Introduction to Breast Carcinogenesis Symptoms, Risks Factors, Treatment and Management

Ebosetale Blessing Ikhuoria, Christian Bach

Abstract—This paper aims to review current research and advancement in prevention and management of breast cancer. Occurrence of breast cancer has increased globally in the last decade. It has been recorded that 15% of cancer-specific breast cancer. It is a comprehensive literature review on Breast cancer and its dependent variables created a theoretical foundation of the paper. Using the review-centric theory, a model was developed and presented to encapsulate the knowledge of the benefits associated with exercise on breast cancer outcomes through adiposity and immunological mechanisms. The model highlights breast cancer and its relationship with immunological biomarkers, obesity-related biomarkers, exercise or physical activity, biomarkers for adiposity. However, more research is needed to understand the use of low doses of radiation inadequate screening, sometimes a screening test may not be able to show with certainty that there is no cancer, or occasionally may miss breast cancer. Over treatment, some breast cancers that are found by mammography would never become a health problem in the woman’s lifetime. False negatives, other test results miss breast cancer. This shows how signs and symptoms of breast cancer, causes and risks factors associated with breast cancer, treatment of breast cancer and the management of breast cancer malignancy can help in the decreased of mortality rate in woman and men who has and are likely to test malignancy to breast cancer disease.

Index terms— Breast Cancer; Signs and symptoms; Breast Pain; Surgery; Treatment; Therapy; Endocrine Therapy; Nipple Retraction; Lump; Chemotherapy; HER2 Negative; Genetic Mutation; Malignancy; Body mass; Medication usage

I. INTRODUCTION

There is a growing literature on breast cancer overview characterized by the uncontrolled growth of abnormal cells [1]-[10]. Breast cancer is an individual tragedy for those affected. It is a highly curable disease when detected early, and an inevitably mortal disease when discovered too late [11]. Breast cancer is described by recalcitrant growth of malignant cell. In the epithelial tissue of breast male and female could be affected by these diseases. Breast cancer has been accounted as the most common cancer in women in the world, which ascent vividly with age. 29% of new cancer cases is breast cancer and 14% of all cancer death related in the world among women in 2012. This analysis shows that 1.7 million new cancer cases in women and about 522,000 deaths in 2012 [15]. As dangerous as its might appear, the mortality to occurrence incidence proportion more benign than pancreas and liver cancer, with proportions of 0.98 and 0.95, respectively termination of manner. Better remedial alternations and significant improvement in general wellbeing, public health and care have resulted in impressive reduction in mortality and a major increment in lifespan longevity. Breast cancer uncommon in men, constituting 1% of all breast cancer analyze and diagnoses in the united states and below 0.1% of cancer related death in men. The type of breast cancer is important in determining the most effective treatment approach[12]. Hormone Receptor-positive breast cancer is the most common type of breast cancer, which account for about 75% of all breast cancer. This cancer category grows in reaction to the hormones estrogen and progesterone and as much considered to respond to therapies that intend and restrain the development of these hormones[17]. HER2-positive breast cancer is another type of breast cancer classified by the system, it is epitomized by cells that produce high amount of protein known as HER2/neu. It exhibits 20–30% of Hormone Receptive-positive breast cancer. HER2-Negative are depicted cancer that do not over enunciate HER2/neu [18]. It represents 20–30% of Hormone Receptor-Positive breast cancers [19]. Tumors that do not overexpress HER2/neu are described as HER2-negative [20]. Breast cancer is a disease that has various symptoms but is mostly detected at a later stage. Outlining and understanding the molecular and biochemical mechanism that underlies the role of some risk factor both genetics and environmental factor in breast cancer aid screening, treatment planning and prevention of the diseases thus in a way decrease the high mortality and modalities associated with the disease. There is a lack of research pertaining Triple negative breast cancer (TNBC), is a subtle form of breast cancer, which is known as a sub type of HER2-negative cancer. TNBC indicate malignant cells, where estrogen and progesterone receptors are deficient or destitute, these cells also do not over expressed the HER2 proteins TNBC account for about 15% of breast cancer, and it is belligerent and more rigid to treat, as it counter and never respond to standard treatment. Due to the aggressiveness of this type of breast cancer, it is more essential to treat patient early. However, with few effective treatments feasible there is high-negative therapeutic need.

II. RESEARCH METHODOLOGY

Review Centric Research

A comprehensive literature review on Breast cancer and its dependent variables created a theoretical foundation of the paper. Using the review-centric theory, a model was developed and presented to encapsulate the knowledge of the benefits associated with exercise on breast cancer

DOI: http://dx.doi.org/10.24018/ejers.2018.3.7.745

Published on July 31, 2018
E. B. Ikhuoria and C. Bach are with University of Bridgeport, USA. (e-mail: eikhuori@my.bridgeport.edu)
outcomes through adiposity and immunological mechanisms.

This review paper shows how signs and symptoms of breast cancer, causes ad risks factors associated with breast cancer, treatment of breast cancer and the management of breast cancer malignancy can help in the decreased of mortality rate in woman and men who has and are likely to test malignancy to breast cancer disease. This review paper shows how signs and symptoms of breast cancer, causes ad risks factors associated with breast cancer, treatment of breast cancer and the management of breast cancer malignancy can help in the decreased of mortality rate in woman and men who has and are likely to test malignancy to breast cancer disease.

III. BREAST CANCER

The research has been regarding breast cancer around the world. Breast cancer research has been done in various stages, because of the way that malignancy has distinctive stages from early recognition to substantial development of the tumor. These growths develop in the breast tissue and it is seen in women mostly and it has high death rate but breast cancer malignancy is seen in men and women [13]. Different difficulties happen amid and after cancer because various medical teams work together to stifle/destroy the tumor for the body [86]. Breast cancer malignancy causes most death in underdeveloped countries around the world in female and it changes human way of life and method of living due to the screening involved [83]. Cancer cell recreate wildly by prompting in-situ carcinoma, which makes it to attack the typical tissue. Pathologist classified cancer into subtypes based on glandular or ductal units [82]. Uneasiness in human conduct that is mental and physical misery state of mind as a result of the threat related mortality [95]. As explained before that breast cancer malignancy are described into 3 sorts: HR positive, human epidermal development factor receptor 2 positive (HER-2), and triple-negative cancer diseases these sorts depend on the immunohistochemical properties of the body and tumor [93]. Breast tumor is dangerous however because of its mindfulness and research, researcher have possessed the capacity to turn out with treatment to help deal with the ailment in this way decreasing death rate and furthermore help in destroying the sickness after early detection.

IV. SIGNS AND SYMPTOMS

The research about signs or symptoms of breast cancer has been helped to reduce mortality rate of the disease, female and male who are susceptible to this disease can self-evaluate themselves before going to the doctor but nevertheless doctors have to perform various test to approve malignancy or benign of breast cancer. Common symptoms of breast cancer are change in look or feel of the breast, nipple and nipple discharge, doing examination of breast regularly help detect these symptoms immediately to prevent growth of disease, redness or scariness of the nipple or breast skin, or a discharge are also symptoms [21]. Previous surgery has effect on breast cancer as these women might experience late symptoms and this is caused by surgeries around the chest wall and shoulder [22]. Palpable lump, mass, thickening tissue, irregularity that feels distinctly different from surrounding tissue, should be identify as signs and symptoms during lifespan [23]. Various machines are used to detect breast cancer in women, diagnostic mammography is commonly used for women who have showed common signs [24]. A change in a wart or mole is a warning sign and symptoms, identify by thickening or lump on body, unexplained weight loss and a change in bowel or bladder habits [25]. Data suggest that sexual dysfunction and hormonal symptom are prevalent in male cancer breast survivor (Ruddy et al., 2013). According to all the researchers and authors all signs and symptoms have been seen and demonstrated in cancer patient and these symptoms has help to reduce the mortality rate of women across the world.

A. Breast lump

Breast lump was the most common symptom, recorded in about four-fifths of all women (83%). The next most commonly reported presenting symptoms were nipple abnormalities (7%), breast pain (6%), and breast skin abnormalities (2%) [26]. The classic symptom for breast cancer is a lump found in the breast or armpit [27].

B. Nipple retraction

Breast self-examination (BSE) is a significant way to be to be familiar with the size of the breast, skin condition of the breast, cyclical changes and breast texture [28]. Alerting features of breast cancer generally known are such as pain in nipple, persistent breast tenderness, discomfort or unusual breast pain, bloody or clear nipple discharge, scaly or pitted skin on nipple, lump mass or swelling of the breast, swelling in the armpit lymph nodes, inverted retracted nipple, scaly or pitted skin on nipple [14]. Metastatic advanced stage diseases, bone pain, bone metastases, shortness of breath, neurological pain or weakness are symptoms present in underarm lymph nodes disease [29].

C. Change in breast shape

The size or shape of the nipple might be affected by natural changes or any changes in the body weight [30]. However, a situation whereby the nipple retract goes in and doesn’t return to its normal shape can be as a result of breast cancer [31]. With the aid of mammogram or ultrasound, problem with the milk ducts situated below the nipple surface and areola may be diagnosed [32]. Changes in the breast size and shape after puberty may be a symptom of the
swelling of the milk ducts or lobes deep within the breast and can be due to regular monthly hormonal cycles, fibrocystic breast cancer or a warning sign of a more serious disease [33], [34].

D. Breast Pain

If you are having breast pain, note whether or not it is changing with your monthly period, and if it is present in one or the two breasts. Even though it feels normal, it can be uncomfortable and it might not be worrisome [35]. However, in a situation where the pain occurs in one breast, armpit or off-cycle, it is advisable to get checked. Also, keeping a good menstrual cycle record might help to understand changes in the hormone in the breast and will be useful for doctors in diagnosing what is wrong in the body [12].

Fig. 2. Signs and symptoms of breast cancer

V. RISK FACTORS

The findings have been carried out about risk factors and its part in breast cancer disease. In spite of the fact that the exact reasons for breast cancer are vague, we know the principle chance elements. All things considered, most women considered at high risk for breast disease don't get it, while numerous with no known risk factors do develop breast cancer malignancy. Among the most significant factors are propelling age and a family history of breast cancer. 10% of all malignancies among ladies worldwide is breast cancer which makes it the most widely recognized sickness however risk factors are to help or show if anytime in ones life there will be odds of having breast cancer [84]. Risk factors which includes constant irritation, corpulence and metabolic brokenness, rest shortage [94]. Pubescence stage may be considered a risk factor also because of the fact that the time at which the main mensuration and labor can make one helpless to the ailment [87]. As early detection can help the multidisciplinary group to destroy the disease however look into has demonstrated that liquor utilization can cause repeat of breast cancer particularly in postmenopausal ladies [92]. Risk factor of breast cancer, contingent upon the quantity of cases, on periods of the bosom malignancy, and on the cases' level of relatives, contrasted with ladies whose family relatives never had first degree growth [42]. Other risk factor elements can likewise be considered, utilization of oral contraceptives and utilization of menopausal hormone treatment [81]. Hazard factors as clarified by the creators are for the most part factors put inconsideration when one is tried harm to bosom growth.

A. Genetic mutation

BRCA1/2, the DNA repair associated BRCA1 gene product is a nuclear phosphoprotein that participates in the DNA damage response, cell cycle [36]. The lifetime risks of breast cancer are as high as 80%, among women carrying BRCA1 mutations, with a higher frequency of cancer risk at younger ages. Male carriers of BRCA pathogenic variants have an increased risk of prostate cancer, and those with BRCA2 pathogenic variants also have a significantly increased lifetime risk of developing breast cancer of about 6% [37]. Family history is a well-known risk factor of BC, depending on the number of cases, on ages of the BC, and on the cases’ degree of relatives. Compared to women without any first degree relatives with BC [38]. There are a number of identified high-risk breast cancer susceptibility genes, including BRCA1, BRCA2, PALB2, TP53, CDH1, and PTEN [39].

B. Body mass

Environmental factors can also initiate the occurrence and progression of breast cancer [40]. High body mass index (BMI) could also increase risk of post-menopausal breast cancer and a negative outcome in those with breast cancer history. Breast density is predictive factor of breast cancer risk. A review concluded that women with breast that contains 60-75% dense tissue are 4-6 greater risk of developing breast cancer when compared to those without dense tissue. However, women that have high BMI have a low breast density, even when increase in BMI corresponds with increase in breast cancer risk. BMI becomes a stronger predictive factor of breast cancer risk if the density of the breast is controlled in analyses [41].

C. Diet/Nutritional state

There is increasing evidence that dairy protein and milk intake increases circulating IGF-I level, which is linked to breast cancer. Dairy intake mainly milk could negatively affect breast cancer risk factors like: height, number of menstrual cycles and birth weight of the mother and her children through IGF-I [42]. The mechanism proposed for the effect of dietary fat on BC involves increased estrogen production in adipose tissue which causes inflammation and modifications in some physiologic processes leading to higher risk of BC [43]. Among vitamin D containing foods, occasional consumption of eggs was associated with lower risk when compared with twice to once per month but higher when compared with daily to once per week. Occasional consumption of mushrooms was found to be significantly associated with higher risk of BC compared to daily consumption. Alcohol consumption increases the risk of breast cancer up to age 70 by 7% [44].

D. Drug/Medication usage

Pharmacotherapy antiestrogens are the use of antiestrogens (tamoxifen, raloxifen) reduces the risk. Due to side effects, the use should be restricted to high-risk women with a strong family history of cancer or mutations in breast cancer-susceptibility genes. Radiation exposure dose of 4Gy delivered to the breast was associated with a 3.2-fold
increase in the risk [44]. Women in either their primary childhood residential road or cross street nearest to their primary childhood residence was divide by a barrier had a moderate increment in breast cancer risk. Combined analysis suggested a high exposure to traffic-related pollutant and that is associated to the overall increment in breast cancer, post-menopausal breast cancer, and invasive ER-brest cancer risk [40].

therapeutic target, and the mTOR inhibitors have been tested in many clinical trials. In the phase II TAMRAD trial, the addition of everolimus to tamoxifen markedly prolonged PFS and OS in patients with AI-resistant metastatic breast cancer [46]. Its been demonstrated that the expression of estrogen responsive genes (PGR, GREB1, TFF1 and PDZK1) was higher at times in the menstrual cycle when the estrogen levels would be expected to be high and low when estrogen levels would be at their nadir. If the expression of responsive genes is affected by circulating hormone levels then measurements of sex hormones may ultimately provide a marker for endocrine sensitivity, and hence disease outcome, after treatment with endocrine agents [47].

**B. Hsp90 Inhibitors**

Pharmacological inhibition of Hsp90 shows great promise in the field of breast cancer treatment because Hsp90 inhibitors have the potential to suppress multiple oncogenic signaling pathways simultaneously, thus reducing the possibility of molecular feedback loops and mutations leading to tumor resistance [48]. HSP90 is a molecular chaperone involved in the structural maturation of various ‘client proteins’ including EGFR, AKT, PI3K, as well as components of the homologous and non-homologous DNA repair pathways (e.g. BRCA1, RAD51). Thus, HSP90 inhibition has the potential to inhibit multiple signaling cascades regulating growth, proliferation and survival. Two ongoing phase I clinical trials are evaluating HSP90 inhibitors for advanced TNBC in combination with olaparib or paclitaxel [49].

**C. Chemotherapy**

A major treatment approach to breast cancer is chemotherapy, which has significantly extended patient life expectancies [50]. Because of the different etiologies of the side effects of chemotherapy patients may encounter a certain degree of behavioral difficulties when managing their symptoms [51]. TNBC is characterized by higher relapse rates compared with ER-positive breast cancers, with a predilection to metastasize to brain and lungs along with loco regional recurrence and lower incidence of metastases to bone, liver and non-regional lymph nodes. In a meta-analysis study platinum-based chemotherapy in breast cancer patients with TNBC showed an improved short-term efficacy compared to the non-TNBC group during neoadjuvant chemotherapy, but is yet to be demonstrated in the advanced breast cancer setting [52]. The other problems included constipation, diarrhea, and stomach discomfort. Patients let nature take its course, used prescribed medicines, or increased dietary fiber to attempt to rectify their symptoms [53].

**D. Surgery**

The best approach to achieve local control in TNBC or any solid tumor is surgery. Studies were undertaken to assess the surgical methods that patients chose, either mastectomy or lumpectomy, and it was found that the triple negative status does not influence their choice [4]. Given the aggressive nature and high relapse rates associated with TNBC, it has been of concern whether conservative surgery is safe in this group of patients. A recent observational
review concurs that TNBC patients tend to present with higher-grade tumors and higher rates of nodal positive disease. However, when comparing across tumor size and grade, TNBCs exhibit lower lymph node involvement [52].

VII. MANAGEMENT

The research done involving management of breast cancer and its role in patient who test malignancy to breast cancer. Breast cancer management is carried out by a various team of breast specialists including surgeons, radiologists, pathologists, breast cares nurses and clinical/medical oncologists, breast cancer patients now receive individualized treatment plans that may include surgery to both the breast and axilla [54]. Breast cancer occurs both in women and in men, but breast cancer is men are relatively uncommon but its incidence has been rising. Traditionally, the Management of Breast cancer in men is based on extrapolation from clinical trials of breast cancer in women, due to the much more extensive data available in women with this disease [55]. Host differences that affect the Management of Breast cancer for young patients including being premenopausal at diagnosis, fertility, genetics, and social/emotional issues in particular should be considered early in the course of their care [56]. The Management of Breast cancer within ectopic breast tissue is similar to breast cancer identified within the true breast, and tumor, node, metastases.

A. Psychological Factor

Women with breast cancer suffered from emotional problems, especially for the anxiety issue, from diagnosis to 4 months after diagnosis. Anxiety was proposed as an important psychological factor during the time of diagnosis and active treatment period [57]. These distressing symptoms not only affect patients at diagnosis and during cancer treatment but also persist years beyond the end of treatment. Given the growing number of breast cancer survivors and the impact of receiving a cancer diagnosis and undergoing treatment on mood and quality of life, it is important to understand cancer-related mental health symptoms to inform treatment and prevention efforts [58]

B. Treatment Options

In the order to select the most suitable treatment for each patient, Clinical data such as Tumor location, Tumor size, Connection to the nipple, Connection to the skin and the thorax wall, Stage of regional nodes [80]. Instrumental data such as Presence of multiple Tumors focuses in the same quadrant or in different ones, distribution and location of micro-calculations and dimension of interested area needs to be known [16]. There are of course other factors that might influence treatment selection in older women including psycho-social issues, differences in pharmacokinetics including drug absorption, hepatic metabolism, renal function, differences in pharmacodynamics including drug elimination, differences in normal tissue toxicity including impaired bone marrow reserve, impaired mucosal protection, impaired cardiac function, impaired neurological function, performance status and last but by no means least patient preference [59].

C. Cell-Target Suicide

The transformation of s pro-drug to toxic metabolite via genetic engineering of tumor cells is a fascinating means of creating an artificial diversity between a normal and neoplastic [60]. Higher chance in destroying malignant cells can be achieved by transferring gene that is present normally in human instead of endogenous gene overexpression. A model for this approach used HSV-1 thymidine kinase gene. The gene is given in combination with ganciclovir which is a prodrug in a way different from mammalian thymidine kinase. The phosphorylated ganciclovir eventually fuses into DNA thus inhibiting the synthesis and transcription of DNA. The effectiveness and safety of this method has been tested in many clinical trials that involve multiple malignancies [61].

D. Gene therapy

It is generally accepted that cancer arises because of an accumulation of multiple molecular genetic defects that end up in a cellular phenotype categorized by disregulated growth. Different strategy of gene therapies has been developed as prospective new cancer therapies. The present proto-oncogene and tumor suppressor gene knowledge in malignancy genesis has triggered gene therapy development tactics aimed at ablating such gene [62]. Finally, immune system modulation can activate anticancer drug defense mechanisms.[63].
VIII. OTHER ASSOCIATED COMPONENTS

**TABLE I: ADDITIONAL FACTORS THAT CONTRIBUTE TO BREAST CANCER**

<table>
<thead>
<tr>
<th>Additional Factors</th>
<th>Contribution to Breast Cancer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signs and symptoms</td>
<td>“Radium bone scan, abdominal sonography or other image studies were performed if specific symptoms, signs or elevated serum alkaline phosphatase level were noted [64] p. 287.”</td>
</tr>
<tr>
<td>Associated factors in breast cancer</td>
<td>“The greater breast cancer-related symptoms are side-effects, symptoms relating to breast and arm, and hair loss, were associated with the changes in flatter diurnal cortisol slopes during 14-month follow up period [65] p. 96.”</td>
</tr>
<tr>
<td>Predictors of symptom distress in breast cancer patients</td>
<td>“Symptom distress may generate physical dysfunction and emotional disturbances, particularly typical symptoms such as upper- arm problems, sleep disturbance, fatigue, and body image disturbance, which develop gradually into long-term side effects. [66] p. 245.”</td>
</tr>
<tr>
<td>Risks factors</td>
<td>“Risk factors for MBC are generally the same as in women (e.g., advanced age, family history, chest wall irradiation, BRCA 1 and 2 gene mutations), but include gender-specific causes of hypogonadism, such as Klinefelters, and oestrogen treatment for prostate cancer [67] p. 1079.”</td>
</tr>
<tr>
<td>Male breast cancer risk factors</td>
<td>“Several forms of breast cancer are estrogen sensitive, with established hormone-related risk factors such as age at menarche and menopause, oral contraceptives, and hormone therapy use [34] p. 137.”</td>
</tr>
<tr>
<td>Screening for familial cancer risk</td>
<td>“Only the Gail modified and the Tyrer-Cuzick models include familial and individual risk factors such as, age at menarche, age at menopause, parity, age at first term pregnancy, BMI, history of LCIS, history of atypical hyperplasia [68] p. 70.”</td>
</tr>
</tbody>
</table>

**Treatment/Therapy**

1. Treatment transition                                  | “The transition from treatment to survivorship has been described as a conflicted experience where women try to balance feelings of gratitude or happiness for getting through treatment for breast cancer with the demands of persistent physical symptoms, uncertainty, anxiety, mood changes, and fears of recurrence [69] p. 178.” |
2. Breast cancer in pregnant women treatment              | “It is important to stress that any diagnostic exam is only justified if therapy can be given; WB-MRI for cancer staging is therefore justified in the second and third trimester, when anticancer chemotherapy can be safely given, while it would be a futile maneuver in the first three months, when the risks associated with chemotherapy are excessive and diagnosis would not lead to treatment [70] p. 180.” |
3. Breast cancer therapy                                  | “Beyond allowing patients who may not otherwise be candidates to have breast conserving surgery, neoadjuvant chemotherapy provides a platform for in vivo evaluation of a breast cancer’s response to therapy [71] p. 2.” |

**Management**

1. Breast cancer management                               | “Guidelines for behavioral risk factor management have been recently developed for healthcare providers delivering follow-up care to BCS and include maintaining a healthy weight, engaging in regular physical activity, adhering to a diet rich in fruits, vegetables and whole grains, reducing dietary fat consumption and limiting alcoholic intake [72] p. 1361.” |
2. Management in breast cancer                             | “Numerous studies have highlighted the value of hypnotic procedures in different clinical situations, such as stress or pain management, situations which are very frequent in cancer management [4] p. 115.” |
3. Surgical management of breast cancer                    | “Generally speaking, the surgical management of the axilla in early breast cancer patients has evolved from aggressive surgery towards less invasive surgery during the last two decades, and may even no surgery at all in some selected patients with a low risk of ALN metastasis in the future. [73] p. 11.” |

Fig. 6. A proposed framework that shows Breast cancer and its components

DOI: [http://dx.doi.org/10.24018/ejers.2018.3.7.745](http://dx.doi.org/10.24018/ejers.2018.3.7.745)
The most common risk factors among the registry participants were a strong family history of breast cancer and biopsy findings of a typia. Only one tenth of the population had BRCA1 or BRCA2 mutations. Quantifying risk is a difficult endeavor; however, studies have shown that a strong family history can quadruple a woman’s risk of breast cancer. A typia can increase a woman’s risk by 4- to 10-fold for AH and LCIS, respectively, and that BRCA1 or BRCA2 mutations can increase a woman’s risk of breast cancer 5- to 20-fold. The differences in risk factors between the 2 registries can be largely explained by the differences in enrollment practices between the 2 institutions. Knowledge and visibility of the registries to both medical and surgical oncology disciplines is crucial for representative sampling across risk factors. We found that while individual or women in either their primary childhood residential road or cross street nearest to their primary childhood residence was divide by a barrier had a moderate increment in breast cancer risk. Combined analysis suggested a high exposure to traffic-related pollutant and that is associated to the overall increment in breast cancer, post-menopausal breast cancer, and invasive ER- breast cancer risk [40].

Among these adjuvant therapy options for premenopausal patients with breast cancer, both endocrine therapy (tamoxifen whether combined or not with ovarian suppression using GnRH agonists) and chemotherapy can result in substantial bone loss from the suppression of oestrogen levels, premature menopause, or direct negative effects of chemotherapy on bone [18]-[20]. Amenorrhea can therefore result from ovarian function suppression or chemotherapy-induced ovarian failure. Chemotherapy-induced ovarian dysfunction accelerates the onset of menopause by an average of 10 years [21]. Between 25% and 100% of premenopausal women may experience early menopause or amenorrhea, especially in women over 40 years of age [22]. Chemotherapy induced ovarian failure results in substantial bone mineral density (BMD) loss of up to 6–8% at the lumbar spine after 1 year [23],[24]. Ovarian function suppression with luteinizing hormone-releasing hormone (LHRH) agonists such as goserelin leads to a mean 10.5% loss of BMD at the lumbar spine and 6.4% at the femoral neck [25]. Tamoxifen alone and in combination with a LHRH agonist are standards of care for women with oestrogen receptor-positive breast cancer. Although tamoxifen is a selective oestrogen receptor modulator with some bone protective activity in postmenopausal women, it has also been associated with bone loss in premenopausal patients. With an estimated 255,180 new cases of BC predicted for 2017 and a 5-year OS rate near 90%, treatment-related toxicity is of particular concern in the management of BC. Using a large population based database with long-term follow-up, this study found a significant excess risk of SMs in BC survivors compared to the general population. However, only a small proportion of these cancers were attributable to the use of post-operative RT. Overall, we found that for every 100 BC patients treated with RT who survive for 10 years, there will be an additional 1.1 SMs (excluding non-melanoma skin cancers). Approximately 3.4% of SMs (excluding non-melanoma skin cancers) were attributable to RT. This is lower than previously published studies estimating that 56% of SMs were attributable to RT. A prior SEER analysis of SMs in BC found organs estimated to receive _ 1 Gy during RT, including esophagus, pleura, lung, bone and soft tissues, had an increased relative risk of SMs. We found each of these high-risk organs to have an increased risk of SMs in patients treated with RT compared to those receiving surgery alone, with the exception of bone, joint and pleura malignancies. Despite 3,644,524 person-years of follow-up, the O and E number of bone, joint and pleura.

XII. CONCLUSION

The prognosis of breast cancer has improved due to the comprehensive breast cancer screening programmes and development of new therapies. However, women with advanced or late breast cancer have a low 5-year survival rate. Generally, only 35% of women with late or advanced breast cancer live for 5 years after diagnosis. One third of women with breast cancer are diagnosed at stage 4 when the cancer has poor diagnosis. Breast cancer treatment options vary based on the stage at which the disease is diagnosed. Women diagnosed with early stage breast cancer are mostly treated with radiotherapy or surgery while those with advanced breast cancer are frequently treated with chemotherapy, hormonal and targeted therapies.

A better understanding of mechanism behind how some factors could induce the development of breast cancer cell will aid in effectively devising strategies for the prevention and treatment of this cancer thus reducing its mortality and morbidity rate.

ACKNOWLEDGMENT

I would like to thank Professor Bach.


Ebobetaile blessing Ikhuoria was born in Lagos, Nigeria on December 1st 1990, she studied animal science in university of Ibadan in 2012 and then transferred to IRGIB-Africa University in 2015, republic of Benin. She acquire her Master degree in Biomedical engineering at University of Bridgeport in 2018. She has work in various higher institutions and laboratories across the globe. She volunteered at Yale University in 2018 for DNA sequencing, also worked at the University of Bridgeport, biomedical engineering as graduate assistant in 2017, she worked as a laboratory analyst at IRGIB-Africa University in 2013. She lectured at Novena University, where she share scientific knowledge with student.

Ms. Ikhuoria is a chapter officer for National Society for Black Engineer, she is also a member of IEEE and SWE. She is a public speaker, who aspire young ones to be in science and Engineering.

DOI: http://dx.doi.org/10.24018/ejers.2018.3.7.745

66