician recommendations all demonstrably hinder BC screening among minority women (Alexandraki and Mooradian, 2010).

For this study, the focus was on the influences of perceived past discrimination and medical mistrust; knowledge of BC and BD; socioeconomic status (SES); and psychological responses to receiving BD notifications on EA and AA women's attitudes and intentions related to discussing the notification with their physicians.

1.1.1. Pre-existing factors

The study considered discrimination, mistrust, knowledge, and SES as pre-existing factors that were already present prior to psychological responses that are contextually bound to receiving BD notification.

1.1.2. Race-related perceptions

Race-related perceptions (e.g., perceptions of discrimination and medical mistrust) adversely affect health and health care of racial and ethnic minorities (Dovidio et al., 2008; Penner and Dovidio, 2016; Penner et al., 2009; Smedley et al., 2003). Perceptions of discrimination are associated with lower adherence to cancer screening behaviors generally (Facione and Facione, 2007; Shariff-Marco et al., 2010), and perceived medical discrimination and medical mistrust contribute to decreased adherence to breast cancer screening guidelines specifically (Crawley et al., 2008; Thompson et al., 2004). This study recognizes that discrimination and medical mistrust are distinct constructs; however, to be succinct, we treat them as race-related perceptions, and it is expected these perceptions will attenuate behavioral intentions for AA women.

1.1.3. Knowledge

Prior research indicates that, compared to EA women, AA women have less knowledge of BD and are less likely to be told about BD by their physicians (Manning et al., 2013, 2016a). Knowledge deficits and lack of physician recommendations are related to AA women's decreased adherence to BC screening guidelines (Alexandraki and Mooradian, 2010; Coleman and O'Sullivan, 2001; Young and Severson, 2005); similar dynamics would likely attenuate AA women's intentions to discuss notifications with physicians.

1.1.4. SES

SES factors (e.g., income, education) are documented barriers to BC screening (Alexandraki and Mooradian, 2010) and have been shown to account for EA women's greater knowledge of BD (Manning et al.,

2013). It is expected that SES would be positively associated with women's behavioral intentions.

Altogether, these pre-existing factors (i.e., race-related perceptions, knowledge, and SES) are expected to account for between-race differences in intentions to discuss BD notification with physicians.

1.1.5. Psychological responses

This study examined how the effects of pre-existing factors on intentions are mediated by women's psychological responses (e.g., anxiety, worry, confusion) to BD notification. Moderate levels of BC anxiety and worry facilitate, whereas high levels hamper BC screening intentions and behaviors (Consedine et al., 2004; Hay et al., 2006; McCaul et al., 1996). Data show that compared to EA women, AA women have more anxiety related to their BD; however, anxiety attenuates AA women's intentions to discuss notifications with physicians whereas it increases similar intentions for EA women (Manning et al., 2016a, 2016b). Thus, it is expected that AA women would have less favorable intentions, and that anxiety would partially account for between-race differences in intentions; this study examined whether worry and confusion similarly accounted for between-race differences.

1.1.6. Race-related perceptions mediation

Perceived discrimination is linked to negative psychological states (e.g., stress, anxiety, etc.), which hinder behaviors that promote health and well-being (Carter et al., 2016; Mouzon et al., 2017; Pascoe and Smart Richman, 2009; Williams and Mohammed, 2009). This study examined whether race-related perceptions influenced psychological responses to BD notifications and, in turn, affected behavioral intentions.

1.1.7. Knowledge mediation

Knowledge attenuates anxieties related to colorectal cancer screening (Honda and Gorin, 2005) and colposcopy (Bekkers et al., 2002; Bosgraaf et al., 2013); hence, knowledge may similarly attenuate anxiety related to BD notification. Since AA women have less BD knowledge (Manning et al., 2013, 2016a), there is a plausible mediational path where less prior BD knowledge among AA recipients results in greater BD related anxiety, which in turn weakens their intentions to discuss BD notifications with physicians.

More knowledge should also be related to less confusion about the BD notification; however, this study did not identify any research indicating whether there were between-race differences in the relation between confusion about a health topic and communicating with one's physician. Hence, this study explored whether BD-notification confusion mediated the relation between race and intentions.

1.1.8. SES mediation

Finally, upon receiving BD notifications, women with fewer resources and thus more concerns about follow up testing may have more negative psychological responses to BD notifications (e.g., anxiety regarding cost of follow-up care) and thus weaker behavioral intentions. Hence, the study examined whether hypothesized effects of SES on behavioral intentions were mediated by women's psychological responses to the notifications.

1.2. Theoretical model

This study used the Theory of Planned Behavior (TPB; Ajzen, 1991; Ajzen, 2011) to frame the model regarding the translation of relevant pre-existing factors and psychological responses to behavioral intentions. The TPB is a well-validated model that has been used successfully in the prediction of health behaviors (e.g., Conner and Sparks, 1996; Hardeman et al., 2002). Though there are no official behavioral guidelines for BD notification recipients, some notification messages clearly indicate that additional screening may be warranted (Haas and Kaplan, 2015; Siu, 2016), implying a *behavioral* target of BD

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