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Review Article

Intervention Approaches for Addressing Breast Cancer Disparities among African American Women

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Abstract

African American women in the U.S. have a higher mortality rate from breast cancer than white women. Black-white differences in survival persist even after accounting for disease stage and tumor characteristics suggesting that the higher rates of breast cancer mortality are due to social factors. Several factors may account for racial differences in breast cancer mortality including socioeconomic factors, access to screening mammography and timely treatment, and biological factors. Efforts to prevent deaths from breast cancer and to address breast cancer disparities have focused on early detection through routine mammography and timely referral for treatment. There is a need for culturally appropriate, tailored health messages for African American women to increase their knowledge and awareness of health behaviors for the early detection of breast cancer. Several promising intervention approaches are reviewed in this article including: 1) the use of cell phone text messaging and smart phone apps to increase breast cancer screening; 2) the use of radio stations that target African American audiences ("black radio") for health promotion activities; and 3) church-based behavioral interventions to promote breast cancer screening among African American women.

Keywords: African Americans; Breast cancer; Cell phone; Church; Disparities; Mammography; Mass media; Survival

Introduction

In the U.S., breast cancer accounts for more cancer deaths in women than any site other than lung cancer. Breast cancer is the most commonly diagnosed invasive cancer in the U.S. for women of all racial and ethnic groups, with an estimated 232,340 new cases diagnosed in 2013 [1]. A variety of risk factors for breast cancer have been well-established by epidemiologic studies including race, ethnicity, family history of cancer, and genetic traits, as well as modifiable exposures such as increased alcohol consumption, physical inactivity, exogenous hormones, and certain female reproductive factors [1,2]. Despite recent advances in understanding the molecular biology of breast cancer, the etiology of many breast cancer cases in the population remains unknown.

It is likely that, in addition to biological factors, social and environmental factors (for example, racism and discrimination and severe stress due to living in poverty) have an adverse impact on access to timely screening and treatment and may also influence how breast cancer is expressed [3-6].

Several promising intervention approaches are reviewed in this article including: 1) the use of cell phone text messaging and smartphone apps to increase breast cancer screening; 2) the use of radio stations that target African American audiences ("black radio") for health promotion activities; and 3) church-based behavioral interventions to promote breast cancer screening among African American women. A summary of black-white disparities in breast cancer is provided below.

Black-White Disparities in Breast Cancer

Age-standardized incidence rates are higher among white women than black women, although black women in the U.S. have a higher mortality rate than white women. Black-white differences in survival persist even after accounting for disease stage and tumor characteristics [4]. Since 1975, the 5 year relative survival rate for breast cancer has increased for both African American and white women [1]. However, there remains a substantial racial difference. In the most recent time period, the 5 year relative survival rate was 79% for African American women and 92% for white women [1]. This disparity in survival is due to both later stage at diagnosis and poorer stage-specific survival among African American women [1]. Both routine screening and access to treatment are important to address breast cancer disparities. A recent study of breast cancer mortality identified numerous U.S. cities that have elevated rates among black women as compared with non-Hispanic white women [7]. Of the 25 largest cities in the U.S., Memphis, TN had the greatest racial disparity with a black-to-white mortality ratio of 2.11 (95% CI 1.75-2.55). In the U.S., black race and Hispanic ethnicity have been associated with later stage at breast cancer diagnosis. Studies have shown that African American women are less likely than white women to receive timely follow-up after an abnormal or inconclusive screening mammogram [4,8]. Compared with white women in the U.S., African American women tend to have more aggressive breast cancers that present more frequently as estrogen receptor negative tumors. Among premenopausal women, tumors that are estrogen receptor negative, progesterone receptor negative, and HER2 negative ("triple negative" tumors) are more common among black women than among white women.

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Efforts to prevent deaths from breast cancer and to address breast cancer disparities have focused on modifiable risk factors such as promoting physical activity and reduced alcohol consumption and early detection through routine mammography. Although data from recent national surveys in the U.S. indicate that African American women are as likely as non-Hispanic white women to have had a recent mammogram, black-white differences in mammography rates and referral for breast cancer diagnostic evaluation and treatment have been identified in some geographic localities and patient populations. Racial differences in breast cancer screening are likely to be due in part to socioeconomic factors such as family income and educational attainment [9]. Breast cancer screening rates are relatively low among the poor, uninsured, and underinsured which contributes to higher mortality rates among these population subgroups [1,3]. Black-white differences in health insurance coverage and access to health care services are likely to play a role as women who have a regular health care provider are more likely to receive a provider recommendation to get a cancer screening test [10-12]. Multilevel analyses have identified important associations with both individual-level variables and contextual effects at the county level [13,14]. The results of these studies indicate that both individual-level variables and contextual effects are important.

A further issue is that some studies have found that some African American women have misconceptions about the etiology of breast cancer, misconceptions about their risk of the disease, and barriers to receiving screening and timely treatment (for example, fear of the disease and mistrust of the health care system due to historical injustices) [4,15]. At-risk African American women are less likely than white women to be informed about current guidelines and recommendations related to breast cancer preventive care [16].

There is a need for culturally appropriate, tailored health messages for African American women to increase their knowledge and awareness of health behaviors for the early detection of breast cancer [3]. Health promotion messages that are culturally tailored for a group address the unique needs of individuals, increase their motivation, tend to be perceived as more personally relevant, and lead to a greater likelihood of behavior change. The tailoring of health promotion messages to a cultural group such as African American women increases the relevance of the messages to members of the target audience [17]. Culturally appropriate interventions address the cultural values of the group, reflect the attitudes and norms of the group, and reflect the behavioral preferences and expectations of the group's members.

The use of mass media to increase breast cancer screening

Mass media used to provide educational and motivational information about cancer screening and other health topics includes radio, television, newspapers, magazines, and billboards. Mass media can be used alone but, in cancer prevention and control practice, it usually is used in conjunction with other components such as small media or existing interventions and infrastructure. A review completed as part of the Guide to Community Preventive Services found insufficient evidence to determine the effectiveness of mass media interventions in increasing screening for breast cancer because too few studies qualified for the review (www.thecommunityguide.org). The Community Preventive Services Task Force findings were based on evidence from a previously completed review (literature search period 1966-2004) and an updated review (search period 2004-2008) [18]. The two published studies captured as part of this review were conducted in Australia (radio and newspaper advertisements targeting Italian-speaking women) and the U.S. (a multi-component intervention aimed at African American women). In the U.S. study, a higher intensity mass media component was compared with a lower intensity program. The results were not statistically significant.

In addition to mass media combined with other intervention approaches (e.g., small media), interventions that enhance access to mammography are likely to be useful for low-income women and those who are racial/ethnic minorities [19]. These approaches include the use of vouchers and same–day appointments to reduce out of pocket expense and overcome structural barriers, help with appointments and scheduling of mammograms, and the use of mobile mammography vans. In addition, there has been increasing interest in using cell phone text messaging and smartphone apps to address breast cancer disparities.

Using cell phone text messaging and smartphone apps to increase breast cancer screening

Mobile phones are a ubiquitous part of modern life. By the end of 2011, there were an estimated 6 billion mobile subscriptions accounting for about 87% of the world's population [20]. Rapid technological advances have led to the emergence of smartphones that combine the voice and text messaging functions of cell phones with powerful computing technology that can support third-party applications, Internet access, and wireless connectivity with other devices [20]. About 85% of adults in the U.S., including the majority of African Americans, own a cell phone and 53% own a smartphone [21].

Lakkis et al. [22] compared the effect of two different types of text message service reminders on increasing screening mammography among women at the American University of Beirut who belonged to a health insurance plan. The sample of women (n=385) who had not had a mammogram in the past two years were randomly assigned to two groups. Members of the first group received a general text message inviting them to have a mammogram and the second group received an additional text message about the benefits of mammogram screening. About 31% of the first group underwent a mammogram screening test during the 6 month follow-up period compared with 32% of the second group ($P > 0.05$). Kratzke et al. [23] surveyed college women (n=546) in New Mexico about their breast cancer prevention information-seeking and interest in smartphone apps. Over half of the participants (54%) desired breast cancer prevention apps. A separate study by Kratzke et al. [24] surveyed a convenience sample of 157 women at an imaging center in rural New Mexico. About 87% of the women used cell phones, 47% used text messaging, many (36%) were interested in receiving text messages about breast cancer prevention, and 37% had an interest in receiving mammogram reminder text messages. Dang et al. (2013) surveyed 905 Hispanic women attending a health fair in Los Angeles about their technology use, mammography use, and breast cancer knowledge. Ninety-two percent were foreign born, most had completed some high school (39%), or elementary education (38%), and most (62%)

were uninsured. The majority (67%) spoke and read only Spanish. Only 60% aged > 40 years had had a recent mammogram. About 70% of the women reported that they have a mobile phone, 65% use text messaging daily, and many (45%) wish to receive a mammogram reminder by text (Dang et al., 2013). The use of short text messages as reminders of breast self-exams have been studied in women in Delhi, India [25]. In addition to text messaging, peer-to-peer email and social media communications have also been suggested as a promising approach to encourage routine cancer screening.

All major smartphone platforms provide third-party developers with application programming interfaces that can be used to build special purpose applications referred to as native applications (apps) [20]. There were an estimated 13,600 consumer health apps for the iPhone by April 2012. Bender et al. [20] examined the purpose and content of cancer-related smartphone apps available for use by the general public and the evidence on their utility or effectiveness. In their study, they systematically reviewed the official application stores for the four major smartphone platforms (iPhone, Android, Nokia, and BlackBerry). Apps were included in their review if they were focused on cancer and available for public use. In addition, they systematically reviewed the literature using MEDLINE, Embase, and the Cochrane Library to identify evaluations of cancer-related smartphone apps. A total of 295 apps from smartphone app stores met their inclusion criteria. The reported app purpose was to raise awareness about cancer (32.2%, 95 of 295), to provide educational information about cancer (26.4%, 78 of 295), assist in early detection (11.5%, 34 of 295), cancer prevention (2.0%, 6 of 295). In addition, 17 of the apps focused on the early detection of breast cancer. Many of the apps promoted a charitable organization or supported fundraising efforts. The review of the health literature identified 594 articles, but none were deemed eligible as they did not report an evaluation of a cancer-focused smartphone app [20]. The authors noted several concerns including the lack of evidence of app effectiveness or description of the procedures or data sources (e.g., evidence, theory) and discrepancies between information generated on smartphone apps and evidence-based guidelines.

The use of black radio to disseminate health messages on breast cancer screening

Radio stations that target African American audiences ("black radio") are an attractive medium for health promotion activities in African American communities [26]. Black radio is viewed as a trusted source of information on a variety of topics by African Americans [3]. Such radio stations generally devote much of their air time to programming such as call-in shows and personal on-air interviews. Call-in shows and on-air interviews are radio formats that can promote social learning, enabling people to reciprocally learn from each other [26]. Black radio stations are an important communication channel to reach African American audiences and can be important agents of change by encouraging community partnerships, promoting awareness, and educating community members about health issues. Such radio stations reach many segments of the black community including both women and men, the elderly, and all income groups [26]. Media marketing reports indicate that a sizeable percentage of African Americans of all ages listen to radio radios. For example, more than 90% of African Americans aged 12 years or older listen to the radio at least once per week [27]. More than 94% of African Americans older than 55 years listen to the radio weekly. In a national survey of 1,895 media users of various racial/ethnic backgrounds, 58% of African American respondents reported that they use ethnic radio to obtain information [28]. Media marketing reports also indicate that African Americans listen to the radio in diverse environments, including at home, at work, in the car, in stores and restaurants, online, and via mobile telephones. Black radio supports "word-of-mouth" strategies for disseminating information about the importance of breast cancer screening from trusted sources [26]. Such radio stations can provide an interactive form that focuses on education, patient action, motivation, and self-empowerment [29]. Although print media have also been used to disseminate information about the importance of screening mammography, black radio has the advantage of overcoming barriers such as low health literacy.

Leeks et al. conducted a qualitative study to determine why low income, uninsured African Women who are eligible for screening through the National Breast and Cervical Cancer Early Detection Program (NBCCEDP) do not participate in NBCCEDP screening services and to identify strategies for increasing enrollment among NBCCEDP-eligible women who have never received breast cancer screening [3]. An important goal of the study was to evaluate messages and materials to help develop a health promotion campaign. Eight focus groups were conducted with a sample of African American women (n=68) in two Georgia cities. The focus group participants were stratified by age (40 to 49 and 50 to 64 years) and mammogram screening status. Themes and patterns in the focus group participants' perception of the health promotion campaign's messages and materials were assessed. Several key issues were identified including the desirability of hearing about breast cancer and the importance of screening from African American breast cancer survivors and to incorporate religious faith and family connectedness in the materials [3].

In the African American Women and Mass Media (AAMM) campaign, which was piloted in Savannah and Macon, Georgia, Hall et al. used black radio as a platform for targeted, culturally competent health promotion and outreach to low income African American women [30]. Radio public service announcements and live radio shows featuring testimonials by breast cancer survivors on black radio stations with R&B and gospel formats aired for one year. In Savannah alone, print materials (small media) were disseminated in a variety of locations in the African American community. A three point, quasi-experimental time series design was used to evaluate the campaign at baseline, during, and after women's exposure to the AAMM campaign in Savannah and Macon and in one comparison city (Columbus, GA). Information was obtained from the National Cancer Institute's Cancer Information Service (1-800-4-CANCER) to monitor the number of telephone calls generated by the campaign in Savannah, Macon, and Columbus. The results indicated that the campaign reached the target audience and was effective in increasing awareness of breast cancer screening through Georgia's NBCCEDP in Savannah and Macon [30]. The highest number of calls was received from Savannah and Macon (426 and 273, respectively, vs. 136 in Columbus) over the 12-month study period.

Health Literacy

Efforts to reduce or eliminate breast cancer disparities in diverse

populations through media interventions must take into account health literacy. Low health literacy has been associated with decreased use of preventive services such as cancer screening, decreased knowledge about the importance of early detection, increased risk of having a chronic disease, increased use of emergency services, poorer treatment adherence, and poorer health outcomes [31]. The Institute of Medicine defines health literacy as "the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions" [32]. Low health literacy is associated with increased sense of fatalism about cancer, decreased participation in cancer control programs, and later stage at diagnosis. Cancer prevention and control messages are often written at too high a reading level for individuals with marginal literacy skills [33].

Church-based Intervention Studies on Breast Cancer Screening

In contrast to the sparse literature on the effectiveness of mass media to promote breast cancer screening, and the very recent literature on the use of smartphone apps and text messaging for cancer prevention and control, there is a sizeable literature on church-based intervention studies on breast cancer screening among African American women [34-50]. The church is the most important social institution in African American communities [40,51]. In view of its important cultural role, service orientation, and multitude of contributions through social networks and organizational structures, the church is an ideal setting in which to offer health promotion activities for African Americans and other minorities. This is particularly true of vulnerable groups such as the poor, elderly, medically underserved, and people who have been harmed by a history of neglect, oppression, or discrimination [40,51]. Several notable studies are summarized below.

The goal of the Forsyth County Cancer Screening Project in North Carolina was to improve the use of breast and cervical cancer screening among low income, predominately African American women aged 40 and older. The multicomponent intervention strategies included chart reminders, examination room prompts, in service meetings, and patient-directed literature in clinic settings, and community out-reach strategies including educational sessions, distribution of literature, community events, media, and church programs [34]. The proportion of women reporting regular use of mammography increased 31-56% ($P < 0.001$) in the intervention city.

In the Witness Project in Arkansas, Erwin et al. studied the effectiveness of a culturally competent breast cancer education program in which cancer survivors were trained to promote early detection and increased breast self-examination and mammography among rural, underserved African American women [35,41]. The setting for the intensive educational program was African American churches in two intervention counties and two control counties in the Mississippi River Delta region of Arkansas. Breast self-examination and mammography significantly increased in the intervention counties ($P < 0.005$)

In the Los Angeles mammography Promotion in Churches Program (LAMP, a church-based telephone mammography counseling intervention was implemented with the assistance of African American, Latino, and white peer counselors [36,43,51]. Thirty churches were randomized to telephone counseling and control conditions. Telephone interviews were conducted to assess intervention effects on mammography adherence. Over a one year follow-up period, the telephone peer counseling intervention reduced the nonadherence rate from 23% to 16% and maintained mammography adherence among participants who were adherent at baseline [51].

A faith-based breast and cervical cancer screening intervention for African American women living in urban communities was conducted as part of the Centers for Disease Control and Prevention (CDC) Racial and Ethnic Approaches to Community Health (REACH) program [48]. A formative evaluation of the program was conducted involving focus groups of women in each of the nine participating churches. Key findings included the acceptability of receiving cancer education within the context of a faith community, the importance of pastoral input, the effectiveness of personal testimonies and lay health advocates, the saliency of biblical scripture in reinforcing health messages, and the effectiveness of multimodal learning aids [48].

These are just a few of the many church-based intervention studies that have been conducted on breast cancer screening among African American women. Additional studies have been conducted in urban Nashville and west Tennessee [38,39,45], in Birmingham, Alabama [43,48], in rural Alabama [45], in Philadelphia [36], in Chicago [47], and in rural Ohio [50]. The intervention approaches examined in these studies extend across many of the intervention approaches highlighted in Guide to Community Preventive Services systematic reviews including small media, one-on-one education, small group education, client reminders, reducing structural barriers, and provider reminders [18]. None of the studies reviewed incorporated new intervention approaches such as text messaging or smartphone apps.

Key points for addressing breast cancer disparities among african american women

- African American women in the U.S. have a higher mortality rate from breast cancer than white women.
- Black-white differences in survival persist even after accounting for disease stage and tumor characteristics.
- Several factors may account for racial differences in breast cancer mortality including socioeconomic factors, access to screening mammography and timely treatment, and biological factors.
- Efforts to prevent deaths from breast cancer and to address breast cancer disparities have focused on early detection through routine mammography and timely referral for treatment.
- There is a need for culturally appropriate, tailored health messages for African American women to increase their knowledge and awareness of health behaviors for the early detection of breast cancer.
- Promising intervention approaches that warrant further study include: 1) the use of cell phone text messaging and

smartphone apps to increase breast cancer screening; 2) the use of radio stations that target African American audiences ("black radio") for health promotion activities; and 3) church-based behavioral interventions to promote breast cancer screening among African American women.

- Studies are also needed that draw comparisons between different subgroups of African American women (for example, those with higher versus lower income or higher versus lower health literacy).
- New studies should take into account recent developments such as expansions in insurance coverage and regulatory changes occurring as a result of The Patient Protection and Affordable Care Act of 2010.

Summary and Conclusion

Several factors likely account for racial differences in breast cancer mortality including socioeconomic factors, access to screening mammography and timely treatment, and biological factors [13]. In the absence of a universal preventive agent or cure for the disease, early detection of breast cancer through routine mammography is key to preventing deaths from the disease and addressing disparities among African American women and other minorities. This review has identified several novel approaches to promoting routine mammography among African American women that warrant further study including text messaging, smartphone apps, peer-to-peer email and social media communications [52]. There is currently a need for rigorous studies of the effectiveness of text messaging and smartphone apps in promoting healthy behaviors in diverse populations. Additional studies of the effectiveness of mass media interventions such as radio programming that targets African American audiences are also needed [26]. Black radio is viewed as a trusted source of information on a variety of topics by African Americans [3]. Additional church-based intervention studies are needed that incorporate new technologies such as text messaging for reminding women to get screened and evidence-based smartphone apps about how women can reduce their risk of dying from breast cancer. Gospel radio programming is also likely to be helpful for reinforcing messages delivered in church settings through small group education. Studies are also needed that draw comparisons between different subgroups of African American women (for example, those with higher versus lower income or higher versus lower health literacy). Finally, new studies should take into account recent developments such as expansions in insurance coverage and regulatory changes occurring as a result of The Patient Protection and Affordable Care Act of 2010 [53]. Whereas the effectiveness of some intervention approaches for promoting routine mammography in diverse populations is well-established [18], carefully designed studies of the effectiveness of smartphone apps, cell phone text messaging, and radio programming have the potential to add importantly to the literature on effective interventions for addressing breast cancer disparities among African American women.

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