



UPSTREAM DETERMINANTS OF HEALTH AND BREAST CANCER SCREENING AMONG NIGERIAN WOMEN

Nduka, Uzoma C.

Walden University, Minneapolis, Minnesota, USA.

ABSTRACT

Macro level variables could help determine health outcomes for Nigerian women. Screening for breast cancer is first step to early detection. The core aim of this paper is to provoke discussion about the significance of breast screening among Nigerian women and the development of breast cancer health improvement strategies by focusing on education, income and unemployment, neighborhood conditions, and transportation. Outcome of this article could influence policy-makers and healthcare providers in establishing ways to improve contemporary health situations. It could also lead to increased awareness of the fundamental circumstances affecting population's health.

Key Words: Breast cancer, Nigerian women

INTRODUCTION

Inequities in breast cancer screening could be propelled by macro level health determinants. Micro level health determinants like age, race, ethnicity, smoking, diet, and physical exercise have been linked with cancer stage (Mandelblatt et al., 1991; WHO, 2010). Socioeconomic and cultural indices have hindered breast cancer prevention and control among African-American women (Gerend & Pai, 2008). In 2012, the global estimated number of people diagnosed with breast cancer was 676, 633 with 25.5 per 100, 000 mortality rate in Sub-Saharan Africa (Mvila et al., 2013). Along the black-white divide, African-American women are, 40% more likely to die of breast cancer disease than any other group of women (CDC, 2012). However, white women had the highest rate of getting breast cancer, followed by black, Hispanic, Asian/Pacific Islander, and American Indian/Alaska Native women (CDC, 2014a). As the most female malignancy in Nigeria (Anyanwu, Egwuonwu, & Ihekwoba, 2011), death through breast cancer among Nigerian women usually presents as late stage breast cancer (Obajimi et al., 2013). Prevalence of breast cancer in Nigeria is 116 cases per 100,000 women annually (Abazie & Abimbola, 2014), and age standardized incidence of 36.3-50.2 per 100,000 in 2008 (Ajayi, Onibokun, & Soyannwo, 2013).

As the second leading cause of cancer deaths among African-American women, studies have shown that this population continues to suffer excessively from this disease (Akhigbe & Omuemu, 2009; Jones & Chilton, 2002). In 2010, 73.2% Black/African American women aged 50-74 had mammography as compared to 72.8% Whites, 69.4% American Indian/Alaska Native, 64.15 Asian women (CDC, 2014b). Azubuike & Okwuokei (2013) noted that by 2020 about 70% of new cancer cases will be recorded in developing nations like Nigeria. Due to the copying of western lifestyle in Nigeria, the peak age of breast cancer is about ten years earlier than in western countries (Azubuike & Okwuokei, 2013). Okobia, Bunker, Okonofua, & Osime (2006) suggested that Nigerian women who have acquired education above high school as well as those who are gainfully employed in skilled jobs like nursing and teaching had greater knowledge of breast cancer than those who do not have high school education and do not have professional jobs. Inadequate knowledge about symptoms of breast cancer and the various types of screening methods available have equally been reported by many studies (Akhigbe & Omuemu, 2009). Odusanya & Tayo, (2001) suggested that approximately 32% of women in Nigeria had knowledge that a lump in the breast signifies cancer, 58.5% were not aware of numerous warning signs of breast cancer,

Corresponding Author:

Nduka, Uzoma C., Walden University, Minneapolis, Minnesota, USA.

Email: uzzu.nduka@gmail.com

Received: 02.01.2015 **Revised:** 16.01.2015 **Accepted:** 30.01.2015

9.8% had knowledge of the methods of detecting breast cancer, and roughly 50% were unaware that breast cancer was curable even after detection. Early detection through mammography and other screenings could lead to diminished breast cancer mortality among women (Patel et al., 2014).

Conceptual Framework

The Health Belief Model (HBM) is a good fit for preventive health behavior like breast cancer screening (Rahman, Dignan, & Shelton, 2005). Developed in the early 50s, the HBM hinges on two frameworks. First, HBM emphasizes the individual's value on a given outcome or goal, otherwise known as value expectancy. Secondly, the HBM illustrates the individual's estimate that an action will result into an outcome. This is also described as the decision-making (Janz & Becker, 1984). The HBM explains why people do or do not take part in a health-based or health-related action (Janz & Becker, 1984). HBM has been used by many researchers to deal with preventive health actions, perceptions of such actions, and modification of variables (Fulton et al., 1991). Fulton, Rakowski, & Jones (1995) used HBM to identify and associate determinants of breast cancer screening such as screening cost, cues to screening, perceived susceptibility to breast cancer, socio-demographic indicators, and utilization of healthcare.

Perceived susceptibility to breast cancer and threats/benefits of breast cancer screening could help the individual ascertain if transportation, education, income, neighborhood conditions pose any barrier to the prevention and control of breast cancer. For women (the individual) in Nigeria to engage or participate in breast cancer screening (the health-based behavior) for health reasons (the expected or perceived outcome), they must believe that participating in breast cancer screening will benefit their health. They must also believe that they will be capable of modifying some of the perceived barriers (education, income, neighborhood conditions, employment) to the health efficacy outcome (Rosenstock, Strecher, & Becker, 1988). Upstream determinants of health could constitute perceived barriers to breast cancer screening among Nigerian women. Inability to obtain health information from healthcare providers or lack of health literacy, income and employment status, transportation, and neighborhood conditions could all be visible barriers for women not to seek breast cancer care and screening in Nigeria.

Education

Education could be viewed in terms of health literacy. Health literacy implies the capacity to collate and collect, process and explain, digest and comprehend the basic health material, facts and figures, and services necessary to making informed health decisions (Oldach &

Katz, 2014). Health education could be seen as the relationship between patient literacy levels and compliance with prescribed therapeutic regimens (Nutbeam, 2000). Austin, McNally, & Stewart (2002) suggested that limited proficiency in language could determine the use or otherwise of preventive health care by women. Obajimi et al., (2013) submitted that education was strongly associated with mammography awareness. Most Nigerian women residing in the village speak only their mother-tongue and can communicate easily that way. In most cases, medical information are not translated into these multiple languages that exist in Nigeria, rarely are the medical information translated into the 3 major languages in Nigeria i.e. Igbo, Hausa, and Yoruba. This makes it herculean for women to seek breast cancer screening. Davis, Williams, Marin, & Parker (2002) recommended that poor health literacy could be associated with difficulty in comprehending both oral and written health instructions and education among cancer patients. This situation is worsened by the fact that 60% of the 40 million illiterates in Nigeria are women according to the 2006 census figures (Oyitso & Olomukoro, 2012). Two thirds of the 68, 293, 63 million women in Nigeria are illiterates. This illiteracy figures among women declines region-by-region.

Knowledge of breast cancer self-examination constitutes another big problem for women in Nigeria. Makanjuola, Amoo, Ajibade, & Makinde (2013) suggested that almost 60% of women in their studies were not aware of breast cancer self-examination. Knowledge of breast cancer risk variables is poor among female healthcare professionals, excluding physicians (Ibrahim & Odusanya, 2009). Most often, healthcare workers fail to educate clients about breast cancer screening (Obajimi et al., 2013). Akhigbe & Omoemu (2009) reported that Nigerian women have very poor knowledge of symptoms and signs of breast cancer and screening methods. Uche (1999) discoursed that 33% of literate women knew that a breast lump was a warning sign of breast cancer and only 50% recognized that cancer could be cured when detected at a very early stage. Osime, Okojie, Aigbekaen, & Aigbekaen (2008) proposed that out of the 400 female civil servants enlisted in their study, 35% or 135 have heard of mammography and 7% or 27 go for annual breast cancer screening. In addition, 37.5% of the study participants were aware that family history of breast cancer is a risk factor, 59.7% knew that breast cancer could metastasize, and 6% would ignore a lump in the breast. Park et al., (2011) submitted that higher education was significantly associated with higher rate of breast cancer screening among women. Flores et al., (2013) reported that living in areas of higher numbers of high school experience was correlated with higher percentage of early stage breast cancer diagnosis and lower range of advanced-stage breast cancer.

Income and unemployment

Lantz, Beversdorf, & Remington (1995) recommended that when compared with the general population, women who have low incomes have reduced rates of breast cancer screening. Garbers et al., (2003) reported that apart from fear, inadequate information, pain, logistical barriers, and descuido, cost has been a weighing barrier to most Mexican and Dominican women who have never had mammogram. In a low-income country like Nigeria where breast cancer disease is often diagnosed at a very late stage, limited resources remains a barrier (WHO, 2014). Approximately 70% of Nigerians live below a dollar a day (Anyanwu, Egwuonwu, & Ihekwoaba, 2011). Being in a survival mood has been seen as an economic impediment to breast cancer screening among low-income populations (Kingsley, 2010). Due to financial incapacitation, breast cancer screening is not often embarked upon by most women in Nigeria (Okobia et al., 2006). Cunningham et al., (2013) suggested that lower socioeconomic condition and financial barriers contributes to advanced stage and poor prognosis of breast cancer disease. While various studies have identified household income as a key determinant in breast cancer screening, Park et al., (2011) concluded that household income was not significantly associated with mammogram. Chor et al., (2014) identified that women who had a monthly income of HK\$30000 or above had a higher detection rate of early stage cancer than those having a monthly household income of less than HK\$10000. Calle, Flanders, Thun, & Martin (1993) proffered that women below the poverty rate stand the greatest risk of underutilization of mammography.

When people lose their jobs, they lose their employer-provided healthcare insurance and may not be able to make hospital visits or attend an already scheduled physician appointment (Catalano & Satariano, 1998). Female unemployment rate in Nigeria, in 2012, was 55.42% (Akande, 2014). Being unemployed is associated with psychological and non-specified physiological illness, and thus may have an impact on early breast cancer detection (Catalano, Satariano, & Ciemins, 2003). Tsunematsu, Kawasaki, Masuoka, & Kakehashi (2013) suggested that there was low rate of breast cancer screening among women with non-regular employment. Litaker & Tomolo (2007) advocated that communities or populations with high per capita income and employment rates could support access to medical services.

Neighborhood Conditions

Mostly, physical and built aspects of the social milieu impacts cancer outcomes (Hiatt & Breen, 2008). Cho et al., (2011) posited that individuals living in neighborhood with low socioeconomic indicators are prone to late stage diagnosis of breast cancer disease. Keegan et al., (2014) suggested that those women who live in areas where

there is no fast-food restaurant, high traffic density were less likely to meet physical activity as recommended by the American Cancer Society. Neighborhood socioeconomic deprivation was related to increased and extended time to resolution (TTR) following an abnormal breast cancer screening (Plascak et al., 2014). Zenk, Tarlov, & Sun (2006), proposed that places with less economic endowments are associated with decreased chances of participating in breast cancer screening and increased risk of late-stage breast cancer diagnosis. Akinyemiju (2012) suggested that women who live in the cities and are classified as middle socioeconomic status households are less likely to receive mammography than women belonging to middle socioeconomic status households in rural areas. Gerend & Pai (2008) recognized that women living in disadvantaged and economically deprived areas, such as the Riverine areas of the Niger-Delta region in Nigeria, could be made to travel long distances and may have to endure long waiting times in order to be seen for breast cancer screening.

Transportation

Kim, Chukwudozie, & Calhoun (2013) suggested that there could be a relationship between distance to screening for breast cancer disease and access to care, especially for women who reside in low-income areas with little or no means of transportation. Lack of transportation constitutes a barrier to breast cancer screening (Alexandraki & Mooradian, 2010; Khaliq, Visvanathan, Landis, & Wright, 2013; Todd & Stuijbergen, 2011). Populations living about 15 minutes away from the facility for screening had no missed mammograms prior to diagnosis but those who missed their appointments lived almost twice as far from the nearest facility (Onitilo et al., 2014). Distance to mammography clinics or sites affects women living in disadvantaged locations because it is associated with breast cancer screening uptake Chukwudozie, & Calhoun, 2013; Onitilo et al., 2014). Travel time could be associated with breast cancer screening. Onega et al., (2011) reported that travel time was related to primary therapy but not related to stage, the size of tumor, or nodal involvement. In tandem with the above study, Celaya et al., (2010) suggested that there was no indication that travel distance to mammography was significantly impacted by stage at cancer diagnosis. Transportation could have a big impact in whether a women goes for breast cancer screening or not. Coughlin & King (2010) noted that women living in regions where less than 2% of the population had no access to a car were probably more likely to have had a Pap test in the past 3 years than women in areas where greater than or equal to 3% of the residents had no access to a car. In their study, Patel et al., (2014) reported that about 60% of participants in Nashville, 56% in Chattanooga, and 83% in Memphis stated transportation issues as a major hindrance to getting a mammogram. Jerome-D'Emilia, & Chittams (2014) iden-

tified lack of transportation as a cultural element barring women from early breast cancer screening in a sample of Hispanic and white women in Southern California.

Discussion and Implications for Social Change

Increasing breast cancer awareness, screening services, and education among Nigerian women living in both the urban and rural areas is paramount. Organizing special events and parties, educational workshops, mass marketing, and the use of social media such as Facebook, LinkedIn, YouTube, and FaceTime can increase the number of people who regularly receive cancer screenings (Escoffery et al., 2014). Giving out monthly, quarterly, or annual transportation vouchers or even making free mass transportation available for women could be another good method of encouraging Nigerian women to participate in breast cancer screening (Pruthi et al., 2010). Policies could be made to target women with low-level or no education. Targeted health education could be helpful in increasing breast cancer screening awareness among rural dwellers as well as urban dwellers in Nigeria. This article could also ginger stronger government involvement through increasing health expenditure, building of small-scale specialized local or rural health facilities for breast cancer screening, and educating and training locals to manage, facilitate, and administer breast cancer screening to rural women. Knowledge of the methods and types of breast cancer screening among urban and rural Nigerian women could lead to increased social support via social media and word-of-mouth or conversational relationship. Unnecessary testing and improper treatment of breast cancer could be prevented as well.

CONCLUSION

In conclusion, various studies have shown that breast cancer screening rates in developing countries are generally very low. Understanding the various upstream determinants of health, such as income and employment status, education, neighborhood conditions, and transportation, could help minimize the growing number of breast cancer patients in the developing worlds. Challenges like fighting infectious diseases, dwindling infrastructure, and socioeconomic barriers could deter developing nations from dealing with some or all of these upstream health determinants to breast cancer screening. However, increasing healthcare budgets to target breast cancer screening could be an effective way of curtailing some of these hurdles.

ACKNOWLEDGEMENT

Authors wish to acknowledge the numerous authors whose works were referenced in this article. Further-

more, Authors would also like to extend their gratitude to International Journal of Current Research and Review (IJCRR) reviewers and editors who deemed this manuscript fit for scientific publication.

REFERENCE

- Abazie, H.O., & Abimbola, O. (2014). Perceived health beliefs of breast cancer and knowledge of its early detection measures among rural women in Umuduru Mbano, Imo State. *Journal of Public Health and Epidemiology*, 6(4), 148-157.
- Ajayi, I.O., Onibokun, A.C., & Soyannwo, O.A. (2013). Breast and cervical cancers awareness and screening practices among rural women in Ona-ara Local Government Area, Ibadan, Nigeria. *African Journal of Biomedical Research*, 16(2013), 95-99.
- Akande, T. (2014). Youth unemployment in Nigeria: a situational analysis. Retrieved January 13, 2015 from World Wide Web: <https://worldaffairscharlotte.wordpress.com/2014/10/09/youth-unemployment-in-nigeria-a-situational-analysis/>
- Akhigbe, A.O., & Omuemu, V.O. (2009). Knowledge, attitudes and practice of breast cancer screening among female health workers in a Nigerian urban city. *BMC Cancer*, 9:203. Doi: 10.1186/1471-2407-9-203.
- Akinyemiju, T.F. (2012). Socio-economic and health access determinants of breast and cervical cancer screening in low-income countries: analysis of the World Health survey. *PLO-SONe*, 7(11), 1-8.
- Alexandraki, I., & Mooradian, A.D. (2010). Barriers related to mammography use for breast cancer screening among minority women. *Journal of the National Medical Association*, 102(3), 206-218.
- Anyanwu, S.N., Egwuonwu, O.A., & Ihekwoaba, E.C. (2011). Acceptance and adherence to treatment among breast cancer patients in Eastern Nigeria. *The Breast*, 20(2011), S51-S53.
- Austin, L.T., McNally, M., & Stewart, D.E. (2002). Breast and cervical cancer screening in Hispanic women: a literature review using the Health Belief Model. *Women's Health Issues*, 12(3), 122-128.
- Azubuike, S.O., & Okwuokei, S.O. (2013). Knowledge, attitude and practices of women towards breast cancer in Benin City, Nigeria. *Annals of Medical & Health Sciences Research*, 3(2), 155-160.
- Calle, E.E., Flanders, D., Thun, M.J., & Martin, L.M. (1993). Demographic predictors of mammography and pap smear screening in US women. *American Journal of Public Health*, 83(1), 53-60.
- Catalano, R.A., Satariano, W.A., & Ciemins, E.L. (2003). Unemployment and the detection of early stage breast tumors among African Americans and non-Hispanic whites. *Annals of Epidemiology*, 13(1), 8-15.
- Catalano, R.A., & Satariano, W.A. (1998). Unemployment and the likelihood of detecting early-stage breast cancer. *American Journal of Public Health*, 88(4), 586-589.
- Celaya, M.O., Berke, E.M., Onega, T.L., Gui, J., Riddle, B.L., Cherala, S.S., 7 Rees, J.R. Breast cancer stage at diagnosis and geographic access to mammography screening (New Hampshire, 1998-2004). *Rural and Remote Health*, 10(2):1361.

- CDC. (2014a). Breast cancer rates by race and ethnicity. Retrieved January 13, 2015 from World Wide Web: <http://www.cdc.gov/cancer/breast/statistics/race.htm>.
- CDC. (2014b). Breast cancer screening rates. Retrieved January 13, 2015 from World Wide Web: <http://www.cdc.gov/cancer/breast/statistics/screening.htm>.
- CDC. (2012). Breast cancer. Retrieved January 13, 2015 from World Wide Web: <http://www.cdc.gov/vitalsigns/breast-cancer/>.
- Cho, Y.I., Johnson, T.P., Barret, R.E., Campbell, R.T., Dolecek, T.A., & Warnecke, R.B. (2011). Neighborhood changes in concentrated immigration and late stage breast cancer diagnosis. *Journal of Immigrant and Minority Health*, 13(1), 9-14.
- Chor, J.S., Lam, H.C., Chan, A., Lee, H.M., Fok, E... & Cheung, P. (2014). Socioeconomic disparity in breast cancer detection in Hong Kong – a high income city: retrospective epidemiological study using the breast cancer registry. *PLoS One*, 9(10), 1-7.
- Coughlin, S.S., & King, J. (2010). Breast and cervical cancer screening among women in metropolitan areas of the United States by county-level commuting time to work and use of public transportation, 2004 and 2006. *BMC Public Health*, 10:146.
- Cunningham, J.E., Walters, C.A., Hill, E.G., Ford, M.E., Barker-Elamin, T., & Bennett, C.L. (2013). Mind the gap: racial differences in breast cancer incidence and biologic phenotype, but not stage, among low-income women participating in a government-funded screening program. *Breast Cancer Research and Treatment*, 137 (2), 589-598.
- Davis, T.C., Williams, M.V., Marin, E., Parker, R.M., Glass, J. (2002). Health literacy and cancer communication. *Cancer Journal for Clinicians*, 52: 134-149.
- Escoffery, C., Rodgers, K.C., Kegler, M.C., Ayala, M., Pinsker, E., & Haardörfer, R. (2014). A grey literature review of special events for promoting cancer screenings. *BMC Cancer*, 14: 454.
- Flores, Y.N., Davidson, P.L., Nakazono, T.T., Carreon, D.C., Mojica, C.M., & Bastani, R. (2013). Neighborhood socioeconomic disadvantage and race/ethnicity as predictors of breast cancer stage at diagnosis. *BMC Public Health*, 13:1061.
- Fulton, J.P., Rakowski, W., & Jones, A.C. (1995). Determinants of breast cancer screening among inner-city Hispanic women in comparison with other inner-city women. *Public Health Report*, 110(4), 476-482.
- Fulton, J.P., Buechner, J.S., Scott, H.D., DeBuono, B.A., Feldman, J.P... & Kovenock, D. (1991). A study guided by the Health Belief Model of the predictors of breast cancer screening of women ages 40 and older. *Public Health Reports*, 106(4), 411-420.
- Garbers, S., Jessop, D.J., Foti, H., UribeArrea, M., & Chiasson, M.A. (2003). Barriers to breast cancer screening for low-income Mexican and Dominican women in New York City. *Journal of Urban Health*, 80(1):81-91.
- Gerend, M.A., & Pai, M. (2008). Social determinants of Black-White disparities in breast cancer mortality: a review. *Cancer Epidemiology Biomarkers Preview*, 17(11), 2913-2923.
- Ibrahim, N.A., & Odusanya, O.O. (2009). Knowledge of risk factors, beliefs and practices of female healthcare professionals towards breast cancer in a tertiary institution in Lagos, Nigeria. *BMC Cancer*, 9:76.
- Janz, N.K., & Becker, M.H. (1984). The Health Belief Model: a decade later. *Health Education Quarterly*, 11(1), 1-47.
- Jerome-D'Emilia, B., & Chittams, J. (2014). Validation of a cultural cancer screening scale for mammogram utilization in a sample of African American women. *Cancer Nursing*, 2014 May 14. Date of Electronic Publication: 2014 May 14. Retrieved January 13, 2015 from World Wide Web: <http://www.ncbi.nlm.nih.gov/pubmed/24831044>.
- Jones, L.A., & Chilton, J.A. (2002). Impact of breast cancer on African-American women: priority areas research in the next decade. *American Journal of Public Health*, 92(4), 539-542.
- Keegan, T.H., Shariff-Marco, S., Sangaramoorthy, M., Koo, J., Hertz, A... & Gomez, S.L. (2014). Neighborhood influences on recreational physical activity and survival after breast cancer. *Cancer Causes and Control*, 25(10):1295-308. Doi: 10.1007/s10552-014-0431-1.
- Khaliq, W., Visvanathan, K., Landis, R., & Wright, S.M. (2013). Breast cancer screening preferences among hospitalized women. *Journal of Women's Health*, 22(7), 637-642.
- Kim, S., Chukwudozie, B., & Calhoun, E. (2013). Sociodemographic characteristics, distance to the clinic, and breast cancer screening results. *Journal of Health Disparities Research and Practice*, 6(1): 70.
- Kingsley, C. (2010). Cultural and socioeconomic factors affecting cancer screening, early detection and care in Latino population. Retrieved January 13, 2015 from World Wide Web: <https://ethnomed.org/clinical/cancer/cultural-and-socioeconomic-factors-affecting-cancer-screening-early-detection-and-care-in-the-latino-population>.
- Lantz, P.M., Beversdorf, S., & Remington, P.L. (1995). Breast and cervical cancer screening in a low-income managed care sample: the efficacy of physician letters and phone calls. *American Journal of Public Health*, 85(6), 834-836.
- Litaker, D., & Tomolo, A. (2007). Association of contextual factors and breast cancer screening: finding new targets to promote early detection. *Journal of Women's Health*, 16(1), 36-45.
- Mandelblatt, J., Andrews, H., Kerner, J., Zauber, A., & Burnett, W. (1991). Determinants of late stage diagnosis of breast and cervical cancer: the impact of age, race, social class, and hospital type. *American Journal of Public Health*, 81(5), 646-649.
- Makanjuola, O.J., Amoo, P.O., Ajibade, B.L., & Makinde, O.Y. (2013). Breast cancer: knowledge and practice of breast self examination among women in rural community of Ondo State, Nigeria. *IOSR Journal of Pharmacy and Biological Sciences*, 8(1), 32-37.
- Mvila, G.L., Postema, S., Marchal, G., Limbergen, E.V., Verdonck, F... & Ongeval, C.V. (2013). From the set-up of a screening program of breast cancer patients to the identification of the first BRCA mutation in the DR Congo. *BMC Public Health*, 14: 759. Doi: 10.1186/1471-2458-14-759.
- Nutbeam, D. (2000). Health literacy as a public health goal: a challenge for contemporary health education and communication strategies into the 21st century. *Health Promotion International*, 15(3), 259-267.
- Obajimi, M.O., Ajayi, I.O., Oluwasola, A.O., Adedokun, B.O., Sofoluwe, A.T... & Olopade, O.I. (2013). Level of awareness of mammography among women attending outpatient clinics in a teaching hospital in Ibadan, South-West Nigeria.

- BMC **Public Health**, **13**:40. Doi: 10.1186/1471-2458-13-40.
- Odusanya, O.O., & Tayo, O.O. (2001). Breast cancer knowledge, attitudes and practice among nurses in Lagos, Nigeria. *Acta Oncologica*, *40*(7), 844–848.
- Okobia, M.N., Bunker, C.H., Okonofua, F.E., & Osime, U. (2006). Knowledge, attitude and practice of Nigerian women towards breast cancer: A cross-sectional study. *World Journal of Surgical Oncology*, *4*:11. Retrieved January 13, 2015 from World Wide Web: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1397833/>
- Oldach, B.R., & Katz, M.L. (2014). Health literacy and cancer screening: a systematic review. *Patient Education and Counseling*, *94*(2014), 149-157.
- Onega, T., Cook, A., Kirilin, B., Shi, X., Alford-Teaster, J... & Buist, D.S. (2011). The influence of travel time on breast cancer characteristics, receipt of primary therapy, and surveillance mammography. *Breast Cancer Research and Treatment*, *129*(1):269-75. Doi: 10.1007/s10549-011-1549-4.
- Onitilo, A.A., Liang, H., Stankowski, R.V., Engel, J.M., Broton, M... & Miskowiak, D.A. (2014). Geographical and seasonal barriers to mammography services and breast cancer stage at diagnosis. *Remote and Rural Health*, *14*(3):2738. Epub 2014 Jul 14.
- Osime, O.C., Okojie, O., Aigbekaen, E.T., & Aigbekaen, I.J. (2008). Knowledge attitude and practice about breast cancer among civil servants in Benin City, Nigeria. *Annals of African Medicine*, *7*(4), 192-197.
- Oyitso, M., & Olomukoro, C.O. (2012). Enhancing women's development through literacy education in Nigeria. *Review of European Studies*, *4*(4), 66-76.
- Park, M.J., Park, E., Choi, K.S., Jun, J.K., & Lee, H. (2011). Sociodemographic gradients in breast and cervical cancer screening in Korea: the Korean National Cancer Screening Survey (KNCSS) 2005-2009. *BMC Cancer*, *11*:257.
- Patel, K., Kanu, M., Liu, J., Bond, B., Brown, E... & Hargreaves, M. (2014). Factors influencing breast cancer screening in low-income African Americans in Tennessee. *Journal of Community Health*, *39*(5), 943–950. Doi: 10.1007/s10900-014-9834-x.
- Plascak, J.J., Llanos, A.A., Pennell, M.L., Weier, R.C., & Paskett, E.D. (2014). Neighborhood factors associated with time to resolution following an abnormal breast or cervical cancer screening test. *Cancer Epidemiology, Biomarkers & Prevention*, *23*(12):2819-28. Doi: 10.1158/1055-9965.EPI-14-0348.
- Pruthi, S., Shmidt, E., Sherman, M.M., Neal, L., & Wahner-Roedler, D. (2010). Promoting a breast cancer screening clinic for underserved women: a community collaboration. *Ethnicity & Disease*, *20*(4), 463-466.
- Rahman, S.M., Dignan, M.B., & Shelton, B.J. (2005). A theory-based model for predicting adherence to guidelines for screening mammography among women aged 40 and older. *International Journal of Cancer Prevention*, *2*(3), 169-179.
- Rosenstock, I.M., Strecher, V.J. & Becker, M.H. (1988). Social Learning Theory and the Health Belief Model. *Health Education Quarterly*, *15*(2), 175-183.
- Todd, A., & Stuijbergen, A. (2011). Barriers and facilitators to breast cancer screening: a qualitative study of women with multiple sclerosis. *International Journal of MS Care*, *13*(2), 49-56.
- Tsunematsu, M., Kawasaki, H., Masuoka, Y., & Kakehashi, M. (2013). Factors affecting breast cancer screening behavior in Japan- assessment using the Health Belief Model and conjoint analysis. *Asian Pacific Journal of Cancer Prevention*, *14* (10), 6041-6048.
- Uche, E.E. (1999). Cancer awareness among a Nigerian population. *Tropical Doctor*, *29*(1), 39-40.
- WHO. (2014). Breast cancer: prevention and control. Retrieved January 13, 2015 from World Wide Web: <http://www.who.int/cancer/detection/breastcancer/en/index3.html>.
- WHO. (2010). A conceptual framework for action on the social determinants of health. Retrieved January 13, 2015 from World Wide Web: http://www.who.int/sdhconference/resources/ConceptualframeworkforactiononSDH_eng.pdf.
- Zenk, S.N., Tarlov, E., & Sun, J. (2006). Spatial equity in facilities providing low- or no-fee screening mammography in Chicago neighborhoods. *Journal of Urban Health: Bulletin of the New York Academy of Medicine*. Doi: 10.1007/s11524-005-9023-4. Retrieved from http://faculty.tamuc.edu/jsun/shannon_jm.pdf.