Mammography: Review of the Controversy, Health Disparities, and Impact on Young African American Women

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Background: Ongoing debate about mammography screening for women in their 40s has brought awareness to the opportunities and challenges for achieving optimal breast health in young African American women and in battling health inequities that place them at greater risk for mortality from breast cancer. Despite the screening controversy, a need exists to understand the complex issues related to mammography knowledge, attitudes, and behaviors of young minority women, while empowering them to take an active role in their breast health care.

Objectives: The purpose of this article is to describe the complicated issues related to screening in young African American women within the context of the uncertainty about the evidence surrounding screening practices.

Methods: Literature was reviewed to garner a comprehensive update of the mammography screening controversy and its impact on mammography practices.

Findings: Nurses should be aware of the mammography screening controversy and breast cancer risk assessment and how they affect young women’s participation in mammography screening. Mammography screening should be a shared decision between the patient and healthcare provider. A better understanding of breast health and its effect on young minority women is needed. Nurses have a prominent role to advocate for, empower, and educate patients as they face the task of deciding whether to begin or continue mammography in their 40s.

The recommendation of mammography screening for women in their 40s has been contentious since inception (Christie, 1977; Hale & deValpine, 2014; Shapiro, Venet, Strax, Venet, & Roeser, 1985). Recommendations are debated, and consensus about best practice guidelines for women has not been reached—most notably, the optimal age to initiate, optimal interval (annually versus biennially), and the age at which screening should stop (Jatoi & Baum, 1993; Quanstrum & Hayward, 2010). Theoretical concern also exists that low-dose radiation from screening mammography potentially may induce breast cancer in women who harbor mutations in the \textit{BRCA1} or \textit{BRCA2} genes. These genes are responsible for DNA repair, and mutations in these genes may reduce the ability to repair damage from low-dose radiation (Foulkes, 2008; Frankenberger-Schwager & Gregus, 2012; Swift, Morrell, Massey, & Chase, 1991; Taylor, 1992). In addition, mammography screening is associated with false positives, which may result in unnecessary biopsies and anxiety and which have been associated with a significant rate of breast cancer overdiagnosis (i.e., finding lesions that never would progress and are not life-threatening) and increased lead time (i.e., the time that mammography-detected cancers remain in the preclinical phase) (Bleyer & Welch, 2012; Christie, 1977; Hale & deValpine, 2014; Jatoi & Baum, 1993). Although opinions...
vary, women should be encouraged to fully participate in the
discussions surrounding their breast health and in the decision
making about screening. Therefore, cogent guidance is needed
to enable women—along with their healthcare providers—to make
the best breast health decisions.

In addition to the controversy, a very real disparity in breast
cancer outcomes exists (Conway-Phillips & Millon-Underwood,
2009; Greene, Torio, & Klassen, 2005). Some of these differences
are involving early detection and treatment. High-quality health
care should be provided to all populations. However, young Afri-
can American women’s breast health has been overlooked, lead-
ing to a breast cancer health disparity and increased mortality for
this population (Conway-Phillips & Millon-Underwood, 2009).
This inequity needs to be better understood, and solutions
should take into consideration the unique needs of young minor-
ity women. Although many factors contribute to this disparity,
the mammography controversy should not overshadow the real
need for quality and individualized breast care, which includes
an understanding of screening risks, benefits, and options. A
degree of consensus must be reached concerning the optimal
level of breast health education and screening required for the
unique needs of this population. Because of changes and modi-
fications to recommendations based on the evolving evidence,
healthcare providers are challenged to ensure that women are
provided the necessary information to make informed choices
about their own care.

Nurses need to be aware of existing healthcare disparities
and the evolving debate in mammography screening to provide
comprehensive care. The purpose of this article is to describe
the issues related to mammography screening in young African
American women, within the context of the uncertainty about
the evidence surrounding screening practices.

Breast Cancer Health Disparity

Health disparities arise from many factors, including unequal
socioeconomic factors, culture differences, discrimination, and
health system barriers that influence access to cancer preven-
tion and treatment services (American Cancer Society [ACS],
2013a, 2013b, 2014a; Calvo-occorsi et al., 2004; Finney, Tumiel-
Berhalter, Fox, & Jaén, 2006). Mitigating health disparities is a
major concern, as evidenced by its inclusion in national health
benchmarks within Healthy People 2020 and the National
Prevention Strategy, which identify ideal population health
improvement targets (U.S. Department of Health and Human
Services, 2011a, 2011b).

Breast cancer, a leading example of a U.S. health disparity,
accounts for an estimated 15% of U.S. cancer deaths and is the
leading site of new cancer cases in women and the second lead-
ning cause of cancer death for African American women (ACS,
2013a, 2013b, 2014a). A percentage of the higher breast cancer
mortality seen in young African American women is because of
aggressive tumor morphology; other gaps in cancer mortality
for racial and ethnic minorities can be attributed to obstacles
in cancer prevention and detection (ACS, 2013a; Andersson &
Janzon, 1997; Bjurstam et al., 1997; Conway-Phillips & Millon-
Underwood, 2009).

Although African American women have a lower incidence of
breast cancer than Caucasian women overall, African American
women have a higher incidence of breast cancer than Cauca-
sian women among women aged younger than 45 years (ACS,
2013b). The reasons for this disparity are not fully understood
but may be partially attributed to differences in knowledge, at-
titudes, and behaviors involving breast health in young African
American women. Mammography often is recommended begin-
ning at age 40 or 50 years for women considered at average risk,
but many African American women lack knowledge about their
own risk and, consequently, have lower rates of screening and
present in later stages of cancer development (Byrne, Mary, &
DeShields, 2011; Conway-Phillips & Millon-Underwood, 2009;
Dailey, Kasl, Holford, & Jones, 2007; Feldstein et al., 2011). This
lack of information about screening options, and less breast
cancer awareness and acknowledgment of risk, may contribute
to increased breast cancer mortality. Women who are unaware
of their individual breast cancer risk may delay screening until
cancer is detected from later-stage disease symptomatology,
when treatment and cure are less viable. Breast cancers detec-
ted in later stages lead to higher incidences of metastasis and

The Case for Mammography

The main reason for the mammography controversy is the
lack of randomized clinical trial (RCT) evidence supporting the
benefits of mammography screening or the lives saved if under-
gone by women in their 40s. Of the nine mammography RCTs
conducted globally to evaluate the efficacy of screening, only
one, the 1960s Breast Cancer Screening Project of the Health
Insurance Plan (HIP) of New York, has been conducted in the
United States, and few, if any, included minority populations
such as African American women. Only two RCTs, the Canadian
National Breast Cancer Screening Study and the U.K. Age Trial,
have been conducted to specifically address mammography ef-
cicacy for women in their 40s; both indicated that if women be-
gan screening in their 40s, the benefits would not be seen until
12–14 years later, at which time they already would be in their
50s, presumably with less screening benefit for the younger age
group (Bjurstam et al., 1997, 2003; Elwood, Cox, & Richardson,
1993; Hendrick, Smith, & Rutledge, 1997; Miller, To, Baines,
& Wall, 2002; Nystrom & Larsson, 1993; Nystrom et al., 1993;
Tabar et al., 1995, 1996). The HIP trial results were the impetus
for the initiation of mass mammography screening in the United
States because this trial demonstrated a reduction in breast can-
cer mortality for women who were screened versus those who
were not (Shapiro, 1997; Shapiro et al., 1985). The HIP trial was
initiated in 1963, and questions have arisen about its methodol-
gy, power, and screening technologies when comparing it to
newer trials. For younger women particularly, mammography
clinical trials have shown far less benefit for women in their
40s than in their 50s. This lower perceived benefit (i.e., lives
saved), coupled with the theoretical risk of radiation inducing
breast cancer in younger women who already have a hereditary
predisposition for breast cancer, causes significant concern for
mass screening because it may often be used without looking at
individualized risks (Clark, 2004; Foulkes, 2008; Taylor, 1992;
U.S. Preventive Services Task Force [USPSTF], 2015).

Despite this, many organizations, researchers, and clinicians
maintain that screening mammography may have benefits in the
broad context of detecting breast cancer in its early stages in some women, allowing earlier cancer treatment and cure than would be accomplished if it were detected at a later stage (Hale & deValpine, 2014; Tabar et al., 2011; USPSTF, 2009). However, no single screening modality detects all breast cancers with equal levels of specificity and sensitivity (Kolb, Lichy, & Newhouse, 2002; Tilanus-Linthorst et al., 2002).

Breast cancer is not a homogenous disease but rather a heterogeneous disease consisting of many differences based on the type of cells, location of the cancer within the breast, and invasiveness of the disease (Habel & Stanford, 1993; Stanford & Greenberg, 1989). Breast cancer morphology also is complex, with different presentations and characteristics among women. Tumors typically are described by their grade, levels of estrogen and progesterone, and HER2 expression. Women with triple receptor-negative breast cancers do not express estrogen (ER–), progesterone, or HER2 and have a poorer prognosis (Habel & Stanford, 1993; Krizmanich-Conniff et al., 2012; Stanford & Greenberg, 1989). Alternately, women with estrogen-positive (ER+) cancers have a better prognosis (Habel & Stanford, 1993; Stanford & Greenberg, 1989).

Caucasian women have a higher incidence of ER+ breast cancers, which are slower-growing, lending to better mammography detection (National Cancer Institute [NCI], 2013; Stanford & Greenberg, 1989). Conversely, ER– cancers are faster growing and are more prevalent in younger women (aged younger than 50 years) and African American women (Gapstur, Dupuis, Gann, Collila, & Winchester, 1996; Ooi, Martinez, & Li, 2011; Stanford & Greenberg, 1989). Because of the histologic makeup of ER– tumors and aggressive growing nature, mammography does not detect them as readily as ER+ tumors (Foukles, 2008; Tilanus-Linthorst et al., 2002).

Although mammography has been shown to detect cancer early and save the lives of some women, it also has caused harm to many women because of false positives, unnecessary additional testing and biopsies, overdosification, increased lead time, and low-dose radiation exposure (Beemsterboer, Warmerdam, Boer, & de Koning, 1998; Bleyer & Welch, 2012; Jatoi & Anderson, 2010). Younger women with denser breasts are less likely to benefit from mammography (Bjurstam et al., 2003; Shapiro, 1977).

A risk-based, or risk stratification, approach to mammography use has been advocated, which would help women ascertain their individual breast cancer risk by using prediction models that include various factors such as breast density, menopause status, and age (Bertrand et al., 2013; Kerlikowske et al., 2013). Easily available risk-based online tools (www.cancer.gov/bcrisktool or www.ems-trials.org/riskevaluator) support women and provide guidance regarding if and when they should undergo mammography screening and the most appropriate interval to do so based on their risk of developing cancer (Centre for Cancer Prevention, Wolfson Institute of Preventive Medicine, 2014; Fletcher, 2011; Kerlikowske et al., 2013; NCI, 2014). Individual risk factors should play a role in guiding screening practices, particularly for younger women (Schrager & Marko, 2013). In a comparative modeling study to determine the threshold relative risk for the harm-benefit ratio of screening between women aged in their 40s and those aged 50–74 years, for those with a two-fold elevated risk of breast cancer, their risk of starting biennial screening at age 40 years was comparable to average-risk women beginning biennial screening at age 50 years (van Ravesteyn et al., 2012).

Mammography is promoted as an intervention and, if practiced early and routinely within the context of individualized assessment, could help address breast cancer health disparities and decrease breast cancer mortality. Mammography often is accompanied by other detection modalities (e.g., ultrasound, magnetic resonance imaging [MRI], clinical breast examination) (Fletcher, 2011; Kolb et al., 2002; Patterson & Noroozian, 2012; Taylor, 1992; Tilanus-Linthorst et al., 2002). However, other tools are still needed.

Digital breast tomosynthesis (DBT), a fairly new technology, is providing even greater detection clarity of noncalcified masses by providing a three-dimensional view of images and reducing tissue superimposition (Houssami & Skaaene, 2013; Houssami & Zackrisson, 2013; Patterson & Noroozian, 2012; Rafferty et al., 2013; Skaaene et al., 2013). In clinical trials, DBT has shown increased detection rates of 30%, fewer recalls, and fewer false-positives when combined with two-dimensional digital mammography (Rafferty et al., 2013; Skaaene et al., 2013; Tingberg et al., 2011). DBT is still in testing, and, to date, evidence does not show that it will reduce interval breast cancers in women who are at high risk. MRI is used as an adjunct in women at high risk (particularly in women with a BRCA gene mutation), offering significant detection benefit without using ionizing radiation, and is more sensitive than mammography (Bosse et al., 2014; Kuhl et al., 2005). Cost limits the use of MRI as a screening tool in at-risk populations, further expanding the cancer disparity (Mahon, 2007; Patterson & Noroozian, 2012). In addition, MRI has not been widely implemented because of associated higher false-positive rates (Bosse et al., 2014; Patterson & Noroozian, 2012). Despite detection advances, continued improvements are needed for women at high risk. In the meantime, mammography will continue to have a place as a screening tool in the early-detection portfolio.

### Screening Guidelines

Screening should be conducted systematically and follow the best practice guidelines for frequency and timing (ACS, 2013a; Christie, 1977; Institute of Medicine, 2003; Malmgren, Parikh, Atwood, & Kaplan, 2012; Quanstrum & Hayward, 2010). Breast cancer screening guidelines differ based on the screening commencement age and screening interval, using research results favored by the guideline sponsoring organization (e.g., ACS, American College of Radiology, Centers for Disease Control and Prevention, USPSTF) (ACS, 2013a, 2014a; Mahon, 2007; USPSTF, 2009). Table 1 provides an overview of selected organizational mammography screening recommendations and shows the varied differences and similarities advocated among organizations. Unfortunately, the widely accepted practice of mass screening has led to a blanket passage for women to participate in screening without adequately provided individualized understanding and informed consent (Jatoi & Baum, 1993; Marshall, 2005).

Significant changes have been made to mammography screening guidelines, which have caused women to change their screening routines (Calvocoresi, Sun, Kasl, Claus, & Jones, 2008; Squiers et al., 2011). All of the guidelines are
Mammography Screening Guidelines for Asymptomatic Women

<table>
<thead>
<tr>
<th>Organization</th>
<th>Intended User</th>
<th>Mammography Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Cancer Society (ACS)</td>
<td>Patients and physicians</td>
<td>Annually beginning at age 40 years</td>
</tr>
<tr>
<td>American College of Radiology</td>
<td>Physicians</td>
<td>Annually beginning at age 40 years</td>
</tr>
<tr>
<td>National Comprehensive Cancer Network (NCCN)</td>
<td>Physicians</td>
<td>Annually beginning at age 40 years</td>
</tr>
<tr>
<td>U.S. Preventive Services Task Force (USPSTF)</td>
<td>Physicians, nurses, and allied healthcare professionals</td>
<td>Biennially beginning at age 50 years until age 74 years</td>
</tr>
</tbody>
</table>

*Note. Based on information from ACS, 2013a, 2014a; Mahon, 2007; NCCN, 2014; USPSTF, 2009.*

ostensibly based on the same body of evidence, but discrepancy still exists. RCT evidence supports recommended mammography commencement at age 50 years, but an abundance of epidemiologic and observational studies lend credence to screening for women in their 40s (ACS, 2013a; Christie, 1977; Hendrick et al., 1997; Kerlikowske et al., 2013; Shapiro, 1997). In 2009, the USPSTF changed its recommended age from 40 to 50 years (USPSTF, 2009). The discussion and rationale surrounding this change have caused debate and sparked screening behavior change in this younger population (Kremer et al., 2012). In the absence of healthcare provider guidance and informed consent, this behavior change that now recommends that women aged in their 40s delay screening may place African American women who are at high risk, at even greater risk for developing later-stage breast cancer (Calvocoressi et al., 2008).

**Informed Consent**

Practice guidelines dictate that, prior to administration of a medical procedure, patients are provided informed consent (Jatoi & Baum, 1993; Osman, 2001). This involves providing specific details to patients on the purpose, benefits, risks, and alternatives; without it, care is considered malpractice or negligent (Jatoi & Baum, 1993; Osman, 2001; Ward, 1999). Nurses have been and continue to be an integral entity of the multidisciplinary healthcare team involved in protecting patients' rights and ensuring that they understand medical procedures and interventions (Judkins-Cohn, Kielwasser-Withrow, Owen, & Ward, 2014; Sims, 2008a, 2008b). Therefore, in obtaining consent from patients, nurses must not only have communication knowledge but also the clinical, legal, and ethical knowledge to serve in a number of roles: manager (ensure adequate process), witness (record patients’ understanding), patient advocate (ensure patients’ understanding), and information giver (recapitulate information in lay terms) (Judkins-Cohn et al., 2014; Susilo et al., 2013).

Informed consent is an important facet of the mammography controversy. Mass population screening practices are not ideal for women in their 40s in the absence of informed consent because of potential risk that could cause breast cancer or other unnecessary harm. Informed consent is not generally practiced in mammography screening; more of a simple consent is routinely used (Jatoi & Anderson, 2010; Ward, 1999). Although women may be at risk for early breast cancer morbidity and mortality with delayed screening, the larger risk is conducting an unnecessary intervention without informed consent (Jatoi & Anderson, 2010; Jatoi & Baum, 1993; Ward, 1999). Younger women have dual challenges of knowing and understanding their breast cancer and screening risks (Jatoi & Baum, 1993; Kerlikowske, 2013; Tabar et al., 2011; Taylor, 1992).

A clear need exists to have equal informed consent for women undergoing mammography screening, without which is assault on patient rights and malpractice (Jatoi & Baum, 1993; Osman, 2001; Tabar et al., 2011; Ward, 1999). Informed consent is not a standard of care practiced across the United States with mass-, mobile-, and some primary care–prescribed mammography screenings (ACS, 2014a; Jatoi & Baum, 1993; Marshall, 2005). Typically with mass and mobile screenings, healthcare providers are not present with patients at the point of care because mammography technicians provide the on-site screening services. Ensuring mammography screening informed consent may be a challenge because health infrastructure does not readily avail itself to this seldom-practiced standard. Therefore, health service infrastructures that provide mammography screening should be retooled to accommodate the availability of informed consent prior to screening accessibility.

An understanding by patients of the risks and benefits of a medical intervention or procedure is the foundation of patient autonomy and serves as the standard of decision making in health care. Patient autonomy is synonymous with liberty, privacy, and individual choice, forming the doctrine of informed consent (Jatoi & Baum, 1993; Osman, 2001). Informed consent allows patients to accept or decline participation in a medical procedure (ACS, 2014b). Simple consent is not appropriate for a medical intervention or procedure (ACS, 2014b; Osman, 2001; Ward, 1999). Informed consent should serve as the standard of care for all medical procedures, including mammography screening (Jatoi & Baum, 1993; Osman, 2001).

Because of disparate breast cancer mortality in younger African American women, they must be informed about the preponderance of the evidence showing differences in cancer characteristics, including its aggressiveness (ACS, 2013a; Conway-Phillips & Millon-Underwood, 2009; Desantis, Ma, Bryan, & Jemal, 2013). Information should be shared on the breast cancer disparity and potential causes leading to increased mortality in this population. Screening informed consent should encompass the very real aspects of the problem, risks, and alternatives.

**Conclusion**

The mammography controversy highlights the very real concerns surrounding screening for women in their 40s. Issues raised present opportunities and challenges for achieving optimal breast health in younger women who are at high risk, and in battling the pervasive health inequities that put younger
Implications for Practice

- Educate patients about the controversy surrounding breast cancer and screening in women in their 40s.
- Keep up-to-date on breast cancer health disparities in African American women.
- Raise awareness and understanding of individual breast cancer risk and available tools that can be used to assess risk.

African American women at greater risk for mortality. In addition, a critical need remains to understand the complex issues related to mammography knowledge, attitudes, and behaviors of minority women, particularly as healthcare providers move away from population-based recommendations to more personalized healthcare decision making. Paramount to this is the real-world perspective of the unique mammography needs and challenges of African American women. Nurses are in a unique position to educate patients and provide the necessary support. However, they must be adequately prepared to discuss risks and benefits that are constantly changing. They also must be well-versed in the implications of recommended guidelines and the disparate way those recommendations can affect different populations. This poses a significant challenge for nurses and requires that they keep up-to-date on research, expert guidelines, and interpretations of that evidence for patient care. They also must be acutely aware of existing disparities and how advances in personalized health care can contribute to patient care and treatment plans that are tailored to meet the unique needs of their patients as individuals.

A simple diagnosis of breast cancer no longer exists. Scientific advances have provided the knowledge needed to differentiate cancer types and, with that, different modes of detection and treatment, but more remains to be done. One size does not fit all, and that means that healthcare providers must view screening guidelines through the lens of personalized health care. Women must weigh their own individual health risks and consult with their healthcare provider to decide their breast health regimens (ACS, 2014b; Jatoi & Baum, 1993; Osman, 2001). Empowering young women to take an active and informed role in their health care improves health behaviors systemically. The decision to proceed with mammography screening is an individual one that should be entered into with care, knowledge, understanding, and a deliberate effort to adhere to screening guidelines if the benefits outweigh the risk. Because of the cancer disparity facing young African American women, they must receive education and guidance on their breast cancer risk (e.g., socioeconomic factors that influence access to healthcare services, tumor morphology, overall breast health), as well as their optimal screening choices. Although a definitive consensus on screening practices may never be reached, close attention to the highest quality research—combined with an equal amount of attention to the preferences and experiences of young African American women—has the potential to improve advances in breast cancer detection and treatment rates and address the existing racial breast cancer health disparity.

References


