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SPECIAL ARTICLE

Breastfeeding and Breast Cancer Risk Reduction: Implications for Black Mothers

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Breast cancer is the most commonly diagnosed cancer and a leading cause of death from cancer among U.S. women. Studies have suggested that breastfeeding reduces breast cancer risk among parous women, and there is mounting evidence that this association may differ by subtype such that breastfeeding may be more protective of some invasive breast cancer types. The purpose of this review is to discuss breast cancer disparities in the context of breastfeeding and the implications for black mothers. Black women in the U.S. have lower rates of breastfeeding and nearly twice the rates of triple-negative breast cancer (an aggressive subtype) compared with white women. In addition to individual challenges to breastfeeding, black women may also differentially face contextual barriers such as a lack of social and cultural acceptance in their communities, inadequate support from the healthcare community, and unsupportive work environments. More work is needed to improve the social factors and policies that influence breastfeeding rates at a population level. Such efforts should give special consideration to the needs of black mothers to adequately address disparities in breastfeeding among this group and possibly help reduce breast cancer risk. Interventions such as peer counseling, hospital policy changes, breastfeeding-specific clinic appointments, group prenatal education, and enhanced breastfeeding programs have been shown to be effective in communities of color. A comprehensive approach that integrates interventions across multiple levels and settings may be most successful in helping mothers reach their breastfeeding goals and reducing disparities in breastfeeding and potentially breast cancer incidence.

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INTRODUCTION

Female breast cancer is the most commonly diagnosed cancer and a leading cause of death from cancer among U.S. women. In 2013, the most recent year data are available, 230,815 women were diagnosed with breast cancer and the annual age-adjusted incidence rate was 123.7 per 100,000 women (incidence counts based on cancer registry data from 99% of the U.S. population).[1] Although overall breast cancer incidence is similar between black women (122.0 per 100,000) and white women in the U.S. (124.4 per 100,000), mortality is higher among black women, in part due to differences in the severity, course, and treatment of breast cancer.[1–3] In 2013, the age-adjusted mortality rates were 28.2 per 100,000 among black women and 20.3 per 100,000 among white women.[1]

Breast cancer is a heterogeneous disease with multiple tumor subtypes, each of which are differentially associated with various risk factors. Tumors that express hormone receptors (estrogen receptor [ER] or progesterone receptor) are classified as Luminal A or Luminal B subtypes. Tumors that express human epidermal growth factor receptor 2 (HER2) and basal-like tumors are primarily classified as hormone receptor negative. Basal-like tumors that lack expression of ER, progesterone receptor, and HER2 are classified as triple-negative breast cancers.[4,5] Luminal A breast cancers have the best

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prognosis and are the most common subtype among women of all races and ethnicities (86.5 per 100,000 women).[6] Compared with other subtypes, triple-negative breast cancer has the poorest prognosis and disproportionately affects younger, premenopausal women and non-Hispanic black women.[6,7] Non-Hispanic black women have almost twice the incidence of triple-negative breast cancer than that of non-Hispanic white women (27.2 per 100,000 non-Hispanic black women; 14.4 per 100,000 non-Hispanic white women).[6]

BREASTFEEDING AND REDUCED RISK OF BREAST CANCER

Reproductive risk factors associated with breast cancer risk include age of menarche, number of pregnancies, age at first birth, lifetime duration of breastfeeding, age at menopause, and use of menopausal hormone therapy; however, research has found that these factors are differentially associated with each subtype.[5] Breastfeeding is of particular interest for breast cancer prevention because it is a modifiable risk factor. Breastfeeding not only reduces breast cancer risk but also confers other health benefits to the mother including reduced risk for endometrial and ovarian cancers[8] and reduced risk for chronic conditions that are also risk factors for cancer, such as hypertension and diabetes.[9,10] Additionally, breastfeeding provides many benefits to the infant, including fewer episodes of diarrhea, ear infections, and lower respiratory infections and a lower risk of sudden infant death, diabetes, asthma, and childhood obesity.[11]

The literature linking breastfeeding to reduced breast cancer risk is growing. A 2002 landmark study that pooled approximately 50,000 breast cancer cases from 47 epidemiologic studies in 30 countries found that the relative risk for breast cancer in parous women is reduced by 4.3% for every 12 months a woman breastfeeds and is reduced by 7% for each birth independently.[12] Similarly, a 2013 review of 32 studies concluded that the risk of having breast cancer was 14% lower among parous women who had ever breastfed compared with parous women who never breastfed. The protective effect of breastfeeding persisted regardless of the number of births and was even greater for women who had cumulatively breastfed for 12 months or longer; they had a 28% lower risk of breast cancer.[13] Victora and colleagues[14] estimated that existing global breastfeeding rates prevent almost 20,000 annual deaths from breast cancer and that an additional 20,000 could be prevented by increasing breastfeeding duration to 12 months per child in high-income countries such as the U.S. and to 2 years per child in low- and middle-income countries.

Although it was previously thought that parous women were less at risk for breast cancer, newer research suggests that this protective effect may be limited to hormone receptor–positive subtypes, and that parity may actually increase a woman's risk for some subtypes such as ER– and triple-negative breast cancer.[15–18] In a case series study, parous women who never breastfed were 2.18 times more likely than nulliparous women to be diagnosed with triple-negative breast cancer (OR=2.18, 95% CI=1.52, 3.12).[15] However, the increased risk of ER– and triple-negative breast cancers associated with parity may be reduced by breastfeeding, with longer durations of breastfeeding further decreasing the risk.[15,16] Compelling evidence from several studies indicates that the relationship between breastfeeding and risk of breast cancer likely differs by breast cancer subtype as defined by receptor status.[5,19,20] A recent meta-analysis found that ever breastfeeding was significantly associated with a reduced odds of developing both luminal (pooled OR=0.77, p=0.003) and triple-negative (pooled OR=0.79, p=0.01) breast cancer subtypes, but there was no significant difference in the odds of developing the HER2 breast cancer subtype.[19] Two of the 11 studies included in this meta-analysis did include nulliparous women in their never-breastfed group. In another meta-analysis, results from several case–control studies found an inverse dose–response between breastfeeding and risk for triple-negative and other hormone receptor–negative breast cancers that could not be explained by parity, suggesting an independent effect of breastfeeding on breast cancer risk for these subtypes. No significant association between breastfeeding and the risk of ER+ and progesterone receptor–positive breast cancer subtypes in cohort studies was found.[20]

Because young women and black women experience a disproportionate incidence of triple-negative and ER– breast cancers, identifying modifiable risk factors for this population is an important public health effort. Studies have examined the association between breastfeeding and breast cancer subtypes among specific racial groups. Data from the African American Breast Cancer Epidemiology and Risk Consortium, which included data from two cohort and two case–control studies, showed that in a pooled analysis of three of the four studies, among black women with children, ever breastfeeding was associated with a reduced risk of ER– breast cancer (OR=0.81, 95% CI=0.69, 0.95) (but not ER+ cancer), suggesting that breastfeeding may ameliorate the effects of parity for the ER– breast cancer subtype. Ever breastfeeding was also associated with a reduced risk of triple-negative breast cancer subtype in parous black women, but the OR was not significant (OR=0.81, 95% CI=0.65, 1.02).[17] Further research is needed to understand the potential ameliorating effect of lactation on the increased risk of triple-negative breast cancer associated with parity. Palmer et al.[17] conjecture that black women may be disproportionately

affected by these cancer subtypes because they tend to have higher parity and lower breastfeeding rates than white women.

Compared to white women, black women also have a higher prevalence of other risk factors for triple-negative and ER- breast cancer subtypes, including younger age at first menarche, younger age at first pregnancy, and higher abdominal adiposity.[18,21,22] Results from a population-based case–control study of black and white women (one of the studies included in the African American Breast Cancer Epidemiology and Risk Consortium), led the researchers to estimate that up to 68% (95% CI=30.0, 90.1) of basal-like (e.g., triple-negative) breast cancer in premenopausal black women could be prevented by increasing breastfeeding and reducing abdominal adiposity. The proportion of the reduction in breast cancer attributable to breastfeeding alone (compared to abdominal adiposity) was not presented in this paper.[18]

Although not fully understood, several biological mechanisms for the protective effect of breastfeeding on breast cancer risk have been proposed. Breastfeeding is associated with hormonal changes and alterations in molecular histology in the breast that may reduce an individual's breast cancer risk.[20,23] Nulliparity is a well-established risk factor for luminal type breast cancer[4,18]; both pregnancy and breastfeeding decrease the number of lifetime menstrual cycles, which may reduce exposure to specific hormones that are associated with increased risk of luminal type breast cancer.[19,24] However, parity increases the risk for ER– and triple-negative breast cancer subtypes, leading to the hypothesis that the mechanisms may be related to different hormonal or non-hormonal factors. Schedin and colleagues[25] have suggested that the ways in which lactation and pregnancy influence some breast cancer subtypes may be related to the process of involution that occurs postpartum. Evidence suggests that breastfeeding supports the differentiation of mammary cells following a pregnancy, and differentiated cells are less likely to become cancerous.[26,27] Additionally, breastfeeding and processes involved during the cessation of breastfeeding (e.g., apoptosis) may decrease cancer risk by removing cells with initial DNA damage from the breast tissue.[28] Further research is needed to better understand the differential mechanisms at play by tumor subtype.

BREASTFEEDING AND BREAST CANCER PREVENTION AMONG PAROUS BLACK WOMEN

The American Academy of Pediatrics recommends exclusive breastfeeding for about the first 6 months of life, followed by continued breastfeeding as complementary foods are introduced, with continuation of breastfeeding for 1 year or longer as mutually desired by mother and infant.[29] Among infants born in 2013, black infants had significantly lower rates than white infants of having ever been breastfed (66.3% vs 84.3%); breastfeeding at 6 months (39.1% vs 57.9%); and exclusive breastfeeding at 6 months (14.6% vs 26.8%).[30] Given that black women are at higher risk for triple-negative breast cancers, they may stand to gain the most from the protective effects of breastfeeding.[20] Furthermore, the potential protective effect of longer breastfeeding duration on breast cancer risk highlights an important opportunity for cancer prevention among black mothers. Addressing the barriers to initiating and continuing breastfeeding could improve breastfeeding rates and reduce racial disparities in triple-negative breast cancer incidence. Phipps and Li[31] estimate that if black women breastfed at the same rate as non-Hispanic white women, the incidence of triple-negative breast cancer in the U.S. could be reduced by two thirds among parous black women.[a]

Many women experience a variety of barriers to breastfeeding that include challenges with latching and pain, concern about insufficient milk supply, perceived inconvenience, embarrassment, and lack of support from employers and child care providers.[33] However, some barriers are unique to and disproportionately experienced by black women, which may contribute to the persistent gap in breastfeeding rates between black mothers and white mothers.[34] A barrier uniquely cited by black mothers is a lack of social and cultural breastfeeding acceptance in the black community that may have been shaped by historical challenges that black women have faced.[35] Although this paper focuses more on overt and quantifiable barriers, the social, structural, and institutional embeddedness of racism that underlies breastfeeding practices and disparities in the U.S. are critically important and deserve closer examination.[34,35]

Black women often experience disparate support from the healthcare community, such as receiving inadequate information about breastfeeding from prenatal providers, hospital providers, and Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) clinics.[36,37] A study examining implementation of hospital practices that support breastfeeding found that those facilities located in ZIP code areas where the percentage of black residents was higher than the national average were less likely to meet five indicators

[a]This impact fraction is based on breastfeeding rates that were 44% for black women and 81% for non-Hispanic white women.[32] Breastfeeding rates among babies born in 2013 are 66% for non-Hispanic black women and 84% for non-Hispanic white women, which could decrease the impact factor.[30]

for supportive breastfeeding practices than those located in areas with a lower percentage of black residents.[38] In-hospital formula introduction has been found to be one of the most important predictors of breastfeeding duration; black infants are more likely to be fed with formula while in the hospital than white infants, a difference that cannot be explained by higher rates of breastfeeding intention among white mothers.[38,39] In addition, many breastfeeding problems arise several days after most women have left the hospital, requiring a continuum of care to connect women to support from other providers or community-based programs. Communities of color are underserved by lactation care providers and there is a need to increase the number of racial and ethnic minority lactation care providers to better represent the women they serve in these communities.[33,40]

Returning to work is also frequently reported as a barrier to breastfeeding for many mothers.[33] In 2015, more than half (58.1%) of mothers with infants aged <1 year participated in the workforce.[41] Employed mothers are less likely to initiate breastfeeding and more likely to stop breastfeeding earlier than mothers who are not employed. A telephone survey of WIC participants found that black mothers were more likely than white mothers to report breastfeeding cessation due to the need to return to work (19.5% vs 8.8%).[42] This may be because black women have an increased likelihood of working in an environment that does not support breastfeeding. For example, black women are more likely to hold jobs with shorter maternity leave, less flexible work hours, insufficient break times, and demanding work schedules.[43]

IMPLICATIONS FOR PUBLIC HEALTH PRACTICE

To increase rates of breastfeeding initiation and duration among black women, and potentially decrease some subtypes of breast cancer incidence, interventions are needed that are specifically designed to meet the needs of black mothers. Integrating interventions across multiple layers of society and in multiple settings, including hospitals and medical settings, workplaces, schools, community-based organizations and places of worship, has been effective at increasing rates of breastfeeding among black women.[34] Including information in these interventions about breastfeeding as a protective factor for aggressive breast cancers that more frequently impact black women may encourage healthcare providers, employers, child care providers, and family and friends to support and encourage breastfeeding. Because triple-negative breast cancer disproportionately affects younger women and non-Hispanic black women,[6,7] providing this information to these women during preconception and interconception care may influence their breastfeeding intentions for future and subsequent children.

Prenatal confidence, self-efficacy, and breastfeeding intention are important predictors of breastfeeding initiation and duration. The American College of Obstetrics and Gynecology states that breastfeeding should be brought up early in prenatal care to enable women to make informed infant feeding decisions.[44] A focus group study with black women found that breastfeeding was not mentioned during prenatal or postnatal care visits for some women, which contributed to their decision not to breastfeed their infants.[45] Participants suggested that prenatal breastfeeding education and supportive communication would help new mothers to breastfeed. Another study found that a brief counseling intervention that focused on providing information about the maternal health benefits of breastfeeding, including a lower risk of breast cancer, significantly increased breastfeeding intention among pregnant low-income black women (AOR=1.20, 95% CI=1.02, 1.42). Prior to the intervention, only 17% of participants felt that breastfeeding was "extremely likely" to lower the risk of breast cancer, whereas 69% of participants felt that breastfeeding was "extremely likely" to lower the risk of breast cancer post-intervention.[46]

In addition, community-based initiatives and programs that provide resources and support for black mothers to breastfeed could include more-specific information about the association between breastfeeding and a lowered risk of some types of breast cancers (and other chronic conditions) that disproportionately affect black women. Partnerships between breastfeeding coalitions and cancer prevention coalitions may further amplify state-level public health efforts to promote breastfeeding as a way to reduce a woman's risk of breast cancer. For example, the Montana comprehensive cancer coalition is partnering with their breastfeeding coalition to create worksite wellness policies that support and encourage breastfeeding and accommodate employees' breastfeeding needs.[47] In Rhode Island, the cancer coalition supports their state breastfeeding coalition's efforts to help all birthing hospitals achieve optimal maternity care practices through "Baby-Friendly Hospital" designation.[48] Currently, 98% of live births in Rhode Island occur in Baby-Friendly facilities.[49] Finally, opportunities to engage breast cancer organizations and advocates in promoting breastfeeding as a way to reduce breast cancer risk and support black women to breastfeed could be explored. Breastfeeding, as a modifiable risk factor for breast cancer, has the potential to contribute to reducing the racial gap in breast cancer incidence and outcomes for some aggressive breast cancer subtypes.

RESEARCH GAPS

Although research points to the public health benefits of breastfeeding, including cancer risk reduction, some gaps in understanding the mechanisms behind this relationship still exist and warrant additional research. The independent contribution of breastfeeding on reducing breast cancer risk is difficult to isolate because of the relationship between breastfeeding and other risk factors such as parity, adiposity, and anovulation, as well as other potential confounders.[18,24] In addition, a woman's age at her first pregnancy and breastfeeding experience, as well as her lifetime parity and breastfeeding, may impact the differentiation of breast tissue as it relates to breast cancer risk.[24] The dose–response relationship is also unclear.[24] Research is needed to better understand what intensity and duration of breastfeeding would confer the most benefit. For example, is the protective effect of breastfeeding stronger for those who exclusively breastfeed? And for how long? Assessing the dose–response relationship in clinical and epidemiologic studies will require consistent definitions in breastfeeding intensity and duration, a standard protocol for grouping lifetime number of breastfeeding months, careful consideration of the relationship between parity and accumulated months of breastfeeding, and more-robust data collection methods.[24,50,51] Furthermore, a better understanding of the role of breastfeeding in particular subtypes of breast cancer could inform risk assessment and prevention recommendations.[5,19,20]

Standard measures of breastfeeding across studies will allow for better meta-analytic capability, enabling researchers to determine the impact of not meeting breastfeeding recommendations on breast cancer risk among black women. For example, black women are more likely to go back to work earlier than white women, and work is a well-known barrier to continued breastfeeding; thus, the relationship between breastfeeding duration and intensity (exclusive versus partial) and its protective effect on triple-negative breast cancer is important to understand in this context.[33,42,43] Additional research is also needed to determine optimal ways to support breastfeeding, particularly among underserved populations who often stand to benefit most.[34] Identifying evidence-based practices that promote initiation and duration of breastfeeding, as well as monitoring policies and practices in place, will facilitate efforts to translate known benefits of breastfeeding into public health action.[33]

CONCLUSIONS

Breastfeeding has become a well-documented protective factor for breast cancer. Black women not only have lower rates of breastfeeding compared with white women, but they are also disproportionally affected by triple-negative breast cancer, an aggressive subtype. From a public health perspective, the evidence linking breastfeeding to cancer risk adds to the importance of ensuring all women have the necessary supports in place to meet their breastfeeding goals. More work is needed to improve the contextual factors that influence breastfeeding rates at a population level. Efforts to do so should give special consideration to the needs of black women to address breastfeeding disparities among this group and potentially contribute to reductions in breast cancer incidence. Interventions such as peer counseling, hospital policy changes, breastfeeding-specific clinic appointments, group prenatal education, and enhanced breastfeeding programs have been shown to be effective in communities of color.[52] A comprehensive approach is needed to integrate interventions across multiple levels (national, state, and local) and settings to help women to reach their breastfeeding goals. By reducing breastfeeding disparities and the incidence of aggressive breast cancers among black women, there could be a reduction in the disparity of breast cancer mortality.

Find out more about how to support breastfeeding women in *The Surgeon General's Call to Action to Support Breastfeeding* www.surgeongeneral.gov/library/calls/breastfeeding/index.html and *The CDC Guide to Strategies to Support Breastfeeding Mothers and Babies* www.cdc.gov/breastfeeding/resources/guide.htm.

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