Free report on breast cancer the role of genetics

Science, Genetics

1. 0 Introduction

Breast cancer is a type of disease where certain breast cells develop abnormally mostly in the milk ducts and lobules leading to formation of tumors. The exact cause of breast cancer is a topic that has flavored many debates and researches but still remains unknown. However a plethora of research has established that certain risk factors have a direct linkage with breast cancer. Breast cancer related risk factors are wide and varied and may include lifestyle choices like smoking/ diet or factors that are beyond the control of a person like gender, age or family history. It is however worth noting from the start that the presence of a risk factor does not essentially mean one will contract breast cancer. The existence of breast cancer in certain families raises the question; do genetics play a role in breast cancer? Scientists have established that inherited breast cancer is mostly associated with two common abnormal genes BRCA1 and BRCA2 (Slowik, 2011). This paper will examine various aspects of breast cancer with a primary reason to establish whether genetics play a role in breast cancer. The report will first examine the background information on breast cancer including the etiology, the pathophysiology, the diagnosis and treatment. The paper will also evaluate and summarize two journals addressing the role of genetics in breast cancer as well as the way the media presents these subject to the public.

2. 0 Background Information on Breast Cancer

Breast cancer is a malignant swelling (tumor) that could affect one or more parts of the breast tissue. The most commonly affected parts are the lobules that generate milk and supply to the ducts and the lining within the milk

ducts. Suffice to say that breast cancer not only affects humans alone but other mammals as well and contrary to popular belief breast cancer also affects men but affects women in most cases. It is the most common invasive cancer affecting women in the world contributing to 16% of all cancers in women. It is more common in the USA, where it affects up to 120 out of 100, 000, than in any other country.

There is no known cause of breast cancer but several factors can predispose someone to breast cancer. The said risk factors include genetic predisposition, age, female gender, high hormone levels, bareness or lack of breastfeeding, iodine deficiency, economic status and race. Incidences of Breast cancer appear to be higher among people with higher incomes probably due to their lifestyle or over-diagnosis as result of access to better health services. Smocking of tobacco especially too much and at an earlier age is another risk factor. Other risk factors include obesity, diet with high fat diet, exposure to radiation, disruptors of the endocrine system, alcoholism, family history of breast cancer and shift work Mutations of certain genes seem to be a predisposing factor.

Cancers, including breast cancer, are as a result of interaction of environmental factors and defective genes (mutations). Certain genes are responsible for the regulation of cell division and when these genes are defective cells divide indefinitely resulting in cancer. Mutations in the genes coding for the proteins responsible for correcting DNA errors can also cause cancer. These mutations may occur at birth or be inherited. Mutations of the second class of genes often results in other mutations leading to unregulated growth, lack of attachment and spread of the cancerous. Another pathway

responsible for breast cancer as well as other cancers is the mutation of genes responsible for the programed cell death (apoptosis) resulting in cells failing to “ committing suicide” at the end of their functional life. As a result the cells accumulate since there is no clearance. Mutations that results in breast cancer have been associated with exposure to estrogen hence the higher incidence in females. The documented Mutations that increase the risk for breast cancer include: BRCA1, BRCA2, TP53, STK11, PTEN, CDH, CHEK2, ATM, PALB2, BARD1, BRI, FGFR2, RAD51 TP53, NF1 or NBN, PALB2, BRIP1, RAD50, 2q35, TGFB1, LSP1, TOX3, MAP3K1 and 8q. Some of the mutations also cause other rare syndromes so that the very presence of the syndromes could imply an increased risk in breast cancer. Suffice to say that the interactions of these mutations and the other risk factors have not been established. However it is definite that the genetic factors play a significant role in increasing the risk of breast cancer. It is important to note that only half of the familial breast cancer has been explained at the level of genetic predisposition.

Breast is characterized by a lump in the breast that is inconsistent with the rest of the tissue. Other symptoms of breast of breast cancer include lumps in the armpits, inversion of the nipple, pain, swelling of the nipple, itching, redness of the breast and increased sensitivity. Other non-specific symptoms may include fever, joint pains, jaundice, and discharge in the nipple and weight loss. The presence of a lump in the breast is usually the first diagnosis but there are several diagnostic tools which include mammography, MRI, ultrasound and biopsy. Biopsy is the most accurate and definitive diagnostic tool but it is invasive thus is only employed when the

results from the other techniques are not definitive enough.

The treatment of breast cancer depends on the stage, size, rate of proliferation and other tumor characteristic. Treatment is often multidisciplinary involving surgery, radiation, chemotherapy and immunotherapy. Surgery involves the extraction of cancerous cells and other cells and surrounding tissues and may be the removal of the entire breast (mastectomy), a quarter of it (quadrantectomy), or just the lump (lumpectomy) depending on the stage, size and rate of growth of the lump. The medication include hormone blocking drugs e. g. tamoxifen, anastrozole, letrozole and monoclonal antibodies e. g. trastuzumab. Radiotherapy may be in form of internal radiation (brachytherapy) or external therapy on the affected region often after surgery.

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