

**UNIVERSITY OF EDUCATION, WINNEBA**

**THE CONTRIBUTION OF HEALTHY EATING PRACTICES TOWARDS  
THE SURVIVAL OF BREAST CANCER PATIENT**



**GERTRUDE BOMO ASAMOAH**

**2020**

**UNIVERSITY OF EDUCATION, WINNEBA**

**CONTRIBUTION OF HEALTHY EATING PRACTICES TOWARDS THE  
SURVIVAL OF BREAST CANCER PATIENT**

**GERTRUDE BOMO ASAMOAH**

**(8130100006)**



**A thesis in the Department of Home Economics, Faculty of Science, submitted to  
the School of Graduate Studies in partial fulfilment  
of the requirements for the award of  
Master of Philosophy  
(Home Economics)**

**JANUARY, 2020**

## DECLARATION

### Student's Declaration

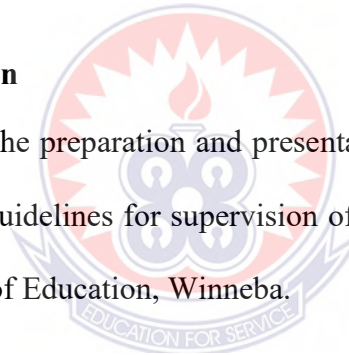
I, Gertrude Bomo Asamoah, declare that this thesis, with the exception of quotations and references contained in published works which have all been identified and duly acknowledged, is entirely my own original work, and that it has not been submitted, either in part or whole, for another degree elsewhere.

Signature:.....

Date:.....

### Supervisors' Declaration

We hereby declare that the preparation and presentation of this work was supervised in accordance with the guidelines for supervision of thesis/dissertation/project as laid down by the University of Education, Winneba.



..... (Principal Supervisor)

Signature:.....

Date: .....

..... (Co-Supervisor)

Signature:.....

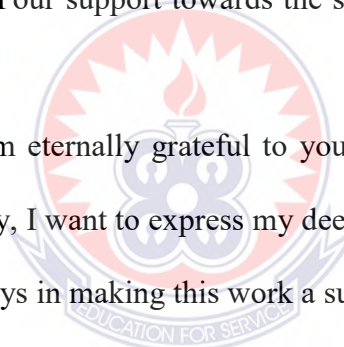
Date: .....

## ACKNOWLEDGEMENTS

I want to thank my supervisors, Prof. Matthew Caurie and Prof. Phyllis Foster for the wonderful guidance that helped me in producing this work. Thank you for always finding time to go through my work despite your extremely busy schedule. I truly appreciate your constant patience and encouragement that allowed me to become more and more passionate about my work. Without you, I would not have been able to produce this great piece of work. Thank you kindly for being the best supervisor.

I am also thankful to the Head of Department of the Radiotherapy Department, Department of Surgery and the National Centre for Radiotherapy and Nuclear Medicine at the Korle- Bu Teaching Hospital for the great assistance and readiness to participate in the study. Your support towards the success of this study is very much esteemed.

To my family, I say I am eternally grateful to you for your unconditional love and unalloyed support. Finally, I want to express my deepest sense of gratitude to all those who helped in diverse ways in making this work a success.



## **DEDICATION**

To my family



## TABLE OF CONTENTS

<b>Content</b>	<b>Page</b>
DECLARATION	ii
ACKNOWLEDGEMENTS	iii
DEDICATION	iv
TABLE OF CONTENTS	v
LIST OF TABLES	ix
LIST OF FIGURES	x
ABSTRACT	xi
<b>CHAPTER ONE: INTRODUCTION</b>	<b>1</b>
Overview	1
Background to the Study	1
Statement of the Problem	6
Purpose of the Study	7
Objectives of the Study	7
Significance of the Study	8
Limitations of the Study	8
Delimitation of the Study	9
Definition of Terms	9
Organisation of the Study	11
<b>CHAPTER TWO: LITERATURE REVIEW</b>	<b>12</b>
Overview	12
Concept of Cancer	12
Breast Anatomy	13
The Lymph (lymphatic) System of the Breast	15



Early Breast Cancer	18
Breast Cancer	18
Signs and Symptoms of Breast Cancer	18
Finding Breast Changes/ Diagnosis	19
Breast Self-Examination	19
Non-Cancerous Breast Changes	21
Breast Changes that Increase One's Risk of Cancer	22
Types of Breast Cancer	22
Invasive (Infiltrating) Ductal Carcinoma	22
Invasive (Infiltrating) Lobular Carcinoma	23
Inflammatory Breast Cancer	23
Recurrent Breast Cancer	23
Causes of Breast Cancer	23
Stages of Breast Cancer	24
Prevalence of Breast Cancer	25
Stage of Diagnosis in Ghana	26
Age at Diagnosis in Ghana	26
Risk Factors of Breast Cancer	27
Nutritional Knowledge and Breast Cancer	29
Eating Habits of Breast Cancer Patients	31
Factors Influencing Food Choices of Breast Cancer Patients	34
Contribution of Nutrition to Breast Cancer	38
Fat Content Food and Breast Cancer	44
Fibre Intake and Breast Cancer	45
Carbohydrates (Sugars and Starches) and Breast Cancer	46
Fruit and Breast Cancer	46
Phyto-oestrogens, Including Soya Products and Breast Cancer	47



Folate (or Its Synthetic Form, Folic Acid) and Breast Cancer	48
Guidelines on Nutrition and Cancer Prevention	49
Summary of Literature Review	51
Theoretical Framework	52
The Protection Motivation Theory	52
Conceptual Framework	54
<b>CHAPTER THREE: RESEARCH METHODS</b>	<b>56</b>
Overview	56
Research Design	56
Study Area	57
Research Instruments	58
Population	59
Sample and Sampling Procedure	59
Ethical Considerations	60
Pre -testing	60
Data Processing and Analysis	61
<b>CHAPTER FOUR: RESULTS</b>	<b>62</b>
Overview	62
Data Presentation	62
Exploratory Data Analysis	62
Knowledge of Breast Cancer Patients on Breast Cancer	66
Frequency of Intake of Pulse and Oily Seeds in a Week	76
Frequency of Exercise	77
Foods that Enhance the Survival of Breast Cancer Patients	82



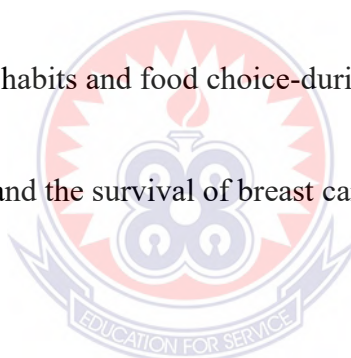


<b>CHAPTER FIVE: DISCUSSION</b>	<b>84</b>
Overview	84
Demographic Characteristics of the Respondents	84
General Nutritional Knowledge of the Respondents	85
Level of Knowledge of the Respondents on Breast Cancer	88
Respondents' Knowledge on the Relationship between Food and Health Problems or Diseases	89
Food Choices and Eating Habits of Breast Cancer Patients	89
Frequency of Exercise	95
Foods that Enhance the Survival of Breast Cancer Patients	98
<b>CHAPTER SIX: SUMMARY, CONCLUSIONS, RECOMMENDATIONS AND SUGGESTIONS FOR FURTHER RESEARCH</b>	<b>101</b>
Summary	101
Summary of the Research Process	101
Key Findings	102
Conclusion	103
Recommendations	105
Suggestion for Further Research	106
<b>REFERENCES</b>	<b>107</b>
<b>APPENDICES</b>	<b>118</b>



## LIST OF TABLES

<b>Table</b>	<b>Page</b>
1: Total Number of Breast Cancer Cases Reported at the Korle Bu Teaching Hospital (Department of surgery)	26
2: Stages of Breast Cancer Reported at the Korle Bu Teaching Hospital	26
3: Features that can Affect the Chance of Breast Cancer Coming Back or Spreading	28
4.1: Demographic Characteristic	63
4.2: Traditional medicine and breast cancer	69
4. 3: Respondents view on brown sugar	72
4.4: Overview on eating habits and food choice-before breast cancer disease treatment	75
4.5: Overview on eating habits and food choice-during breast cancer disease treatment	75
4. 6: Impact of nutrition and the survival of breast cancer	81

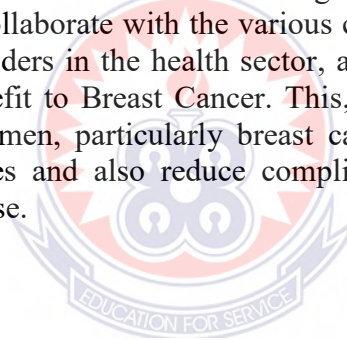


## LIST OF FIGURES

<b>Figure</b>	<b>Page</b>
1: Anatomy of the Breast	15
2: The Lymph (lymphatic) System of the Breast	17
3: Procedure for Breast Self-Examination	21
4: Theoretical Framework	53
5: Conceptual Framework	55
4. 1: relationship between patient's height and breast cancer onset	63
4.2: Weights of Patients	64
4.3: Patient's Occupation	64
4.4: Marital Status of Patients under study	65
4.5: Patients final education stage	65
4.6: Age of disease onset	66
4.7: Breast Cancer Patients with other health conditions	67
4. 8: Exposure of breast cancer	67
4. 9: Spiritual and breast cancer	68
4. 10: History of breast cancer traits in family	69
4. 11: Respondents knowledge on protein food	70
4. 12: Respondents' Knowledge on the Amount of Roughage in Foods	71
4. 13: Respondents' Knowledge on Unsaturated Foods	72
4. 14: Respondents' view on bread type with the most vitamins and minerals	73
4. 15: Relationship between Food and Health Problems or Disease	74
4. 16: Health as a factor influencing food choice	78
4. 17: Mood and food choice	78
4. 18: Convenience and food choice	79
4. 19: Sensory appeal to make a food choice	80
4. 20: Price factor in making a food choice	81

## ABSTRACT

The purpose of this study was to examine and expound the contribution of healthy eating practices towards the health status of breast cancer patients. The research design adopted for the study was the cross sectional survey and the purposive and convenience sampling methods were adopted to derive a sample size of ninety (90) breast cancer patients, who visit the National Centre for Radiotherapy and Nuclear Medicine at the Korle-Bu Teaching Hospital for treatment. A structured questionnaire and an interview guide was employed to gather the relevant data for the study. The SPSS Version 21 was used to analyse the data collected. Results of the study revealed that the level of knowledge of the breast cancer patients on both nutrition and breast cancer was low. Moreover, the results of the study revealed that certain factors especially the price of the food influenced food choice and so there was not very significant change in the participants eating habits. Additionally, the findings of the study revealed that foods such as cereals, fruits, low-fat foods, sugar-free fluids/drinks and herbal tea, less salty and spicy foods, vegetables and high fibre content foods helped in the management of breast cancer. Physical activity was also found to be associated with less fatigue, improved energy level, improved appetite for food, healthy weight and sound sleep among the breast cancer patients. Based on the findings of the study, it is recommended among other things that the Ministry of Health (MOH) should collaborate with the various cancer treatment centres in Ghana as well as other stakeholders in the health sector, and educate breast cancer patients on nutrition and its benefit to Breast Cancer. This, together with the knowledge on nutrition, will guide women, particularly breast cancer patients in making healthy food choices at all times and also reduce complications of other chronic disease associated with the disease.



## CHAPTER ONE

### INTRODUCTION

#### **Overview**

This chapter covers the background to the study, statement of the problem, purpose of the study, objectives of the study, research questions, significance of the study, limitations of the study, delimitation of the study, definition of terms and the organisation of the study.

#### **Background to the Study**

All living organisms require good nutrition to grow and sustain life. Observing good nutrition involves taking in the right quality and quantity of nutrients necessary for achieving normal growth and good health. Any major deviation in the amount of nutrient intake in quality or quantity can negatively affect one's growth and life span in a number of ways, especially during the later periods of his or her life. This is because malnutrition can greatly undermine the ability of the body cells and organ reserves to restore homeostasis. The benefit of practicing good nutrition to both an individual and the nation at large cannot be overemphasized. The nation benefits in the form of higher productivity as individuals who are well nourished and healthy become more productive at their various workplaces.

A healthy and prolonged life can be achieved and maintained by every individual and the main rudiment for obtaining a better quality of life is to uphold healthy eating habits and good nutrition, which provides the needed support for the growth of an individual. Before taking in any food, it is vital for one to examine the health implications of that food. Practicing healthy eating and good nutrition habits means eating various food that have the essential nutrients in their right quantities and proportions because the body cannot derive all the nutrients needed for growth and

maintenance in one single food. Essential food nutrients needed for effective growth comprise protein, carbohydrates, fat, water, vitamins and minerals.

Cancer has been tagged as a deadly and boundless disease and an equal opportunity disease that is not bias based on age, race, colour or believe (Tetteh, 2004). Breast cancer in particular, is one of the well known cancers that torments females worldwide (Youlden, Nathan, Dunn, Muller, Pyke, Baade, 2012). The World Health Organization [WHO] (2000), attest that, breast cancer constitutes 16% of all female cancers and it is prevalent among women than men. Also, The Centre for Disease Control (2010) maintains that, breast cancer is the another most deadly disease with women. Statistics from the American Cancer Society (2004) revealed that in United States of America alone, over 2,111,000 women were infected with Invasive Breast Cancer in the year 2003. Hyman, Kauraniemi, Hautaniemi, Wolf, Mousse, Rozenblum, Ringner, Sauter, Monni and Elkahoul (2002), poses that Breast cancer has been one of the principal major causes of death among Ghanaian women with 75% of all breast cancer cases occurring in post-menopause women and women who are 40 years and above. Overweight women are also at high risk of breast cancer (Hyman *et al.*, 2002).

Wiafe-Addai (2013) inputs that, the severity of breast cancer death has inspired researchers from three leading hospitals in Ghana that treat the majority of breast cancer cases in the country, thus Korle-Bu Teaching Hospital (KBTH), Komfo Anokye Teaching Hospital (KATH), and Peace and Love Hospital (PLH) to work in collaboration with other researchers from the National Cancer Institute in United States of America (USA) on a novel research study to explore the causes of breast cancer with Ghanaian women. Additionally, a comprehensive three-year research by local and international medical experts aimed at discovering what causes cancer of

the breast among Ghanaian women was conducted in Ghana in the year 2013 (Wiafe-Addai, 2013).

Nutrition is very cardinal in the development and maintenance of a state of health that is ideal for an individual and as stated by Wardlaw, 2000 it is the knowledge of food, the nutrients they possess, their action, interaction and balance in relation to health and disease and the process by which an organism consumes, absorbs, transports, uses and excretes food substance. A mal-nourished diet may have an injurious influence on one's health, thus causing deficiency diseases, health-threatening conditions and other common chronic systemic diseases.

According to Massie (2005), whereas death from infectious diseases has declined greatly, death from unhealthy life style is on the increase. Scientific literature on breast cancer has recently focused on preventive strategies and many of the recommendations put forward by the literature fall within the domain of nutrition (Massie, 2005). Common observations by the researcher reveal that healthy foods such as fruits and vegetables are consumed less, particularly among Ghanaians. Increasing urbanization has caused a shift from healthy diets towards unhealthy diets as most people are gradually moving away from cooking their own food to patronizing foods that are already processed and are often high in sugar, salt and fat.

The increasing number of deaths resulting from nutritional deficiencies has raised a lot of concerns on how to minimize nutritional risk factors and promote good health among people. For instance, in their 2013 Endometrial Cancer Report, the American Institute for Cancer Research revealed that they were, among others, going to focus more on creating awareness of the relationship diet and risk of cancer, and to also fund diet-related and cancer prevention studies. Karthaus and Frieler (2004) contend it

is common for people living with cancer to have nutritional issues because research has revealed that an estimated number approximately 50-80% of all cancer cases was as a result of poor nutrition.

Wiafe-Addai (2013) iterates that, most of the deaths that occur among breast cancer patients are caused by ignorance and misconceptions about the disease. Similarly, Ghartey (2003) adds that factors such as cultural beliefs, poverty and ignorance deter some women from seeking orthodox medicine to treat breast cancer. The debilitating effects of breast cancer on women worldwide are really worrying. In Ghana for instance, the principal malignancy is breast cancer and it is also one of the common hospital admission cases (Wiafe-Addai, 2013). Most women detected to have breast cancer tend to move from one religious' leader to another to seek treatment as they usually believe it is a spiritual disease. Likewise, Zelle, Nyarko, Bosu, Aikins, Niëns, Lauer and Baltussen (2012), most patients also wait till the disease gets to the advanced stage before reporting to the hospital. Zelle *et al.* (2012) impute this practice to the high level of ignorance about breast cancer in Ghana. Due to this, Zelle *et al.* (2012) recommend the intensification of breast cancer education so as to create more awareness of the disease among people.

Breast disease is often initially linked with anticipation of having breast cancer. This usually leaves the patient, the patient's family and friends very perturbed. It is, therefore, necessary that society attaches great importance to any system which can help to detect breast cancer early to help deal with breast-related diseases. In Ghana, most specialized breast cancer detection centres are situated in the urban areas such as Accra and Kumasi. The expense involved in hospital admission, surgery, laboratory and radiologic examinations together with the high cost of transportation to these centres for those living outside the urban centres are usually insurmountable for many



rural folks. This consequently scares them off from visiting these breast cancer detection centres. According to Boateng (2014), serious education on cancer must be extended to the rural areas, especially education on breast and cervical cancer.

It is expected that when individuals are educated on the important role that nutrition plays regarding the prevention and management of breast cancer, it will help to minimize the rate of deaths that occur among breast cancer patients, especially among rural folks. According to the American Cancer Society (2013), observing and practicing good nutrition is very important if the individual is managing a chronic disease such as cancer as both the illness and its treatments can alter the person's taste buds and food acceptance. Cancer and cancer treatments, for instance, affects the body's tolerance of certain foods and uses nutrients (American Cancer Society, 2013). The nutritional demands of people suffering from cancer differ from person to person. Moreover, it is quite difficult to take a balanced diet when one is receiving treatment for cancer, particularly if he or she has treatment side effects that last for a long time. In this case, the doctor or dietician may suggest a daily multivitamin and mineral supplement for the individual (American Cancer Society, 2013).

Nutrition therapy is to increase nutrients that are lacking to achieve nutritional wellbeing, and further avoid complications for breast cancer patients in vigorous treatment and recovery. The aims of nutrition therapy for patients suffering from advanced cancer are to limit secondary effects, reduce the threat of infection, preserve strength and vitality and promote quality of life. According to Ledesma (2013), good nutrition reduces the occurrence of breast cancer and the risk of breast cancer advancement or recurrence.

Studies suggest that healthy lifestyle choices such as eating food that contains a little quantity of sugar and processed foods, avoiding alcohol, keeping a healthy weight, exercising daily and avoiding smoking can reduce the likeliness of breast cancer. By choosing the healthiest lifestyle options possible, the individual is empowered and assured that the tendency of having breast cancer is as low as possible (American Cancer Society, 2010; Getz, Hofling, Mesirov, Tibshirani, Golub, Meyerson, & Lander, 2010; Brown, Byers, Doyle, Aziz, Eldridge, Hamilton, & Sawyer 2011). For instance, some studies suggest that the greater the intake of fibre, the lower the occurrence of breast cancer. Women who eat beans and lentils at least twice a week have a 24% lower risk of developing breast cancer as compared to women who eat them less than once a year. According to Ledesma (2013), high fibre intake decreases the development of breast cancer and more so women who eat beans and lentils not less than twice in a week have a 24% lower risk of developing breast cancer than women who eat them less than once a month. It is against this background that this study seeks to discover the impact of nutrition on the health status of breast cancer patients.

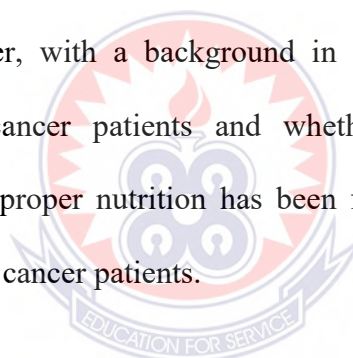
### **Statement of the Problem**

Studies piloted in Ghana revealed that breast cancer is the key cause of cancer deaths among Ghanaian women. According to Wiafe-Addai (2013), a total of 2,900 Ghanaians are diagnosed with breast cancer annually and half of these individuals die from the disease. It is despondent to know that in spite of Ghana's ability to successfully stop and locally treat breast cancer, about one-third of people detected with breast cancer lose their lives every year because of low awareness, "late-stage treatment" which result in death (Zelle *et al.*, 2012).

The prediction by World Health Organisation (WHO) is that by 2020 there would be a tremendous increase in the number of breast cancer cases and it is likely that out of eight women one stands the chance of developing breast cancer in her lifetime.

Countless studies suggest that proper nutrition is a vital component that can prevent one-third of all cancer cases (Getz *et al.*, 2010; Brown *et al.*, 2011; Karen, 2014). Whereas Clegg-Lamprey (2014) and Wiafe-Addai (2013), agrees that the increase in the disease burden is characterized by ignorance and misconceptions. However, the habit of eating healthily prior to cancer treatment and even afterwards can promote longevity.

The debilitating consequence of increasing death rate of breast cancer patient compelled the researcher, with a background in nutrition, to assess the level of knowledge of breast cancer patients and whether they adhere to appropriate nutritional standards as proper nutrition has been found to increase the health and prolong the life of breast cancer patients.



### **Purpose of the Study**

The purpose of this study was to examine and explain the contribution of healthy eating practices towards the survival of breast cancer patients who visit the National Centre for Radiotherapy and Nuclear Medicine at the Korle-Bu Teaching Hospital in the Greater Accra Region for treatment.

### **Objectives of the Study**

Specifically, the study sought to:

1. assess the nutritional knowledge of breast cancer patients.
2. examine the eating habits of breast cancer patients.
3. examine factors affecting food choices of breast cancer patients

4. ascertain the influence of nutrition towards the survival of breast cancer patients.

### **Research Questions**

The study was guided by the following research questions:

1. What knowledge do breast cancer patients have on nutrition?
2. What are the eating habits of breast cancer patients?
3. What factors influence the food choices of breast cancer patients?
4. What role does nutrition play to enhance the survival of breast cancer patients?

### **Significance of the Study**

The result of the study when published will be useful in creating awareness on the contribution of healthy eating practices to the survival of breast cancer. This will help educators and other stakeholders of breast cancer management to develop new strategies and modules to educate both breast cancer patients and the general public on how good nutrition practices can contribute to a better quality of life for all. This will go a long way to curb the increasing mortality rate of breast cancer in Ghana. Again, the findings of this study will serve as valuable source of information to students and other researchers who are also interested in breast cancer issues in Ghana.

### **Limitations of the Study**

The main challenge that the researcher encountered in the course of the study was the delay in collecting the necessary data for the study. Breast cancer patients who fell within our criteria only visited the hospital either yearly or quarterly and by appointment. Some of the patients who fell within our criteria couldn't honour their appointment due to reasons unknown to the researcher. Additionally, a significant

number of those who honoured their appointment were not willing to participate in the data collection due to reasons unknown to the researcher.

This delayed the data collection process a little.

### **Delimitation of the Study**

The study was conducted on female breast cancer patients who visited the National Centre for Radiotherapy and Nuclear Medicine in the Greater Accra Region. The use of breast cancer patients from only the National Centre for Radiotherapy and Nuclear Medicine for the study could pose a problem to the generalization of the study findings since it is not the only credible health centre for handling breast cancer cases. The findings of the study could, therefore, not be applied suitably to all breast cancer patients in Ghana.

### **Definition of Terms**

**Adenosis:** Breast adenosis is a nonthreatening disorder in which the lobules becomes bigger than the normal size.

**Areola:** The skin surrounding the nipple which is dark-coloured

**Benign:** This is not cancer. Benign tumours become grand but do not spread to other body parts.

**Biopsy:** This is taking sample of cells or tissues to be examined by a pathologist.

**Breast density:** Breast density refers to the significant amount of different tissues present in the breast.

**Breast implant:** This is a silicone gel-filled or saline-filled sac put underneath the chest muscle to bring back breast shape.

**Gland:** This is an organ that creates more than one substances such as producing milk, hormones, digestive juices, sweat, tears, or saliva.

**Hormone:** This is one of the many chemicals produced by glands in the body. Activities of certain cells or organs are controlled by hormones circulating in the blood stream. Some hormones can also be prepared in the laboratory.

**In Situ:** In its original place. For instance, in carcinoma in situ, abnormal cells are found only in the place where they first formed. They have not disseminated.

**Lobe:** A sector of an organ such as the breast, liver, lung, thyroid, or brain.

**Lymph:** Also called lymphatic fluid is the clear fluid that journeys through the lymphatic system and transports cells that help fight infections and other diseases.

**Nipple:** In medicine, nipple refers to the small raised area in the centre of the breast through which milk can flow to the outside.

**Nipple discharge:** This is fluid discharged by the nipple that is not breast milk.

**Non-invasive:** In cancer, the term non-invasive describes disease that is still within the tissue in which it began.

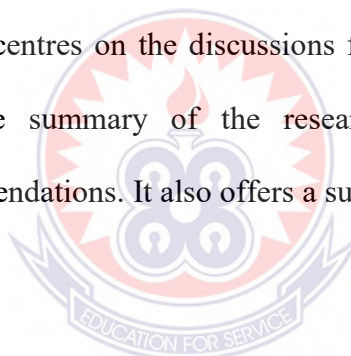
**Radiologist:** A doctor who specializes in creating and interpreting pictures of areas inside the body. The pictures are produced with x-rays, sound waves, or other types of energy

**Stage:** The degree of a cancer in the body. Staging is mostly based on the size of the tumour, whether lymph nodes contain cancer, and whether the cancer has spread from the original site to other areas of the body.

**Tumour:** This is an abnormal growth of tissue that occurs when cells divide more than they should or do not die when they should.

### **Organisation of the Study**

The first chapter gives the background to the study, problem statement, objectives of the study, research questions, significance of the study, delimitation and limitation of the study and definition of terms. The second chapter discusses the relevant literature relating to the study. The third chapter deals with the methodology used in obtaining data and information for the study. It comprises research design, study area, population, sample and sampling procedure, research instrument, data collection procedure, and data analysis procedure. Chapter four focuses on the results of the data collected. Chapter Five centres on the discussions from the data collected. Chapter Six emphasises on the summary of the research process, research findings, conclusions and recommendations. It also offers a suggestion for further research.



## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **Overview**

This chapter reviews important literature on breast cancer management among women. This review is deemed necessary as it will enable the reader to know the extent of work carried out by other researchers in the quest to minimize the increasing mortality rate resulting from breast cancer in Ghana. The literature review focuses on the following: concept of cancer, anatomy of the breast, breast cancer, prevalence of breast cancer, risk factors of breast cancer, treatment of breast cancer, prevention of breast cancer, and nutrition and breast cancer. Also, both the theoretical and conceptual framework of the study has also been presented in this chapter.

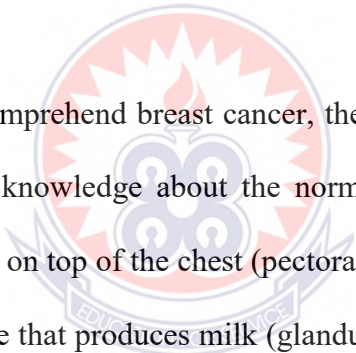
#### **Concept of Cancer**

The body is composed of lots of living cells and these body cells in an orderly way normally develop, divide into new cells, and eventually die. Normal cells throughout the early stages of an individual's life divide faster to allow the person to grow. Usually these cells divide only to substitute worn-out or dying cells or to restore damages during the adult stage (American Cancer Society, 2014). Cancer begins when cells in a given part of the body start to grow out of control. Cancer comes in many forms but they all begin when abnormal cells begin to grow in an uncontrolled manner (American Cancer Society, 2013). Cancer is the name for a group of diseases that develop, when the body's cells grow in an uncontrolled way and spread into the body's tissues (National Cancer Institute, 2015).



Cells become cancerous when the DNA in them are destroyed. Every cell has a DNA that directs all the actions of the cell. The cycle regularly is that damaged DNA in a normal cell is either repaired or dies. The case in cancerous cells is that the damaged DNA neither gets repaired nor dies. Instead, this cell keeps on making new cells which is not needed by the body. However, these new cells will all have the same damaged DNA just like the initial cell (American Cancer Society, 2013). People can inherit damaged DNA, It has been revealed that mistakes that occur while the normal cell is reproducing and other environmental factors such as cigarette smoking causes the damage of DNA. However, in most cases, no clear cause is found (American Cancer Society, 2013).

### **Breast Anatomy**



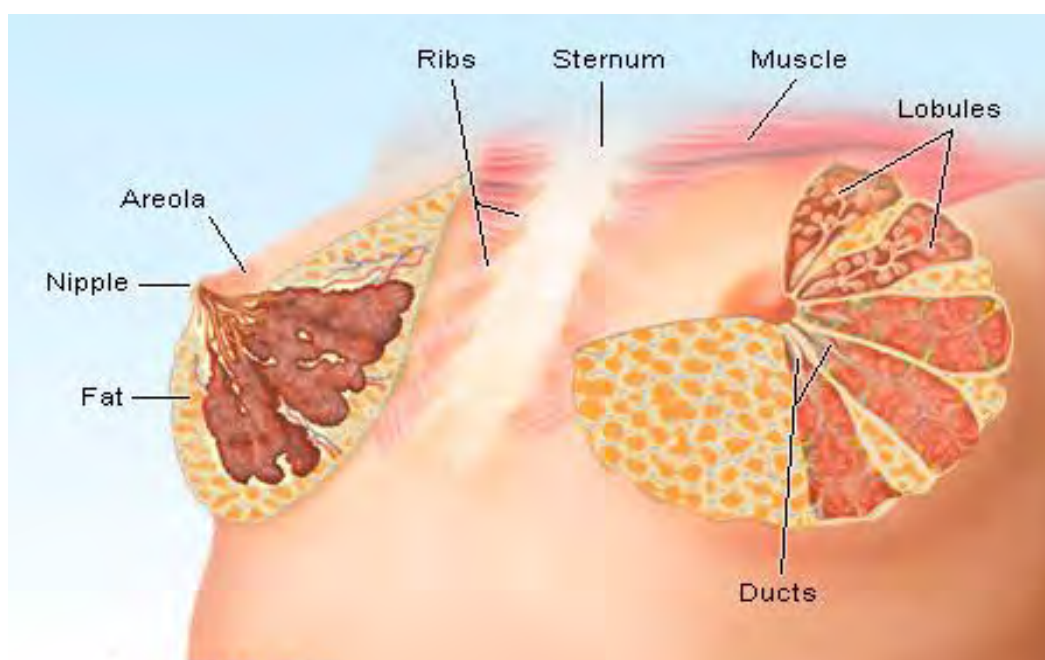
In order to effectively comprehend breast cancer, there is the need for one to have at least some fundamental knowledge about the normal structure of the breasts. The breast is the tissue placed on top of the chest (pectoral) muscles. Breasts of women are made of specialized tissue that produces milk (glandular tissue) as well as fatty tissue. The volume of fat determines the size of the breast (Howard & Gusterson, 2000). According to the American Cancer Society (2013), the female breast is composed of mainly of lobules (glands that produces milk), ducts (tiny tubes transporting milk from the lobules to the nipple), and stroma (fatty tissue and connective tissue that surrounds the ducts and lobules, blood vessels, and lymphatic vessels). There are also lymph nodes under the breastbone (internal mammary nodes) and in the neck (supraclavicular nodes).

Individually the breast has six (6) to nine (9) overlapping segments, called lobes and in each lobes are many minor lobules, which eventually end up in dozens of tiny bulbs

that can produce milk. The lobes, lobules and bulbs are all connected by thin tubes called ducts (American Cancer Society, 2013). These ducts lead to the nipple in the centre of a dark area of skin called the areola. Fat fills the spaces around the lobules and ducts. The breast has no muscles however underneath each breast are muscles which lie below them and cover the ribs (Johns Hopkins Medicine, 2014). The American Cancer Society (2013) adds that, the part of the breast which produces milk is structured into 15 to 20 sections, called lobes. There are smaller structures in the lobes which are known as lobules, where milk is produced. The milk then travels through a network of tiny tubes called ducts which unites into bigger ducts and finally leaves the skin in the nipple. The nipple is surrounded by a dark area of skin called the areola.

The shape of the breast is made possible by connective tissues and ligaments giving it support. Whereas sensitivity to the breast is by the work of nerves. Each breast also has blood vessels and vessels that transport colourless fluid called lymph. The lymph vessels lead to small bean-shaped structures called lymph nodes. Collections of lymph nodes are found in the axilla (under the arm), above the collarbone and in the chest. Lymph nodes are also found in many other parts of the body (National Cancer Institute, 2015). The anatomy of the breast is shown in Figure 1.

**Figure 1: Anatomy of the Breast**



**MedicineNet, (2010)**

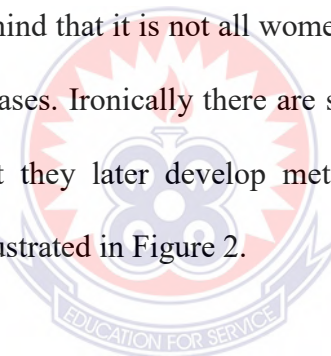
### **The Lymph (lymphatic) System of the Breast**

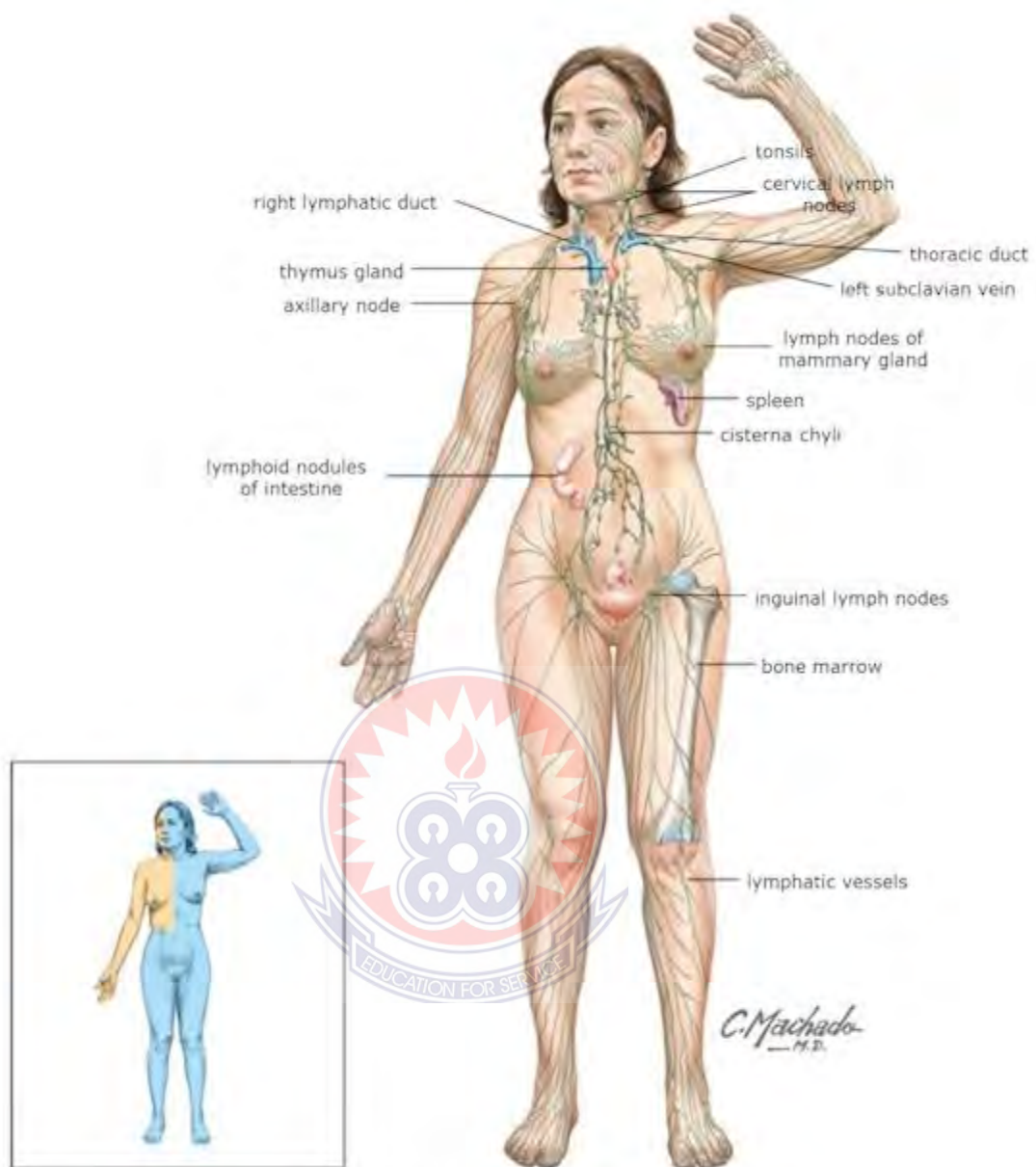
There is the need to understand the operations of the lymph system as it one of the ways through which breast cancer can spread. The Lymph System is a multifaceted network of tubes spread out throughout the body to drain fluid (called lymph) from nearby tissues and empties it back into the bloodstream. The lymph system has its traditional function to manage fluid levels and then filter out bacteria and as part of the Immune System it contains white blood cells. Filtration of lymph fluid is through the Spleen, Thymus and Lymph Nodes before it is emptied back into the blood (Homan, Kayani, & Yun, 2016).

Lymph nodes are small, bean-shaped collections of immune system cells (cells that are vital in fighting infections) that are linked by lymphatic vessels (American Cancer Society, 2015). Lymphatic vessels are like small veins, except that they carry a clear fluid called lymph instead of blood away from the breast. In a nutshell the Lymph has

tissue fluid, waste products as well as immune system cells. Breast cancer cells can enter lymphatic vessels and begin to grow in lymph nodes. According to the American Cancer Society (2015), most lymphatic vessels in the breast connect to lymph nodes under the arm (axillary nodes). Some lymphatic vessels connect to lymph nodes inside the chest (internal mammary nodes) and those either above or below the collarbone (supraclavicular or infraclavicular nodes).

Once the cancer cells have spread to lymph nodes, there is a higher chance that the cells could have also gotten into the bloodstream and spread (metastasized) to other sites in the body. It is likely to find cancer in other organs when there are a lot more lymph nodes carrying breast cancer and this often has a bearing on the treatment plan. It is important to bear in mind that it is not all women with cancer cells in their lymph nodes that develop metastases. Ironically there are some women with no cancer cells in their lymph nodes yet they later develop metastases. The Lymph (lymphatic) System of the Breast is illustrated in Figure 2.





The blue area indicates those portions of the body drained by the thoracic duct.  
The other areas of the body are drained by the right lymphatic duct.

**Figure 2: The Lymph (lymphatic) System of the Breast**

*Green Leaves Herbal Health (2012)*

### **Early Breast Cancer**

The term early breast cancer refers to that type of cancer confined in the breast which sometimes spread to lymph nodes in the breast or armpit or may not spread at all. It is possible for some cancers to spread outside the breast and armpit area and not be detected. Early breast cancer can grow in the ducts or lobules of the breast (American Cancer Society, 2015).

### **Breast Cancer**

When a malignant tumour matures from cells in the breast then we can refer to this situation as breast cancer. Breast cancer begins either in the cells of the lobules, which are the milk-producing glands, or the ducts, the passages that drain milk from the lobules to the nipple (American Cancer Society, 2015). A malignant tumour is a collection of cancer cells that can grow into (invade) nearby tissues or spread (metastasize) to distant areas of the body. Breast cancer begins in the breast tissue that is made up of glands for producing milk called lobules and the ducts connecting the lobules to the nipple. The rest of the breast is made up of fatty, connective, and lymphatic tissues (American Cancer Society, 2015).

### **Signs and Symptoms of Breast Cancer**

There are usually no symptoms of breast cancer and in most cases it is cured without any difficulty when the tumour is small. Due to this regular recommended breast screening is important for early detection of the disease when the disease is at its early stage. One common physical sign when the breast has grown to a size and can be felt is a painless lump (Zaney, 2015). Occasionally, breast cancer can spread to underarm lymph nodes and cause a lump or swelling even before the original breast tumour turns out to be sizeable enough to be felt. The minor common signs and symptoms of

breast cancer include breast pain or heaviness, persistent transformations of the breast such as swelling, thickening, or redness of the breast's skin as well as nipple abnormalities such as spontaneous discharge, which is mostly in the form of blood; erosion; inversion; and tenderness (American Cancer Society, 2015). It is imperative to bear in mind that the presence or absence of pain does not signify the existence or the non-existence of breast cancer. As a result of this, the American Cancer Society (2013) recommends that any persistent abnormality in the breast should be assessed by a physician as soon as possible.

### **Finding Breast Changes/ Diagnosis**

Breast cancer is typically detected during a screening examination. This can be done either before or as soon as symptoms have developed. Ideally, a woman should get screened for breast cancer as soon as she begins to feel a lump in her breast. Several diagnostic methods are employed with respect to the extent of spread and also the pattern of the disease. Some of these diagnostic methods include MRI, Mammogram, and Clinical breast examination (American Cancer Society, 2013). The commonest and inexpensive method of detecting or finding breast changes is Breast self-examination.

### **Breast Self-Examination**

Breast self-examination is undertaken to identify unusual changes in the breast as it is common for the breast to be swollen and tender right before or during the menstrual period. The breast must be examined about a week after menstrual period for effective breast self-examination. The United States (US) Breast Cancer Organisation (2015), has reiterated that it is possible to treat breast cancer successfully when detected in its early stages. The US Breast Cancer Organisation (2015) has outlined five (5) steps

for effective breast self-examination. Below are five (5) steps outlined by the US Breast Cancer Organisation for effective breast self-examination;

**Step 1:** observe the breasts with shoulders straight and arms on the hip. Some of the essential things to look out for at this stage include the size, shape and colour of the breast, whether or not the breasts are evenly shaped and that there are no distortions or swelling. These changes in the breast must be reported to the doctor when noticed: dimpling, puckering, swollen of the skin, a changed in the position of the nipple or an inverted nipple (i.e. a nipple that is pushed inward instead of sticking out), redness, soreness, rash, or swelling.

**Step 2:** Now, lift up your hand and look for the same changes.

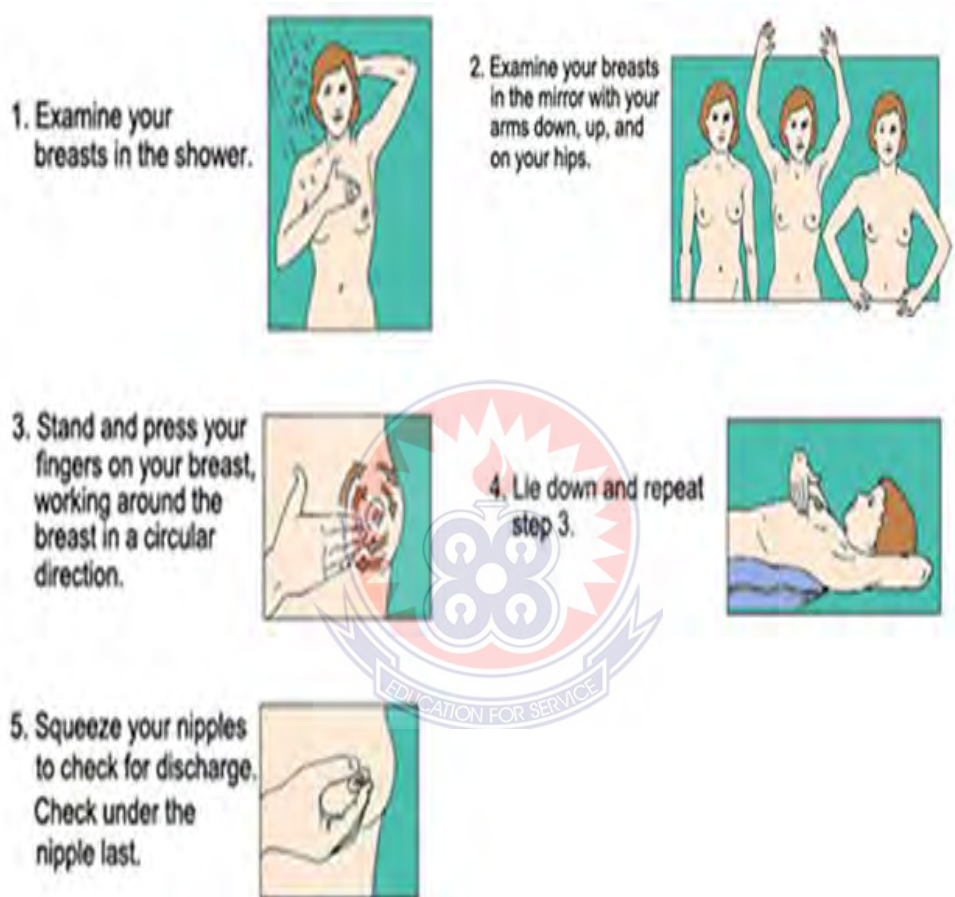
**Step 3:** Observe signs of fluid such as watery milky, yellowish fluid or even blood coming out of one or both nipples as you stand in front of the mirror.

**Step 4:** Whiles lying down and with a firm, smooth touch, using a circular motion with the first few finger pads of your hand, feel the left breast with your right hand and the right breast with your left hand. The entire breast must be covered from top to bottom, side to side, thus from the collarbone to the top of the abdomen, and from the armpit to your cleavage. This process must follow a pattern to ensure that the breast is fully covered. Starting at the nipple, move in larger and larger circles till you reach the outer edge of the breast. Move your fingers up and down vertically, in rows, as if you are mowing a lawn. The up-and-down approach seems to work best for most women. Be sure to feel all the tissue from the front to the back of your breasts, thus for the skin and tissue just beneath, use light pressure; use medium pressure for tissue in the middle of your breasts; use firm pressure for the deep tissue in the back. When you have reached the deep tissue, you should be able to feel down to your ribcage.



**Step 5:** Finally, feel your breasts while you are standing or sitting. For many women, they like to do this step in the shower because the easiest way to feel their breasts is when their skin is wet and slippery. Cover your entire breast, using the same hand movements as described in step 4.

**Figure 3: Procedure for Breast Self-Examination**



*American Bedu (2011)*

### **Non-Cancerous Breast Changes**

Some changes that occur in the breast are not cancerous and do not also increase one's chances of getting breast cancer. These changes are termed as benign changes and they include the following: Adenosis, Cysts, Fat Necrosis, Fibroadenomas and Intraductal Papilloma (National Cancer Institute, 2004).

## **Breast Changes that Increase One's Risk of Cancer**

There are other conditions which are not cancerous, but they increase one's chances of getting breast cancer. The National Cancer Institute (2004), has these conditions as:

Atypical Hyperplasia (ALH): abnormal cells in the breast lobules, Atypical Ductal Hyperplasia (ADH): abnormal cells in the breast ducts and then Lobular Carcinoma In Situ (LCIS): more abnormal cells found in the breast lobules which have not spread outside the breast lobules, thus the term "in situ," a Latin term meaning "in place" (National Cancer Institute, 2004).

## **Types of Breast Cancer**

### **Ductal Carcinoma In Situ**

Komen (2013), mentions that Ductal carcinoma in situ (DCIS) which is also referred to as intraductal carcinoma is considered non-invasive or pre-invasive breast cancer. DCIS means that cells that lined the ducts have changed to look like cancer cells. With DCIS, abnormal cells which are cancer cells have not invaded the walls of the ducts into the surrounding breast. In a situation where DCIS develops into invasive breast cancer an individual can die from it. Komen (2013), continues that it is likely that about 1 out of every 5 newly diagnosed breast cancer cases would be DCIS even though there is no best way to undoubtedly define which cases will go on to become invasive cancers.

### **Invasive (Infiltrating) Ductal Carcinoma**

This is the most common type of breast cancer. Invasive (infiltrating) ductal carcinoma (IDC) begins in a milk duct of the breast, breaks through the wall of the duct, and grows into the fatty tissue of the breast. At this point, it may be able to spread (metastasize) to other parts of the body through the lymphatic system and

bloodstream. According to Komen (2013), about 8 out of 10 invasive breast cancers are infiltrating ductal carcinomas.

### **Invasive (Infiltrating) Lobular Carcinoma**

Invasive lobular carcinoma (ILC) begins in the milk-producing glands (lobules). Like IDC, it can spread (metastasize) to other parts of the body. About one (1) in ten (10) invasive breast cancer is invasive lobular carcinoma. Invasive lobular carcinoma may be harder to detect by a mammogram than invasive ductal carcinoma (Komen, 2013).

### **Inflammatory Breast Cancer**

Inflammatory breast cancer is an uncommon, but very dangerous and aggressive type of breast cancer. The breast may feel warm and look red. One may observe ridges, welts or hives on your breast; or the skin may look wrinkled. At times it is misdiagnosed as a simple infection (National Cancer Institute, 2004).

### **Recurrent Breast Cancer**

This occurs when the cancer that had previously been treated resurfaces or re-occurs. It may resurface in the breast, in the soft tissues of the chest (the chest wall) or in another part of the body (National Cancer Institute, 2004).

### **Causes of Breast Cancer**

According to the American Cancer Society (2010), genetic abnormality is always the cause of breast cancer, meaning a “mistake” in the genetic material. However, only 5-10% of cancers are as result of an abnormality inherited from your mother or father. Instead, 85-90% of breast cancers are as a result of genetic abnormalities that occur due to the aging process and the “wear and tear” of life in general.

## **Stages of Breast Cancer**

Stage of Breast Cancer is most often expressed as a number on a scale of zero to four with stage zero describing non-invasive cancers that stay within their original location and stage IV describing invasive cancers that have dispersed outside the breast to other parts of the body (National Cancer Institute, 2015). To plan the treatment of breast cancer, it is expedient for the health care provider to know the degree of the disease. Breast cancer stage is based on the size of the tumor and the extent of the spread of cancer.

Stage zero is a very early breast cancer where cancer has not spread within or out of the breast. It is sometimes referred to as DCIS, LCIS or breast cancer in situ or noninvasive cancer.

stage II cancer, the cancer has spread to the lymph nodes under the arm yet it is no larger than one inch; the cancer is between one and two inches;

Stage III cancer is divided into two stages: IIIA and IIIB. With regard to IIIA, The cancer is larger than two inches and has spread to the lymph nodes under the arm. For Stage IIIB cancer, the cancer has spread to tissues close to the breast, such as the skin and chest wall, as well as the ribs and the muscles in the chest. Also, the cancer has spread to lymph nodes inside the chest wall along the breastbone.

Stage IV, the cancer has spread to other parts of the body, most often the bones, lungs, liver or brain. It is also when the tumour has spread locally to the lymph nodes inside the neck and skin.

## **Prevalence of Breast Cancer**

According to Getz (2010), breast cancer has become a common diagnosis for American women. About one in every eight women in the United States has breast cancer, making it the most common diagnosed cancer in women. A survey conducted by the American Cancer Society (2013) revealed that an estimated number of 232,340 new cases of invasive breast cancer were recorded among women in the United States of America. The American Cancer Society further revealed that an estimated number of 64,640 additional cases of in situ breast cancer were likely to be recorded in the same year. The survey again revealed that approximately 39,620 women were expected to die from breast cancer in year 2013.

According to Siegel *et al.* (2010), the second most common malignancy in women is breast cancer. In Ghana, Wiafe-Addai (2013) posits that an estimated 2,900 Ghanaians are diagnosed of breast cancer every year and more than half of these people die from the disease. According to Wiafe-Addai, the aforementioned figure even represents only those who report at the hospitals for treatment as many patients seek treatment from other sources such as prayer camps and shrines. In the year 2012 for instance, the number of reported cases of breast cancer at the Korle Bu Teaching Hospital (KBTH) was found to have increased from about 320 cases annually as at 2007 to over 400 cases between 2008 and 2012. According to Clegg-Lampsey (2012), breast cancer is on the increase in Ghana and that the World Health Organization (WHO) in the year 2008 even estimated a total of 2,000 new cases of breast cancer in Ghana. Currently, Ghana records not less 3,000 breast cancer cases each year (Wiafe-Addai, 2013). The number of breast cancer cases reported at the Department of Surgery of the Korle Bu Teaching Hospital for the year 2011, 2012, and 2013 are presented in Table 1.

**Table 1: Total Number of Breast Cancer Cases Reported at the Korle Bu Teaching Hospital (Department of surgery)**

Year	Total Breast Cancer Cases	Mastectomy	Wide Local Excision
2013	380	103	19
2012	442	94	25
2011	350	110	14

Source: Field survey, Adade (2015)

### Stage of Diagnosis in Ghana

According to Wiafe-Addai (2013), about 60% of Ghanaian women who are diagnosed with breast cancer are mostly found when disease is in its advanced stage. Adade (2015) has provided percentage representation of the stages of breast cancer that are reported at the Korle Bu Teaching Hospital in 2015 and this has been presented in Table 2.

**Table 2: Stages of Breast Cancer Reported at the Korle Bu Teaching Hospital**

Stage	Percentage
Stage 4	50%
Stage 3	30%
Stage 2	15%
Stage 1	5%

Source: Field survey, Adade (2015)

### Age at Diagnosis in Ghana

According to Wiafe-Addai (2013), the most alarming part of the issue of breast cancer in Ghana is that women between the ages of 21 and 28 years are mostly diagnosed of late stage of breast cancer, a situation which is very perturbing. Similarly, Adade

(2015) contends that apart from the high percentages of reported cases of women with breast cancer who are between the ages of 50–65 years, more young women between the ages of 20-30 years are being diagnosed of the disease.

### **Risk Factors of Breast Cancer**

Komen (2013), American Cancer Society (2010) and have categorised risk factors for developing breast cancer into three divisions which are the natural risk factors, lifestyle related risk factors and lifestyle choices risk factors .

The natural risk factors include age, gender, Genetic Risk Factors, Family History of Breast Cancer, Personal History of Breast Cancer, Dense Breast Tissue, Menstrual Periods , Previous Chest Radiation and Diethylstilboestrol Exposure (Komen, 2013 & American Cancer Society, 2010).

There are also lifestyle-Related Factors associated with breast cancer and these are Having Children, Birth Control, Hormone Therapy After Menopause and Breastfeeding (Komen, 2013 & American Cancer Society, 2010).

Lifestyle Choices risk factors include Drinking of Alcohol, obesity and Physical Activity (Komen, 2013 & American Cancer Society, 2010).

**Table 3: Features that can Affect the Chance of Breast Cancer Coming Back or Spreading**

Factor	The breast cancer is less likely to come back or spread if:	The breast cancer is more likely to come back or spread if:
Size	Cancer is smaller (less than 2 cm)	Cancer is larger (more than 2 cm)
Lymph nodes in the armpit	No cancer cells in the lymph nodes	Cancer cells in the lymph nodes
HER2	Cancer cells are HER2-negative	Cancer cells are HER2-positive
Hormone receptors	Cancer cells have hormone receptors and you have hormonal therapy	Cancer cells do not have hormone receptors
Grade	Grade of cancer is low (Grade I)	Grade of cancer is high (Grade 3)
Surgical margin	Surgical margin is clear	Surgical margin is not clear

Source: Field survey, Adade (2015)

The bulk of literature aimed at determining the relationship nutrition and breast cancer development is enormous but for the purpose of the study, the researcher having given a detailed information on breast cancer reviewed related literature based on the objectives of the study.

Based on these premises, the researcher reviewed literature on the nutritional knowledge of breast cancer patients being the first objective of the study.



## **Nutritional Knowledge and Breast Cancer**

Nutrition according to Laguna and Claudio (2004), is the "science of food, the nutrients and other substances therein, their action, interaction and balance in relation to health and disease, and the processes by which the organism ingests, absorbs, transports, utilizes and excretes food substances". Nutrition information forms a component of health information (Obasola & Agunbiade, 2016).

Nutritional knowledge refers to knowledge of concepts and processes related to nutrition and health or simply, knowledge of nutrients (Shakkour, 2007). Miller and Cassady (2015), also defined nutrition knowledge "as having an awareness of practices and concepts related to nutrition including adequate food intake and wellbeing, food intake and disease, foods signifying key sources of nutrients and dietary guidelines and references". Insight into determinants of nutrition knowledge is very essential, both for designing measures intended to increase levels of nutrition knowledge and for food industry attempting to position food products based on their nutritional properties (Klaus *et al.*, 2012). It is believed that an adequate nutrition knowledge will lead to appropriate dietary habits which plays a vital role in the management of breast cancer.

Various studies conducted has revealed that having sufficient nutritional information does not always promise patients' strict compliance. It can therefore be deduced that dietary recommendations may not always be strictly followed by subjects even when appropriate dietary information and resources are available (Eisinger-Watzl, Wittig, Heuer, & Hoffmann, 2014) and therefore will adversely upset the efforts of health promotion and information strategies. Contrary to these findings other school of thoughts believe that, having adequate nutrition information help individuals to make appropriate selection of foods (Whitney & Rolfes, 2016) thus providing nutrition

knowledge and skills on indicators such as good diet and working out helps to improve the well-being of the roper and healthy nutrition are fundamental to a better quality of life (WHO, individual and/or groups (Hawkes, 2013).

Good nutrition in middle ages provides people with metabolisms that are better prepared to fight off the diseases associated with changes in diet and physical activity. With no good nutrition, people's lives and livelihoods are built on quicksand (WHO, 2014).

In as much as nutritional knowledge is important in informing nutritional choices, obtaining accurate and adequate nutrition information is more essential as it could inform nutritional choices positively and encourage the maintenance of a healthy nutritional status. Acquisition of information happens intentionally or by coincidence. The thoughtful attempt to acquire information refers to a conscious determination to obtain information in response to a need or a lack of know-how in one's mind, whereas opportunistic gaining of information refers to a situation where a person without warning comes across fascinating or beneficial information (Basic & Erdelez, 2014). Acquiring nutrition information is essential because it could inform nutrition choices positively and enhance the maintenance of a healthy weight status (Hillis, 2015).

Nutrition knowledge is very necessary in the management of breast cancer because, breast cancer is mentioned among some nutrition-dependent cancers due to the risk brought by an overweight status in postmenopausal women and consumption of alcohol and there is much to acquire with regards to the influence of foods on the mammary gland before and during breast cancer development (Teegarden, Romieu &

Lelievre, 2012). Having reviewed literature on nutritional knowledge, the researcher further continued with literature on the eating habits of breast cancer patients.

### **Eating Habits of Breast Cancer Patients**

Education on nutrition by nutritionist and dieticians help one make informed food choices so that he or she can start reaping the advantages of a healthy diet. Studies have shown that a healthy diet, energy and reduced risk of cancer, among other diseases are positively related. Owing to this it is expected that breast cancer patients would adhere to these pieces of advice in their selection of food, nonetheless these nutritional goals are hindered based on certain challenges that the researcher came across.

According to Brown *et al.* (2011), it is counterproductive for vitamin supplements that contain high levels of folic acid to be taken by cancer patients, or to consume fortified food products that contain high levels of folic acid when using chemotherapy agents, such as methotrexate, that act by interfering with folic acid metabolism. This interaction demonstrates the essence of enquiring and advising survivors about supplement use during treatment. Moderate amounts of foods such as breakfast cereals that do not go beyond the Dietary Reference Intake established by the National Academy of Science (formerly known as the Recommended Daily Allowance) for folate are unlikely to decrease the efficiency of these drugs.

According to Monsen (2000), many vitamin supplements contain higher levels of antioxidants such as vitamins C and E than the ideal level. Other dietary supplements may contain high levels of non-vitamin antioxidant phytochemicals or antioxidant minerals. Taking antioxidant vitamins during chemotherapy or radiation therapy might therefore reduce the efficacy of those therapies (Kong & Lillehei, 2009),

consequently, some experts have recommended against taking antioxidant supplements when undergoing such treatment (Labriola & Livingston, 1999).

According to Lissoni, Barni and Mandala (1999), it is prudent for patients undertaking chemotherapy or radiotherapy not to go beyond the upper intake limits of the Dietary Reference Intake for vitamin supplements and to stop taking other nutritional supplements that contain antioxidant compounds as doing so would greatly impede the treatment process. According to the American Cancer Society (2015), in the course of active cancer treatment, maintaining caloric balance is the most vital nutritional goal. If it is not feasible to meet nutritional needs through regular diet alone, nutritious snacks or drinks may be recommended. Commercially prepared liquid nutritional products can also be helpful to assist with consumption of calories and nutrients. These products are best used as only impermanent aids.

Although cancer treatment can cause fatigue, light, regular physical activity in the course of treatment one should be spurred to improve appetite, stimulate digestion, prevent constipation, maintain energy level and muscle mass, and provide relaxation or stress reduction. Advice from a nutritionally qualified health care provider can be helpful in evaluating problems with eating and physical activity and in creating an individualized plan to meet the exact challenges faced during the cancer treatment phase (American Cancer Society, 2015). According to Wade and Schimff (1989), food safety is of special interest to cancer survivors, particularly during episodes of iatrogenic immunosuppression. During any immunosuppressive cancer treatments, patients should be particularly cautious to stay away from foods that may contain unsafe levels of pathogenic microorganisms.

To make food as safe as possible, Wade and Schimff (1989) put forward the following guidelines: before eating one should wash hands thoroughly; all aspects of food preparation should be kept clean, including washing hands before food preparation, and washing fruits and vegetables thoroughly; in dealing with raw meats, fish, poultry, and eggs one should use special care; and carefully clean all utensils, countertops, cutting boards, and sponges that have come into contact with raw meat; keep raw meats and ready-to-eat foods separate; cook to appropriate temperatures; meat, poultry, and eggs; and thoroughly clean all utensils, countertops, cutting boards, and sponges that have come into contact with raw meat; keep raw meat and ready-to-eat foods separate; cook to proper temperatures; meat, poultry and seafood should be thoroughly cooked and beverages (that is, milk and juices) should be pasteurized; store foods promptly at low temperatures (below 40<sup>0</sup> F) to reduce bacterial growth; when eating in restaurants, bacterial contaminated foods such as salad bars, sushi, and raw or undercooked meat, fish, shellfish, poultry, and eggs should be avoided; and if there is any question or concern about purity of water (e.g. well water) it can be examined for bacterial content by getting in touch with local public health department.

Formerly, some researchers and health care providers believed that nutritional intake should be severely limited to effectively treat cancer. This theory, which was centred on the belief that starvation would deprive a growing tumour of needed nutrition, is now known to be wrong (Rivadeneira, Evoy, & Fahey, 2008). Current research and clinical practice have clearly shown that starvation does not increase survival, but is detrimental in the face of the cancer survivor's high nutritional needs during and after therapy (Rivadeneira *et al.*, 2008). Cancer patients should thus be encouraged to

consume enough calories (as protein, carbohydrate and fat) to maintain weight and optimal body nutrient stores.

According to the American Cancer Society (2015) frying, broiling, or grilling meats at very high temperatures creates chemicals that might increase the risk of some types of cancer (especially meats that are higher in fat and poultry with skin).

There is one thing knowing and another thing implementing the acquired knowledge for a desired goal. It is presupposed that having the right nutritional knowledge and good dietary pattern will lead to making healthy food choices for a better quality of life. However this is not always so as certain factors tend to militate the selection of healthy food by breast cancer patient. Thus having been informed about nutritional knowledge and breast cancer and eating habits of breast cancer patients it is imperative to ascertain factors that influence breast cancer patients in the selection of food in the management of breast cancer.

### **Factors Influencing Food Choices of Breast Cancer Patients**

It is important to note that a better understanding of the factors influencing food choice can go a long way to effectively modify individual's dietary pattern. This is because our human nature and choice of food doesn't just happen but it goes through certain thought processes which are influenced by Agro-economic and social setting, mental and existing individual characteristics, as well as the actual and supposed natural and extrinsic attributes of the foods themselves. Thus a thoughtful consideration of the great impact of these influences under diverse situations can serve to enlighten many of the observed characteristics of human intake of food, and highlight possible opportunities for support.

In addition when an individual has a 'healthy' approach towards eating, making healthy food choices would not be done because of fear of chronic disease but rather to improve health and prolong life.

Certain physiological mechanisms, such as signals to the brain from the gastrointestinal tract and adipose tissue, determine our individual choices of food which is very subjective. These activities triggers our hunger and level of satisfaction, motivates us to eat specific nutrients and finally, the benefits we derive from eating healthily.

Brown *et al.* (2011), adds that cancer treatment sometimes leads to long-term problems, such as dysphagia, xerostomia, or malabsorption that can make eating difficult and that can impair nutritional status, leading to persistent weight loss, muscle wasting, and nutrient deficiencies.

Symptoms such as fatigue (extreme tiredness), light-headedness, dry mouth, a bad taste in the mouth, and nausea can be caused by dehydration (loss of fluid from the body). To help avoid these problems, cancer patients should try to take in enough fluids (American Cancer Society, 2015).

Cancer treatment, according to Shils *et al.* (1999), may interrupt the ability to eat, digest, or absorb food as a result of side effects such as nausea, vomiting, changes in taste or smell, loss of appetite, or bowel changes. When these problems come up, usual food choices and eating patterns may need to be temporarily adjusted. For example, small, frequent meals or snacks may be easier to consume than three large daily meals. Food choices within this period should be easy to chew, swallow, digest, and absorb and should be appealing, even if they are also high in calories or fat (Shils *et al.*, 1999; Mahan & Escott-Stump, 1996).

Owing to the complex nature of the individual and food choices, several researches have been conducted to review the factors affecting food choices but for the purpose of the study, the researcher restricted herself to the following factors: health consciousness, habit/routine of the individual, price of food, taste of food/sensory appeal, convenience in preparation; cultural /religious / ethnic background, availability of food and mood.

The health consciousness factor mostly denotes willingness to change rather than concerning oneself about sensory appeal and cost of the food item (“to avoid kidney disease, I would be prepared to modify the way I eat”).

Health value or health consciousness according to Tudoran, Dopico and Olsen (2009) is the extent to which individuals place importance to their health and since individuals have different values so People perceive health value differently (Lone, Pence , Levi & Chan, 2009; Tromp *et al.*, 2005).

Taste’ is reliably known to be one of the main factors that influence food choices. It would be appropriate to define taste to mean the sum of all the sensual stimulation that is created by the eating of a food. Thus taste includes not only taste per se but also smell, form and feel of food. These sensory aspects are thought to influence, in particular, spontaneous food choice.

From an early age, taste and familiarity influence behaviour towards food. A liking for sweetness and a dislike for bitterness are considered innate human traits, present from birth. Taste preferences and food aversions develop through experiences and are influenced by our attitudes, beliefs and expectations. Harnack *et al.* (1997) have reviewed the literature on environmental and social factors affecting dietary behaviour for chronic disease prevention in American populations. According to them, taste



preferences appear to consistently represent a barrier to healthier eating as well as cost and confusion about dietary guidelines.

An unhealthy factor identified by Hollis and Henry (2007), revealed that for convenience sake individuals consume whatever is handy and when it comes to mood people tend to eat more or less depending on their mood.

Cultural factors affect food choice and it gives a basis to develop an understanding of what food and food choice really mean to the consumer.

Cultural rules of cooking and suitability exert great influences on what individuals put on their plate and when. Therefore, different ethnic or cultural groups often reflect rather different food choice behaviours (Johnson & Birch, 1994). Culture is perhaps the most obvious influence on food preferences and choice, and has strong historical backgrounds, rooted in unique combinations of environment (geography, climate, and range of native plant and animal species), ritual and belief systems (religious and secular), community and family structure, human endeavour (innovation, mechanization, experimentation), mobility (exploration, immigration), and economic and political systems, which are integrated into a range of particular 'traditional' and accepted rules of cooking and appropriateness (Furst *et al.* 1996). Within larger cultural units there are also identifiable subgroups which manifest their own particular norms and behaviours regarding food choices. The family or household unit typically provide extensive opportunities for reinforcement of common food choice and eating behaviours, sensory likes and dislikes, and also methods of food intake control (Ray & Klesges, 2006). Within this general food choice environment, individuals make decisions about what to eat.

Having reviewed relevant literature on factors influencing food choices, It is very necessary to know the contribution of nutrition to breast cancer regardless of factors militating the implementation of nutritional knowledge to promote quality of life of breast cancer patients.

### **Contribution of Nutrition to Breast Cancer**

It is known that an enormous body of scientific proof on the connection between nutritional factors and the risk for breast cancer has been collected and testified during the past several years. However, some research results in this field are usually considered inconsistent in the proof for specific dietary factors and different views on the interpretation of these data.

A healthy diet might help reduce breast cancer risk by helping women maintain a healthy weight. There are other good reasons for eating a healthier diet as well. Eating a healthier diet reduces the risk of developing many other diseases, including heart disease, type 2 diabetes and several other forms of cancer. According to Blanchard, Denniston, Baker, Ainsworth, Courneya, Hann, Gesme, Reding, Flynn and Kennedy (2003), most cancer survivors effect at least some dietary changes following their diagnosis. In one survey of a general survivorship population, 51% of survivors said they had reduced their fat intake, 44% increased their fibre intake, and 43% reduced their red meat intake. More than 28% indicated their physician recommended that they reduce their fat intake, and 15% reported that their physician recommended they increase their fibre intake (Blanchard *et al.*, 2003). Outcome from a survey of breast and prostate cancer survivors were similar, with 29% reporting that their doctor recommended that they reduce fat intake and 16% reporting a recommendation to increase their fruit and vegetable intake (Demark-Wahnefried *et al.*,2000).

In addition to that, it is important to note that on a cellular level, each breast cancer case is considered to have a unique disease pathway, with associated genetic deviations that may or may not be influenced by different etiological factors or interventions (Slatter, O'Brian & Mori, 1995), this heterogeneity likely limits the ability to recognize definite associations between dietary factors and risk for developing breast cancer.

The American Institute for Cancer Research (2012) recommendations on nutrition state that after receiving treatment, if possible and unless otherwise advised, survivors should focus on following the health care centre's cancer prevention recommendations for diet, physical activity, and healthy weight maintenance. According to Karen (2014), vegetables, fruits, whole grains, and legumes form the core of a diet that reduces the risk of developing cancer and heart disease. Plant foods that are not highly processed or refined serve a wide range of nutrients and phytochemicals that may act protectively throughout cancer development, influencing DNA repair, inflammation, cell proliferation, and cancer progression. Diets built around foods low in calorie density are recommended to avoid weight gain and support intentional weight loss (Karen, 2014).

According to Chlebowski, Blackburn and Thomson (2006), a limited but growing body of evidence shows that nutritional interventions for cancer survivors lowers the risk of recurrence. Chlebowski *et al.* (2006) recommends that cancer patients should follow dietary guidelines established for primary prevention of cancer including other diseases (e.g. cardiovascular disease, osteoporosis, and diabetes) by their treatment centre. Studies have suggested that the risk of recurrence of breast cancer might be increased by obesity and possibly by diets high in fat and low in fruits and vegetables (Holmes & Kroenke, 2004; Chlebowski *et al.*, 2006). Studies suggest that adequate

dietary intake of calcium and vitamin D, exercise, and smoking cessation are good for cancer patients (Hillner *et al.*, 2003; Friedlander & Thewes, 2003; Chlebowski *et al.*, 2006).

More intake of vegetables, fruits, and fibre and less intake of fat have been found to reduce the risk of breast cancer recurrence or mortality among women with early breast cancer in the Women's Healthy Eating and Living Study (Kwan *et al.*, 2009). The American Cancer Society (2010) adds that, the nutrients made up of organic foods are better than other foods in terms of reducing the risk of cancer reoccurrence or the risk of cancer progression.

According to the American Cancer Society (2010), high fibre consumption may have an advantage by altering hormonal actions of breast cancer and other hormonal-dependent cancers. Daily fibre consumption should be 25 to 30 grams of insoluble and soluble fibre. Also, there is strong proof that a diet rich in vegetables, fruits, and other plant-based foods may reduce the risk of some types of cancer and may reduce the risk of some types of cancer, including breast cancer. Quite a number of healthful compounds are found in vegetables and fruits, and it is likely that these compounds would work together to create positive effects on recurrence or survival for breast, prostate, and ovarian cancers (American Cancer Society, 2010). Food is the best source of vitamins and minerals.

According to the American Cancer Society (2010), juicing can add variety to one's diet and can also serve as a good way to get vegetables and fruits, particularly if the person has an issue chewing or swallowing. Juicing also helps the body to absorb some of the nutrients in vegetables and fruits. Drinking a lot of fruit juice can add extra calories to a person's diet, too. Cancer patients are, therefore, advised to buy

juice products that are 100% vegetable or fruit juices and pasteurized to get rid of harmful germs. These, according to the American Cancer Society (2010), are better for everyone, emphatically for people who have weak immune systems, such as those receiving chemotherapy.

This is especially important if the patient is losing fluid as a result of vomiting and diarrhoea. According to the American Cancer Society (2010), healthy adult men need to take about 3.7 litres of water a day, while women need about 2.7 litres. However, most of this fluid is obtained from foods. Cancer patients who have difficulty eating or drinking or are losing fluid due to vomiting or diarrhoea and cannot take in enough fluid must talk to their health care team as they may have to be treated with intravenous (IV) fluids.

The Women's Intervention Nutrition Study by Chlebowski *et al.* (2006) found that a low-fat diet reduced the risk of recurrence among postmenopausal breast cancer survivors, especially among women with oestrogen receptor-negative tumours. High intake of saturated fat or trans fats was found to increase the risk of death from any cause in the Collaborative Women's Longevity Study (Beasley *et al.*, 2011).

A 2013 review of five cohort studies examining soy products and breast cancer survival reported that soy product consumption was associated with better survival and lower risk of recurrence (Chi, Wu, Zeng, Xing, Liu, & Xu, 2013). The status of the vitamin D may be also essential in association to breast cancer risk and survival. It has been hypothesized that a low vitamin D status worsens breast cancer prognosis (Jacobs *et al.*, 2011; Vrieling *et al.*, 2013). Notwithstanding, a study on women healthy eating and living conducted by Pierce *et al.*, (2007) found no difference in breast cancer recurrence or death between a control group and an intervention group

eating a low-fat diet very high in vegetables and fruits. Within the control group, neither the consumption of five vegetables and fruits daily nor moderate physical activity alone was related with lower mortality. However, compared with women who met neither standard, those who met both dietary and activity standards experienced almost 50% lower mortality (Pierce *et al.*, 2007).

Rock, Doyle and Denmark-Wahnerfried (2012) contend that neither observational nor interventional studies have demonstrated a strong link between vegetable and fruit consumption and reduced cancer recurrence or mortality. Studies suggest that the effects of a diet which is high in vegetable and fruits are normally influenced by personal characteristics such as hormonal status, genetics, gut microbiota, and medical treatment as well as how the diet is implemented, including the choice and preparation of vegetables and fruits, total calorie intake, and overall diet and lifestyle quality (Pierce, 2009; Rock *et al.*, 2011).

Recent prospective studies have reported that breast cancer prognosis can be improved by consumption of fruits and vegetables and dietary components that are abundant in fruits and vegetables, such as carotenoid and dietary fibre (Belle *et al.*; 2011; Rock *et al.*; 2008).

The American Cancer Society (2010) recommends the following foods for breast cancer patients: grains (wheat, rye, oats, rice, corn, bulgur, barley), green leafy vegetables (lettuce, spinach, swiss chard, endives, beet greens, romaine), cruciferous vegetables (broccoli, cabbage, turnip, brussels sprouts, cauliflower, kohlrabi, bok choy, watercress, collards, kale, mustard greens, rutabaga), umbelliferous vegetables (celery, parsley, fennel, carrots, parsnip), allium vegetables (garlic, onions, shallots, chives, leek), legumes (soybeans, peas, chickpeas, lima beans, peanut, carob, dried

beans, lentils), Solanaceous vegetables (eggplant, tomatoes), cucurbitaceous vegetables (pumpkin, squash, cucumber, muskmelon, watermelon, Sulforaphane (broccoli sprout) Isothiocyanates (mustard, horseradish, cruciferous vegetables), and phenolic compounds (garlic, green tea, soybeans, cereal grains, cruciferous, umbelliferous, solanaceous, cucurbitaceous vegetables, licorice root, flax seed).

According to the American Cancer Society (2012), sugar consumption has not been proven to directly increase the risk of developing cancer or having it get worse (progress). However, sugars and sugar-sweetened drinks and foods add large amounts of calories to the diet which can lead to weight gain, which in the long run can affect cancer outcomes. There are many kinds of sugars, including honey, raw sugar, brown sugar, corn syrup, and molasses. Many drinks, such as soft drinks and fruit-flavoured beverages contain high amount of sugar. Most foods and drinks that are high in added sugar do not offer many nutrients and may replace more nutritious food choices. For this reason, limiting the intake of foods and drinks with added sugar is recommended (American Cancer Society, 2010).

Cancer patients should try to obtain the nutrients they need through food, not supplements (American Cancer Society, 2010). Dietary supplements should only be used only upon the advice of the physician due to the deficiency of a particular nutrient. However, vitamins or other supplements should not be taken with the view to getting higher than recommended levels of nutrients as this may do more harm than good.

It is worthy to note that some foods and the nutrients they provide play a vital role in breast cancer management and so further relationships of some individual nutrients and breast cancer were also reviewed.

## **Fat Content Food and Breast Cancer**

The relationship between dietary fat and the risk of breast cancer has been controversial for decades. Fats comprise oils, butter and margarine including the fat in meats, fish and nuts. Sweets, biscuits, cakes and other already processed foods also contain hidden fats. Numerous studies have so far investigated the relationship between fat intake and the risk of breast cancer, but the outcomes have been inconsistent (American Cancer Society, 2010). A study conducted by Hunter and Willett (1996) had no proof of a positive association between total dietary fat intake and the risk of breast cancer. Even among women whose energy intake from fat was less than 20%, there was no reduction in risk. Hunter and Willett (1996), therefore, concluded that reducing the total intake of fat in midlife is not likely to reduce the risk of breast cancer substantially. Martin-Moreno *et al.*, (2013), however, contend that higher intake of olive oil, which is rich in monounsaturated fat, is significantly linked to a lower risk of breast cancer.

According to the American Cancer Society (2010), controversy exists on the role of dietary fat on the promotion of breast cancer. Some studies on animals and epidemiological data have suggested that the type of fat consumed may initiate the development of breast cancer. The American Cancer Society, therefore, recommends the following for breast cancer patients: limiting the consumption of highly saturated foods such as beef, lamb, organ meats, cheeses, cream, butter, ice cream; decreasing food containing trans fatty acids, such as commercially prepared baked goods, crackers and margarine; increasing the intake of poultry, fish and vegetarian proteins such as legumes and lentils. Increasing the consumption of fish to 3 times per week will increase omega-3-polyunsaturated fat intake, and these fatty acids can prevent the growth of breast tumours (American Cancer Society, 2010).



The American Cancer Society (2010), a low-fat diet may reduce the possibility of the cancer coming back. This effect is strongest in women whose cancers are oestrogen receptor negative. Though it is not clear that accumulated fat intake affects cancer outcomes, diets that are very contain high amount of fat tend to contain high number of calories, too. This can lead to obesity (being very overweight), which is related to a higher risk of many types of cancer, a higher risk of developing certain cancers again after treatment, and worse survival for many types of cancer (American Cancer Society, 2010).

### **Fibre Intake and Breast Cancer**

Dietary fibre comprises many different plant carbohydrates that are indigestible by humans. Fibres may either be soluble (like oat bran) or insoluble (like wheat bran and cellulose). Soluble fibre reduce blood cholesterol levels hence reducing the risk of developing heart disease. Fibre is also associated with improved bowel function (American Cancer Society, 2010). According to the American Cancer Society (2010), good sources of fibre include beans, vegetables, whole grains, nuts, and fruits. Eating these foods is advisable because they contain other nutrients that may help reduce the risk of developing cancer. They also have other health benefits, such as reduced risk of heart disease. As of now, it cannot be told if fibre intake can affect cancer risk or survival.

A diet rich in natural fibre obtained from fruits, vegetables, legumes (e.g. lentils, split peas, black beans, pinto beans), and whole-grains may reduce cancer risk and/or reduce risk of cancer (American Cancer Society, 2010). More so, a high fibre functions to decrease hormone levels that may be involved in the progression of

breast cancer. Fibre binds to toxic compounds and carcinogens, which are later expelled out of the body.

### **Carbohydrates (Sugars and Starches) and Breast Cancer**

It is recommended that carbohydrates should constitute more than half of one's consumption of calories. There are particular aspects of their metabolism that have been examined for a link with breast cancer risk. Carbohydrates in diets has an impact on the levels of blood glucose (blood sugar) and the hormone insulin in the body. According to Warren and Devine (2006), presently, there's little evidence that the intake of carbohydrates, in general, is linked with breast cancer risk. This relationship has been evaluated in 17 case-control studies and seven cohort studies. The outcomes from both types of studies have proven no clear correlation between carbohydrates and breast cancer risk. Some of these studies have considered the source of the carbohydrate, whether it was obtained from sugars or starches. But no consistent difference in type of carbohydrate has been found either (Warren & Devine, 2006).

### **Fruit and Breast Cancer**

Studies suggest that women who take more fruits have a lower risk of breast cancer (American Cancer Society, 2010). This may be as a result of the fibre and antioxidants that they contain. Anti-oxidants are molecules that prevent a chemical process known as oxidation, which happens when oxygen molecules join with another chemical. Oxidation can cause damage of gene in cells and that may lead to cancer. Antioxidants include vitamins A, C and E and selenium. If a person changes his or her diet such that more fruit and vegetables are included, in addition to more starchy carbohydrates, he or she will almost definitely eat less fat. Due to this, the person will

be more likely to keep his or her weight within a healthy range. This helps to minimise one's risk of getting breast cancer.

According to the American Cancer Society (2010), phytochemicals with antioxidant, antiestrogen and chemopreventive properties are found in fruits, vegetables and whole grains and these may prevent cancer. The American Cancer Society, therefore, recommends five or more servings of fruit and vegetables everyday. Cruciferous vegetables (broccoli, cauliflower, kale, cabbage and brussel sprouts) are particularly rich in phytochemicals (American Cancer Society, 2010).

According to the American Cancer Society (2010), there are no food or dietary supplements that will act as “magic bullets” to hinder breast cancer from returning. However, the following guidelines, when followed, can help to reduce the probability of breast cancer recurrence: increase fruits intake, vegetables and whole grains, reduce intake of fat to less than 30 percent of calories, reduce consumption of cured, pickled and smoked foods, achieve and retain a healthy weight, and alcohol should be consumed moderately, if at all.

### **Phyto-oestrogens, Including Soya Products and Breast Cancer**

As a result of the difference in breast cancer rates in different parts of the world, scientists have been researching whether or not the intake of phyto-oestrogens could affect one's risk of developing breast cancer. Phyto-oestrogens also referred to as plant oestrogens are chemicals found in plants. They have a similar structure to that of the female sex hormone oestrogen. There are various types of phyto-oestrogens. A number of them are found in soya bean products (isoflavones). The fibre of whole grains, fruit, vegetables and flax seed (lignans) also contain phyto-oesteogens. It may also be found in milk, depending on what the cows have been eating.

The main type of phyto-oestrogens in the Western diet is the lignans. Researches carried out on the effect of lignans on breast cancer risk have provided contradictory results. As a result of this, in 2009, researchers looked at all the studies that had been undertaken. It was found out that in women who had had their menopause, high levels of lignin in the diet slightly reduced their breast cancer risk whereas no effect was reported for premenopausal women. A joint study by Institute for Cancer Research of UK, the National Cancer Institute of the USA, and the National University of Singapore in the year 2002 revealed that women who ate diet with greater quantity of soya had less dense breast tissue as compared to women who took diet with low soya diets.

According to the American Cancer Society (2010), an excellent source of protein is soy foods and can be a good alternative for meals without meat. Soy contains a lot of phytochemicals, some of which have weak oestrogen activity and seem to protect against hormone-dependent cancers in animal studies (American Cancer Society, 2010). Some other compounds in soy have antioxidant properties and may have anticancer effects. According to the American Cancer Society (2010), in reducing cancer risk, there is a great deal of interest in the possible role of soy foods especially breast cancer risk. But the proof at this time is mixed. For the breast cancer patient, current research finds no harmful effects from the intake of soy foods. These foods may even aid tamoxifen work to better.

### **Folate (or Its Synthetic Form, Folic Acid) and Breast Cancer**

Folate is an important vitamin necessary for numerous processes, including division of cell, repair of DNA, immune function, production of energy, homocysteine metabolism and cognitive health. High dose of synthetic folic acid protects against

cancer initiation. Folate, a B vitamin found naturally in foods, is seen to have a protective effect on breast cancer risk. However, folic acid (FA) which is the synthetic form of folate found in supplements and fortified foods may increase breast cancer risk when consumed at very high doses. Folic acid is a recognised supplement to a lot of women, especially the pregnant ones or those who intend to get pregnant. Nonetheless, studies suggest that intake of large amount of folate (a B vitamin) and its synthetic form (folic acid) might actually increase the risk of getting breast cancer.

### **Guidelines on Nutrition and Cancer Prevention**

The American Cancer Society (1996) provides the following guidelines on diet, nutrition and cancer prevention: most of the foods eaten should be from plant sources; take five or more servings of fruits and vegetables each day; eat other foods from plant sources, such as bread, cereals, grain products, rice, pasta, or beans several times each day; be physically kicking, achieve and maintain a healthy weight; be at moderately active for 30 minutes or more on most days of the week; stay within your healthy weight range; limit alcoholic beverages, if you drink at all.

During all the phases of cancer survival, though there may be cancer survivors with no specific nutritional problems, the principles outlined in the American Cancer Society's Guidelines on Diet, Nutrition, and Cancer Prevention should be considered the basis for a healthy diet. Appropriate nutrition and physical activity recommendations can promote their long-term health and quality of life (Karen, 2014). According to Karen (2014), research on how nutrition, physical activity, and body composition affect cancer recurrence, the development of second primary cancers, and overall survival for cancer survivors is still limited. However, evidence

has accumulated that supports recommendations to enhance recovery and promote long-term health and quality of life.

According to Brown *et al.*, (2001), after a diagnosis of cancer, many survivors are normally encouraged to seek information about diet, physical activity, dietary supplement use, and nutritional complementary therapies. According to Getz *et al.* (2010), observing good nutrition is not only helpful and healing to the body but also to the mind. Getz *et al.* (2010), adds that, most patients often embrace a nutrition plan due to the feeling of control that it gives them over their situation compared to other treatments like chemo and radiation. Similarly, Lanford (2011) maintains that diet is one of the important issues for patients. According to Lanford (2011), a lot of issues concerning cancer are out of the patient's control, but nutrition and healthy lifestyle are some of the things that they can keep under control. A better comprehension of the pertinent needs of the growing population of cancer survivors can be promoted by patient-centered approaches and a new focus on downstream data collection for the identification of possible complications and later effects (Kappel, 2013).

Being groomed to make healthy choices through fruits and vegetables intake, smart beverage choices, more physical activity, and proper portions can really enhance the patient's quality of life for the better, irrespective of how it even affects weight. As a result, diet is one of the important issues for patients. An improvement in diet does not only increase the well-being of patients, but also promote post-medical operation healing, reduce the risk for comorbidities during and after cancer, and provide a sense of active participation in one's healing process (Getz *et al.*, 2010).

According to Getz *et al.* (2010), patients are typically very welcoming to the guidance a dietitian can offer as they tend to be motivated and desire to take back some of the

power they feel they have lost since being diagnosed of breast cancer. Cancer survivors have a wide range of options and choices about what to eat, how to exercise, and what types of supplements or herbal remedies might improve the outcome of standard cancer therapy through magazine articles, books, Internet postings, family, and friends. (Brown *et al.*, 2011). According to Karen (2014), cancer survivors face myriad nutrition-related challenges, including those caused by an increased risk of cancer recurrence or the development of a second cancer, cardiovascular disease (CVD), or other chronic diseases.

Studies suggest that among breast cancer survivors, higher scores for a healthy dietary pattern are not consistent in association with lower breast cancer recurrence or mortality but are directly linked with a 28% to 46% reduction in other causes of mortality, which includes deaths from other cancers, CVD, and additional causes.

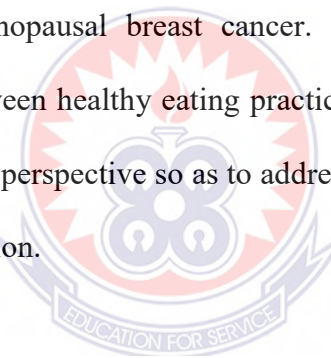
### **Summary of Literature Review**

The acceptance and implementation of healthy lifestyle behaviours provides an opportunity for cancer survivors to take control of some aspects of their health and improve outcomes from cancer and other chronic illnesses. Moderate exercise, for instance, has many advantages for cancer survivors, which includes improved vigour and vitality, cardiorespiratory fitness, quality of life, and mental health. A healthy diet low in saturated fat and rich in fruits and vegetables is recommended for the general public to prevent cancer, but also for cancer survivors to reduce their risk for subsequent cancer.

According to Cho *et al.* (2014), a progressive improvement in overall breast cancer survival during the past decades has led to increased interest in the effect of diet and exercise on breast cancer prognosis. Cancer survivors are at increased risk of

developing a second cancer which depends on the treatment being given. They may be at increased risk for cardiovascular disease, osteoporosis, and other chronic illnesses. Lifestyle behaviours that may have contributed to the development of cancer, such as smoking and unhealthy diet persist, can continue to threaten survival and quality of life of the patient. A healthy diet high in fruits, vegetables, and soy products and low in fat seems to be essential for breast cancer patients (Cho *et al.*, 2014).

Although studies have been conducted on the relationship between nutrition and breast cancer, almost all of these studies were conducted outside Ghana. Most of these studies were conducted in countries where postmenopausal breast cancer is predominant than premenopausal breast cancer. Therefore, there is the need to examine relationship between healthy eating practices and the management of breast cancer from the Ghanaian perspective so as to address the gap in literature and help in sound policy implementation.

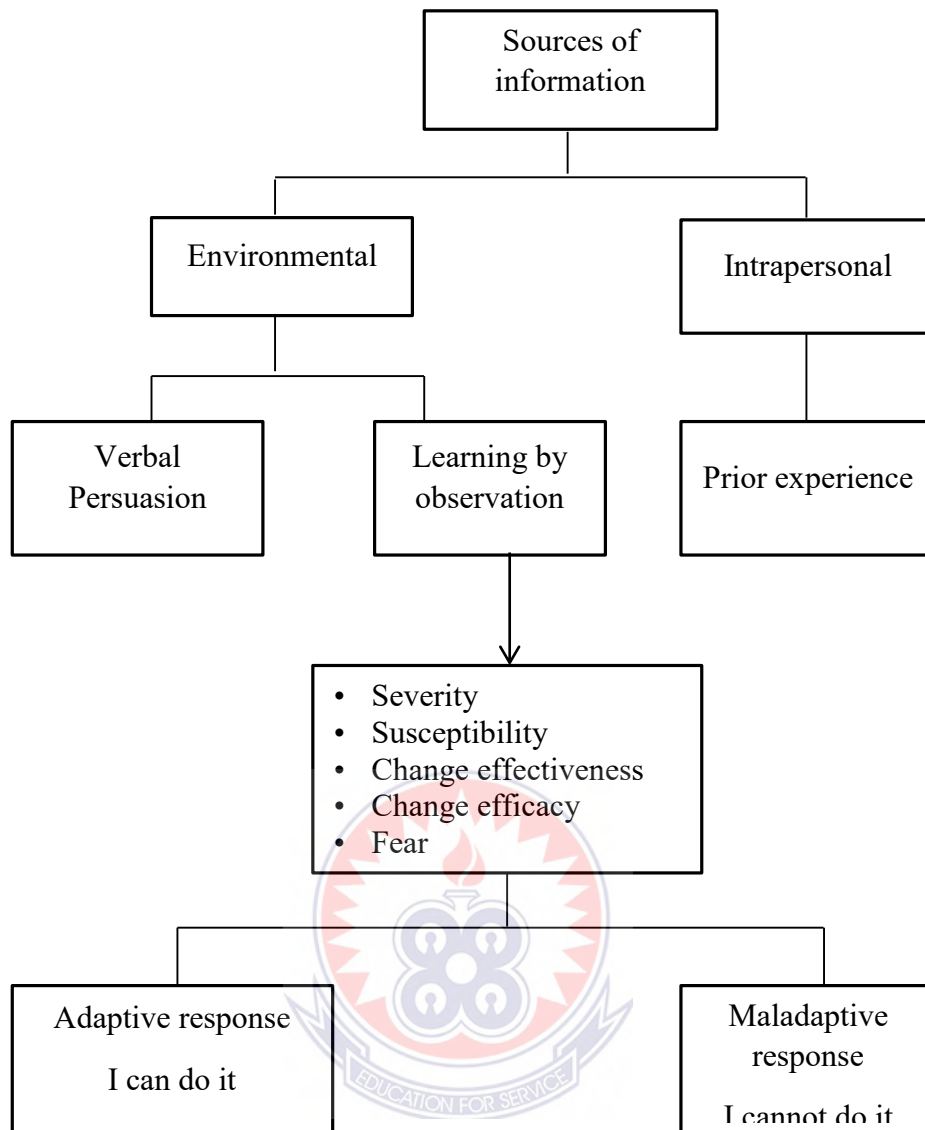


## **Theoretical Framework**

### **The Protection Motivation Theory**

The Protection Motivation Theory suggest that a person is motivated to protect himself by assessing the threat of a potentially harmful behaviour against how well he or she thinks can cope with the behaviour. Protection Motivation Theory (PMT) states that health related behaviours are as a result of how a person assesses the severity of the problem, how susceptible the person feels to the problem, how effective the change will be to solve the problem, the person's confidence in performing the risk-reducing behaviour as well as the fear resulting from being educated about the problem. This is illustrated in Figure 4





**Figure 4: Theoretical Framework**

Source: Researcher's Construct

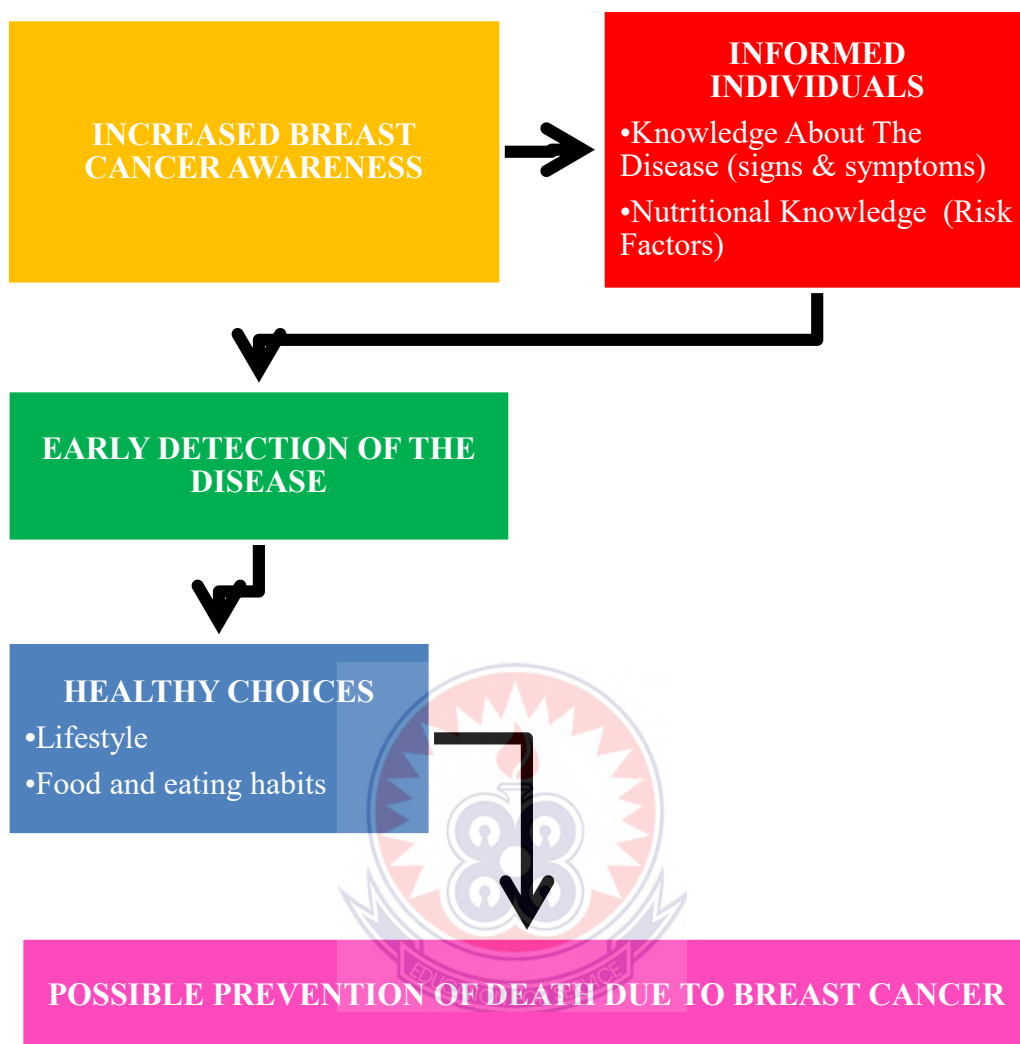
As illustrated in Figure 1, each individual gets information about a disease, in this case breast cancer, from two main sources. These are environmental and intrapersonal sources. The environmental sources include the media, friends, and other written sources such as books. Some individuals also get information about breast cancer through vicarious learning, thus by observing the experiences of individuals who are already diagnosed of breast cancer. Information from intrapersonal source is mainly through prior personal experience. Having received the necessary information, the individual evaluates the how severe the disease is, how likely he or she can contract

the disease, how a change in his or her current behaviour can effectively help to protect him or herself against the diseases and whether or not he or she has the ability to undertake the desired change. In the end, the individual resolves to either carry out the desired change in behaviour or declines to change.

### **Conceptual Framework**

Cancer is increasing among women all over the world and the story is not different in Ghana. However, reviewed literature has revealed that early detection of the disease is a requirement for its management and undoubtedly a prerequisite to prevent death as a result of breast cancer. Thus, an increase in the education of the public and also individual with the diseases about breast cancer creates an awareness that will help curb the increasing mortality rate of the disease. The possible benefits of the health education is that it energizes one to act in an adaptive way, and that coping information decreases the tendency to respond maladaptively to unhealthy lifestyles, particularly risk factors. Also, it can be deduced literature that were reviewed that awareness of the disease provides detailed knowledge of the disease which, in turn, ignites a positive attitude towards the disease prevention and management. This leads to the possible reduction in the increasing rate of the disease as well as possible death due to the disease. The conceptual framework for the study is therefore based on the assumption that education about breast cancer increases awareness which has the potential to reduce the increasing death due to the disease. This is illustrated in Figure 5.

**Figure 5: Conceptual Framework**



Source: Researcher's Construct

## **CHAPTER THREE**

### **RESEARCH METHODS**

#### **Overview**

This chapter presents and explains the methods that were employed for the collection and analysis of the data that were gathered for the study. It describes the research design, study population, sample and sampling procedure, research instruments, data collection procedure, ethical considerations, and data processing and analysis.

#### **Research Design**

The research design that was adopted for the study was a cross-sectional survey. The nature of study and the result expected compelled the researcher to adopt the cross-sectional survey research design. According to Bland (2011), a cross sectional survey is carried out at one point in time usually to evaluate the frequency of the outcome of interest for the purpose of public health planning. The cross-sectional survey was deemed appropriate for this study because, as reiterated by Pine, Pitts and Nugent (1997), it is useful in investigating the link between risk factor and the outcome of interest. Also, the use of the cross-sectional survey helped the researcher to obtain varying views on nutritional knowledge, food choices and eating habits of breast cancer patients and the kinds of foods that enhance their survival from different breast cancer patients who were receiving treatment at the Korle Bu Teaching Hospital.

As reiterated by Clegg-Lamptey (2014), there is a high occurrence of breast cancer in Ghana. Also, the researcher is very aware of the relationship between food choices of individuals and the onset of diseases. The cross-sectional survey research design was, therefore adopted so as to identify the contribution of nutrition in the lives of survivors of breast cancer.

## **Study Area**

This study was done at the Centre for Radiotherapy and Nuclear Medicine, a unit at the Korle-Bu Teaching Hospital which is a tertiary hospital and receives referrals from all over Ghana and its neighbouring countries such as Togo, Burkina Faso, etc. Currently, Ghana has three main cancer treatment centres. Two are publicly owned while one is privately owned. The facilities include the Korle Bu Centre for Radiotherapy and Nuclear Medicine, Komfo Anokye Teaching Hospital Cancer Treatment Centre, and the Sweden Ghana Medicine Centre. The National Centre for Radiotherapy and Nuclear Medicine at Korle Bu, Accra is the premier centre and became operational in 1997 through a collaborative effort between the Government of Ghana, acting through the Ministry of Health and the International Atomic Energy Agency (IAEA), and through the Ghana Atomic Energy Commission (GAEC). The National Centre for Radiotherapy and Nuclear Medicine is among Ghana's three leading hospitals that handle breast cancer cases in the country.

The centre stands tall in the sub-region as a centre of excellence for treatment and training. The centre was the first to introduce Linear Accelerators (LINACs) for improved cancer care and enhanced radiological security in Ghana. Common cancer types recorded at the centre include breast cancer, cervical cancer, prostate cancer, and head and neck cancer. The centre treats on average 70 patients per day. The vision of the centre is to be an ultramodern cancer centre in West Africa managed by competent Ghanaian specialists, equipped with standard machines, innovative and diagnostic tools, capable of early cancer detection, aside all, an effective treatment outcome and palliation of systems arising from the disease, while its mission is to provide safe, efficient and holistic treatment facilities which enhance quality of life,

prolong survival and above all improve condition of cancer patients across Ghana (Korle BU Teaching Hospital, 2013).

### **Research Instruments**

The structured questionnaire and an interview guide were the research instrument used for the study. The questionnaire had both open and closed ended questions and was structured into six sections covering relevant information.

The first section aimed at obtaining information on the respondents' demographic characteristics. These pieces of information included information on their ages, occupational background, onset of disease, location and educational background.

The second section also focused on the respondents' knowledge on breast cancer. These pieces of information included Age of disease onset , age when Medical Treatment Started, presence of any other health condition, how the patients got to know they had breast cancer, Can Breast Cancer be caused spiritually and also if there is any history of Breast Cancer in the family .

The third section consisted of statements that sought to examine the nutritional knowledge of the respondents as well as respondent's knowledge on the relationship between food and health problems or disease. These statements were adapted from Parmenter and Wardle (1999).

The fourth section sought to examine the eating habits of breast cancer patient. Pieces of information included how often they ate certain food items such as fruits, vegetables, pulse and oily seeds, alcohol, meat, cereal and whole grain, salt cured food, sweets, water and then how often they exercised.

The fifth section sought to examine factors influencing food choice of the respondents with statements adapted from Steptoe, Pollard and Wardle (1995). These factors were health, mood, convenience, sensory appeal and price.

The sixth section also sought to find out benefits of good nutrition in the management of breast cancer. The pieces of information included; food they have discovered to be helpful in managing breast cancer, whether they had experienced any change after practicing good nutrition, whether they would attribute their survival of the disease to good nutrition and finally foods they would recommend or avoid by Breast Cancer patients undergoing Breast Cancer treatment in order of preference.

### **Population**

The population for the study consisted of all breast cancer patients who visit the National Centre for Radiotherapy and Nuclear Medicine for treatment. They were made up of female breast cancer patients who had registered with the National Centre for Radiotherapy and Nuclear Medicine and had been receiving treatment for at least one year. Only breast cancer patients were considered appropriate for the study because they were better placed to provide the needed information for the study due to their experience.

### **Sample and Sampling Procedure**

A total of ninety (90) female breast cancer patients were used for the study. Convenience sampling (also known as Haphazard Sampling or Accidental Sampling) is a type of nonprobability or non-random sampling where members of the target population that meet certain practical criteria, such as easy accessibility, geographical proximity, availability at a given time, or the willingness to participate are involved for the purpose of the study. It is also referred to the researching subjects of the

population that are easily accessible to the research study. All newly diagnosed breast cancer patients were exempted from the study because they did not have enough experience about the diseases and, therefore, were not in good standing to provide the needed information for the study. This is because most of the questions asked in the study could be only answered by patients who have been receiving treatment for some time.

### **Ethical Considerations**

Permission was sought from the Korle-Bu Teaching Hospital Institutional Review Board as well as the Head of department of the study area. Verbal consent was obtained from each respondent before he or she would be made to take part in the study. The researcher also informed the respondents that the study is solely for academic purposes. Additionally, the respondents were assured of their anonymity as well as the confidentiality of any information that they provided. Moreover, each respondent was made aware of her freedom to withdraw from the study anytime at her own will.

### **Pre -testing**

Both the research questionnaire and the interview guide were pre-tested using 10 breast cancer patients from the Chemotherapy Suite of the Department of Surgery at the Korle Bu Teaching Hospital. The purpose of the pre-testing was to help ascertain the content validity of the instruments. It was also aimed at ensuring that the various questions were clear, easy to understand and straightforward. The Pre-testing exercise revealed that some questions were too technical which resulted in 90% of the respondents not being able to provide the appropriate answers for the questions. The researcher, therefore, edited the instruments to make them clearer in a way that could



be easily understood and answered by the respondents. The instruments were also given to experts in the areas of breast cancer for proof reading and make suggestions for further improvement. After these have been done, the researcher again administered the instruments to a different set of cancer patients from the Chemotherapy Suite of the Department of Surgery at the Korle Bu Teaching Hospital. This time around, all the respondents were able to respond to the various questions with ease.

### **Data Processing and Analysis**

The raw data that were gathered from the respondents were, first of all, edited, coded and put into themes, where appropriate. After that, the data were entered into statistical software for processing and analysis. The statistical software that was adopted for the data analysis was the Statistical Software for the Social Sciences (SPSS) version 21. SPSS was adopted for this study because it is very effective in identifying and comparing data to reach a logical conclusion. Frequencies and percentages were used to determine the direction of the responses. The results of the data analyses were presented in tables and figures.

## CHAPTER FOUR

### RESULTS

#### Overview

In this chapter, we looked at the analysis and information deduced from the data collected and inferences were made using the information obtained from the data to come out with solid conclusions and recommendations. The results are presented in accordance with the research questions that guided the study. Detailed results in relation to each research question have been provided.

#### Data Presentation

The data for this analysis was obtained from answers and comments given by patients living with the breast cancer disease, and this information was obtained by administering questionnaires with both open and close ended questions. A total of 90 patients (females) answered the questionnaire.

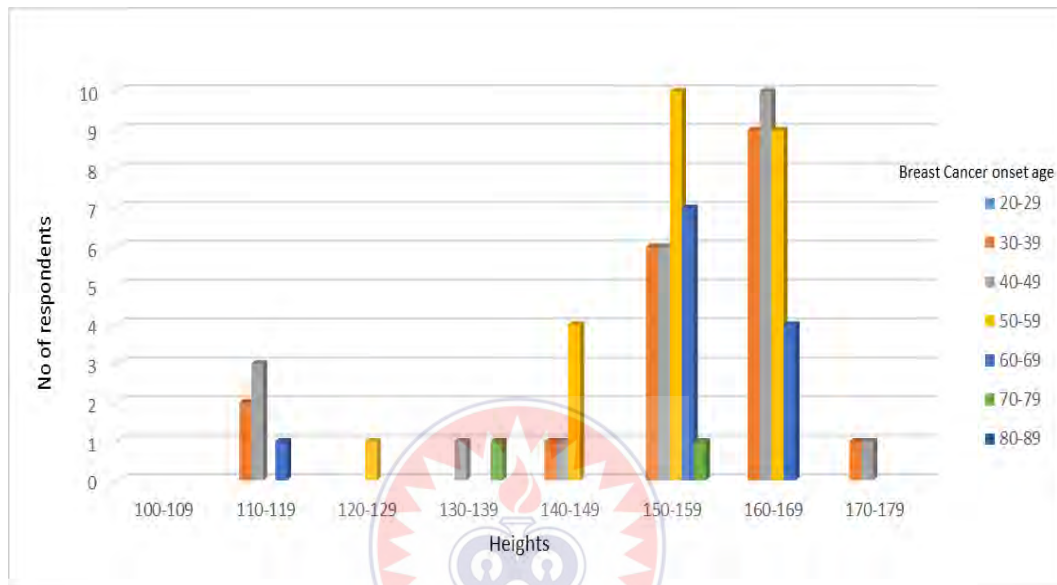
#### Exploratory Data Analysis

Below is the summary and analysis of the data.

Section one of the interview guide sought to obtain information on the respondents' demographic characteristics. This information includes information on their age, location, occupation, marital status, number of dependents and educational background. The results on the demographic characteristics of the respondents are presented in Table 4.1

**Table 4.1: Demographic Characteristic**

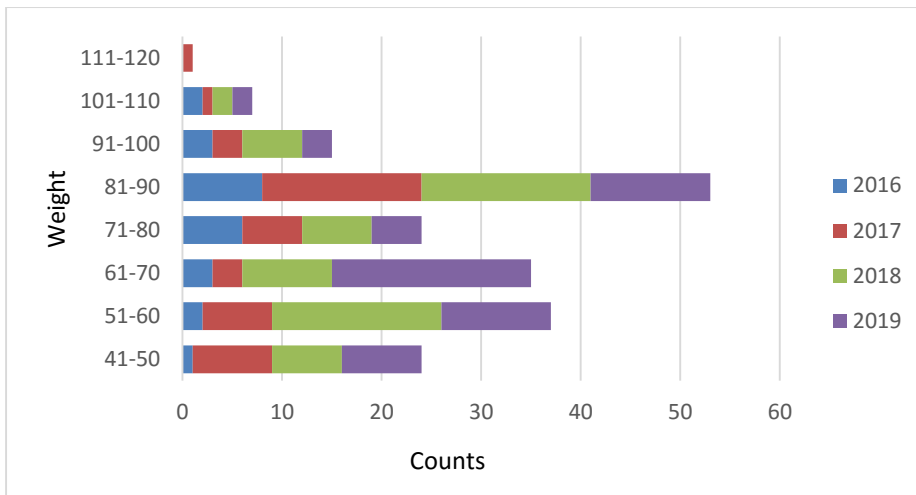
Age	Frequency (N)	Percentage (%)
Below 40years	11	12
Between 40-50years	29	32
Above 50years	50	56



Source : Respondents Hospital Folder

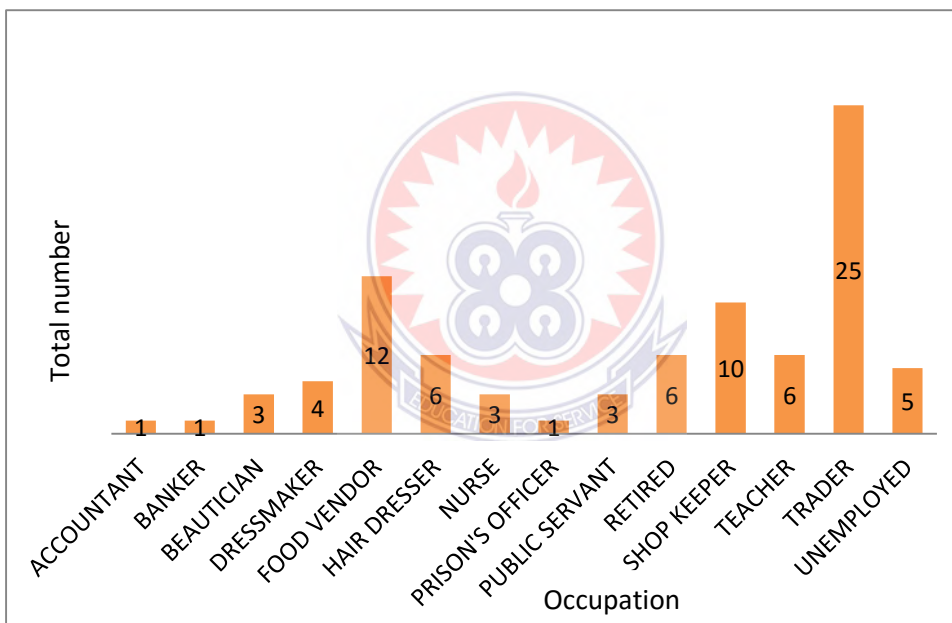
**Figure 4. 1: relationship between patient's height and breast cancer onset**

Fig 4.1 shows the relationship between patient's height and breast cancer onset ages. Ten patients within the height range of 150-159 contracted the breast cancer disease within ages 50-59, likewise 10 patients within the height range of 160-169 contracted the breast cancer disease within ages 40-49.

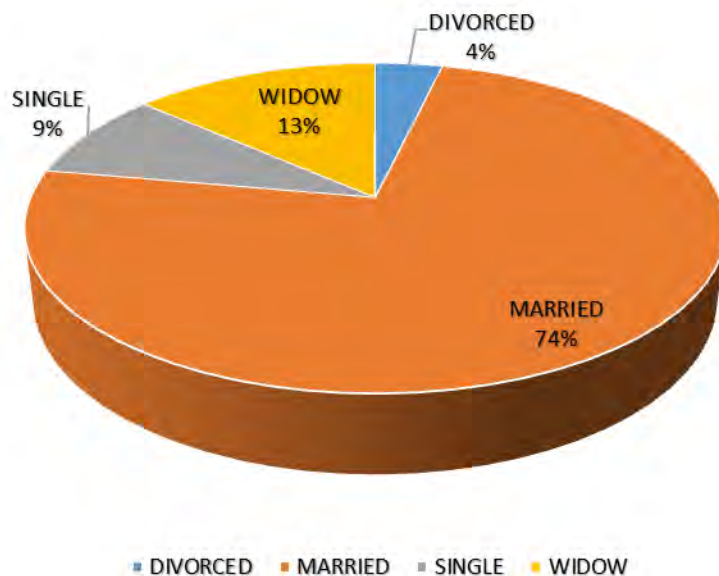


Source : Respondents Hospital Folder

**Figure 4.2: Weights of Patients**

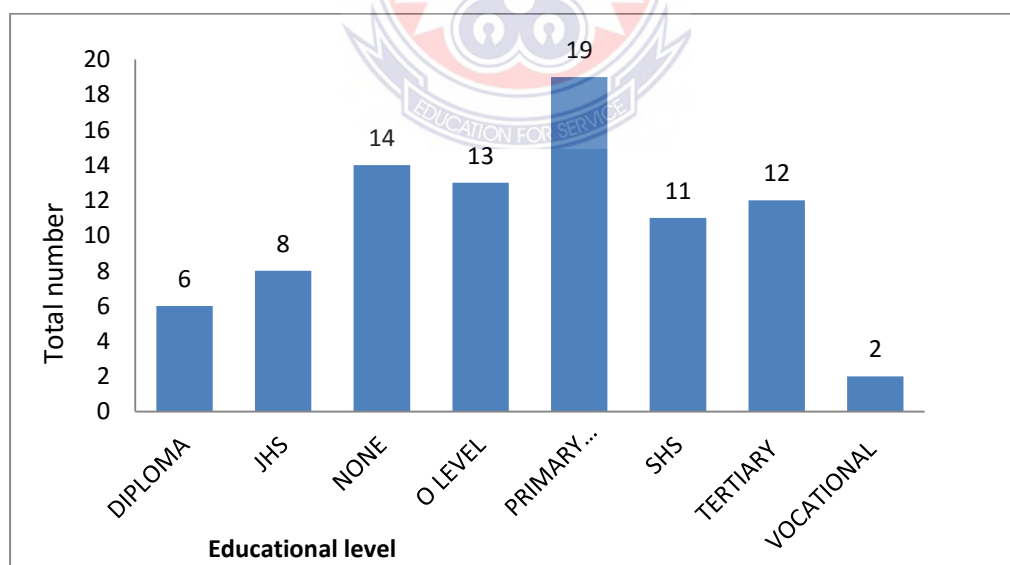


**Figure 4.3: Patient's Occupation**



**Figure 4.4: Marital Status of Patients under study**

The marital status of all patients under the study indicates that 74% of the patients are married, 13% of the patients are widows, 4% divorced and 9% single. This shows that majority of breast cancer patients were women married women.



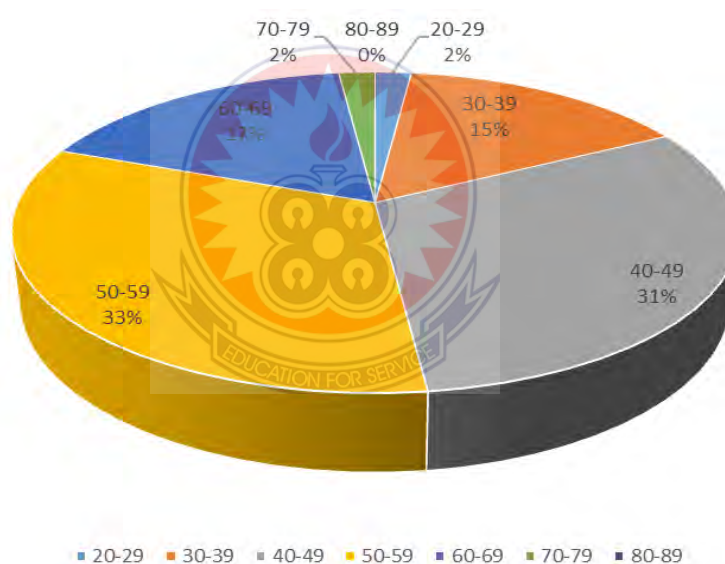
**Figure 4.5: Patients final education stage**

In relation to the respondents’ level of education, the results in Figure 4.5 show that majority of the respondents, 19 (22%) attended primary school only, 12 (14%) of them had been to the tertiary level of education, 11(13%) and 8(10%) had be educated

to the secondary and junior high school respectively and 14 (16%) had not attained any formal education.

### Knowledge of Breast Cancer Patients on Breast Cancer

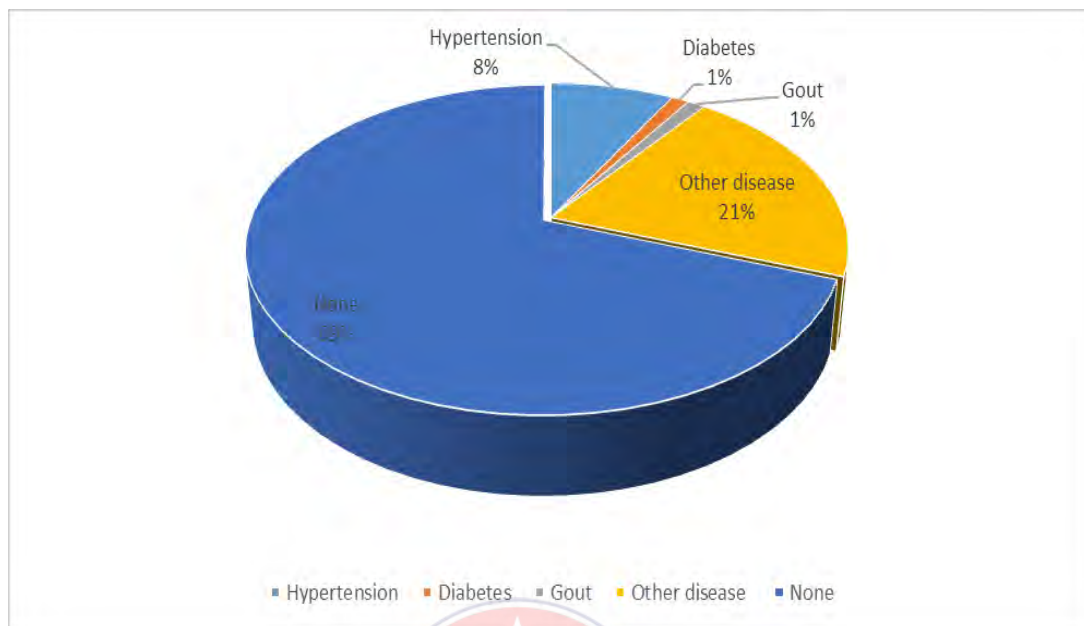
The research further sought to examine the respondents' level of knowledge on breast cancer. Deeming it appropriate to establish the level of knowledge of breast cancer patients on breast cancer, as to knowing exactly their level of knowledge on the disease can assist the various stakeholders in the health sector to put in place appropriate measures that can help maintain or even enhance their knowledge on the disease much more.



**Figure 4.6: Age of disease onset**

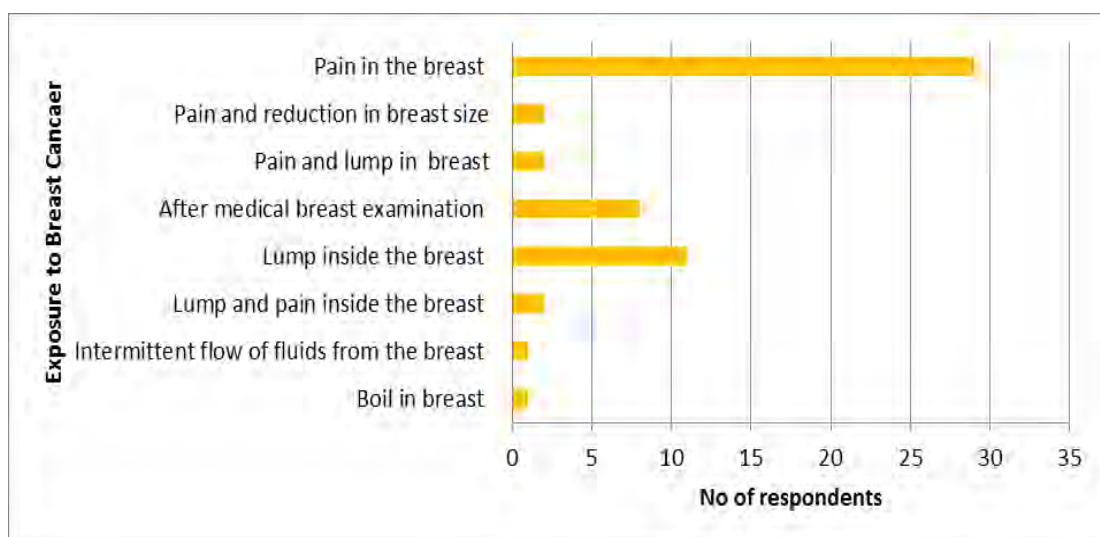
Figure 4.6 explains the onset age at which patient finds out she has the disease. Its show the various age ranges of breast cancer disease onset with 44% of total patients contracted the breast cancer disease within the ages 30-39 and 2% for ages 20-29 thus, both being a premenopausal stage, 17% and 27% for the following breast cancer disease onset ages respectively thus 50-59 and 40-49 and 9%, and 1% showing

patients contracted the breast cancer disease within the ages 60-69 and 70-79 respectively representing the postmenopausal stage.



**Figure 4.7: Breast Cancer Patients with other health conditions**

From Figure 4.7 it is observed that 69% of the patients under the study had no other health condition, 8% had hypertension, and 1% each representing patients with Diabetes and Gout. The remaining 21% representing patients with other health conditions (e.g. Eye problem) aside the ones stated above.

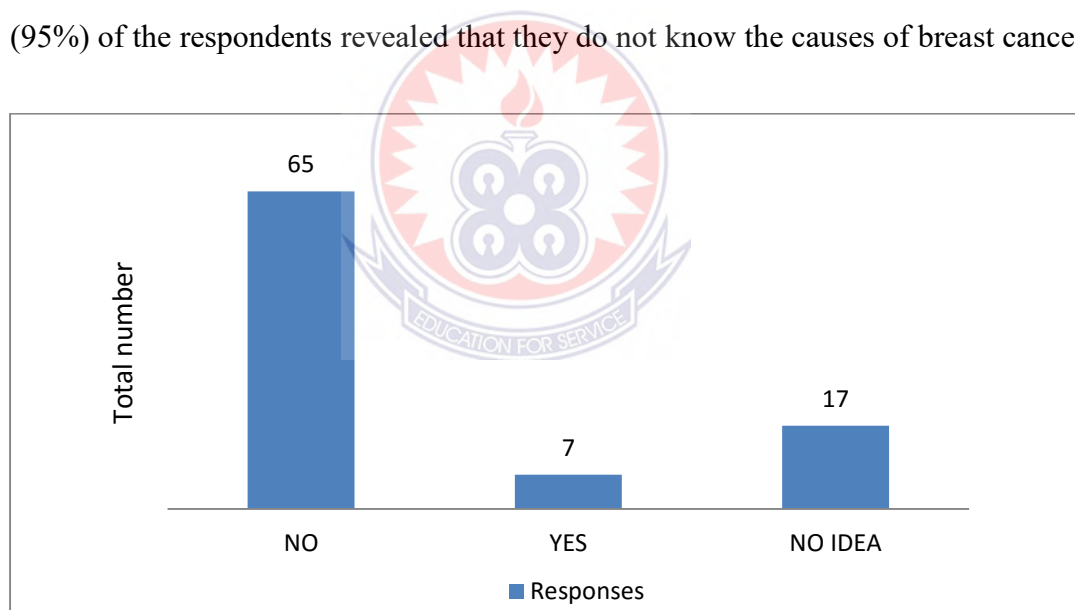


**Figure 4. 8: Exposure of breast cancer**

From Figure 4.8 we can deduce that the top three ways by which patients got to know they had the breast cancer disease was as follows:

- They noticed a pain in their breast and visited the hospital
- They noticed they had lumps in their breast and visited the hospital
- They had a random breast cancer examination and it was medically revealed to them.

This shows that majority 81(91%) of the respondents did not know that they had breast cancer before they were diagnosed of the disease. However, 77 (85%) of them revealed that they had heard about breast cancer before they were eventually diagnosed of the disease. With regard to the causes of breast cancer, majority 86 (95%) of the respondents revealed that they do not know the causes of breast cancer.



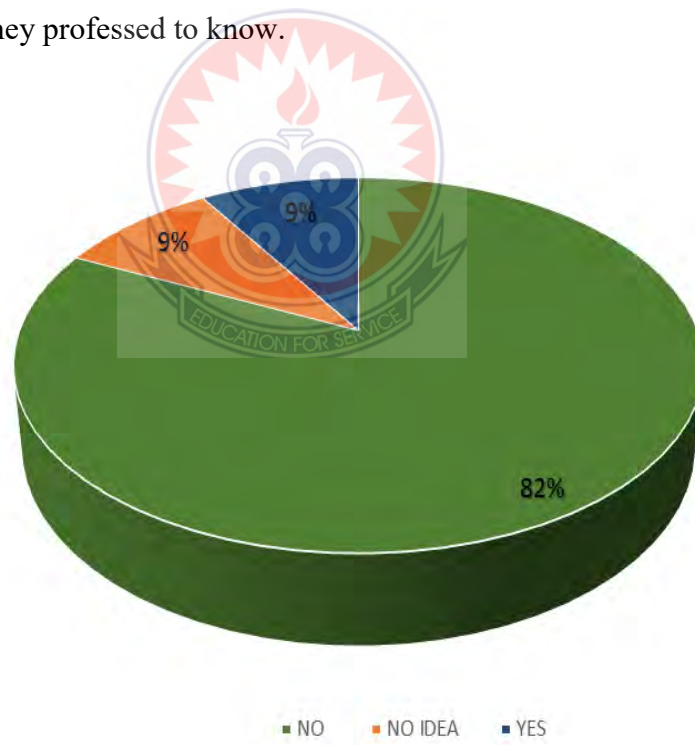
**Figure 4. 9: Spiritual and breast cancer**



**Table 4.2: Traditional medicine and breast cancer**

<b>SPIRITUALITY AND ITS RELATION TO BREAST CANCER</b>		<b>NO</b>	<b>NO IDEA</b>	<b>YES</b>	<b>Total</b>
NO		41	10	5	56
NO	IDEA	15	4	3	22
YES		6	1	1	8
<b>Total</b>		<b>62</b>	<b>15</b>	<b>9</b>	<b>86</b>

According to Table 4.2 and figure 1.8 show 8 representing 9% of the respondents were of the view that breast cancer can be caused spiritually. Only 8 (10%) of the respondent revealed that they know of traditional medicines for treating breast cancer. However, they were unable to cite even a single example of those traditional medicines that they professed to know.

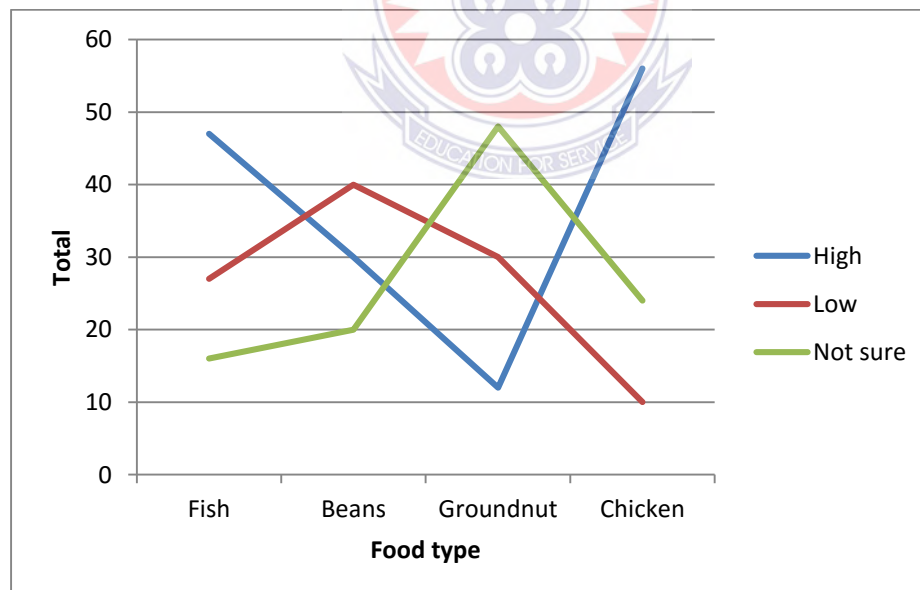
**Figure 4. 10: History of breast cancer traits in family**

From the analysis, 82% of the patients revealed they had no history of breast cancer trait in the family, 9% said they had breast cancer trait in the family with the remaining 9% expressing no idea on the topic in question.

The respondents' General Knowledge on Nutrition

*Respondents' Knowledge on the Amount of Protein in Foods*

The research questions sought to examine the level of knowledge of the breast cancer patients in relation to nutrition. To determine this, the respondents were presented with a number of questions on nutrition. Each question had the options; high, not sure, and low of which the respondents were required to answer each by selecting the appropriate option. The first thing that the study sought to examine regarding the nutritional knowledge of the respondents was their level of knowledge on protein foods. The result is presented in Figure 4.11

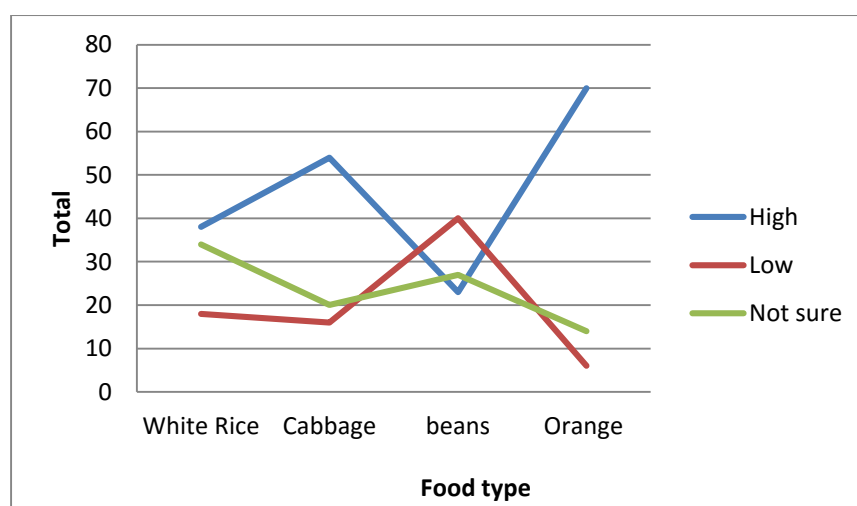


**Figure 4. 11: Respondents knowledge on protein food**

Figure 4.11 contains results on the respondents' views on the amount of protein contained in chicken, fish, beans, and groundnut. In relation to chicken, the results showed that 56 (62%) of the respondents were of the view that chicken has high

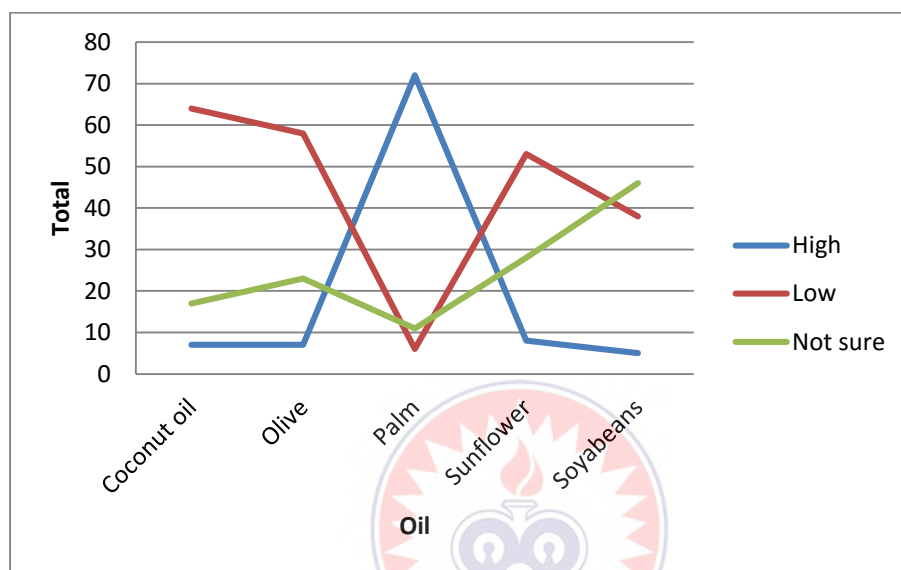
content of protein. Ten of the respondents representing 23% disagreed that chicken contain high amount of protein while 24 (27%) of the respondents were not sure about the amount of protein contained in chicken. With regard to fish, the results from Figure 4.11 again show that 27 (30%) of the respondents disagreed that the amount of protein contained in fish is high. Sixteen (18%) of the respondents were not sure whether fish contained high amount of protein while 47 (52%) of the respondents agreed that fish contain high amount of protein.

Additionally, results from Figure 4.11 shows that 30 (33%) of the respondents agreed that beans contain high amount of protein. Twenty (22%) of them were uncertain about the amount of protein contained in beans while the remaining 40 (45%) of the respondents disagreed that beans contain high level of protein. The results from Figure 4.11 further showed that 12 (13%) of the respondents agreed that groundnuts contain high amount of protein. However, 48 (53%) of the respondents were not so sure about the amount of protein contained in groundnut while the remaining 30 (34%) of the respondents disagreed that beans contain high level



**Figure 4. 12: Respondents' Knowledge on the Amount of Roughage in Foods**

Results from Figure 4.12 shows that majority 70 (78%) of the respondents agreed that orange contains high amount of roughage. Additionally, majority of the respondents agreed that all the following contains high amount of roughage: cabbage 54(60%) and white rice 38 (42%). However, 40 (44%) of the respondents disagreed that beans contains high amount of roughage.



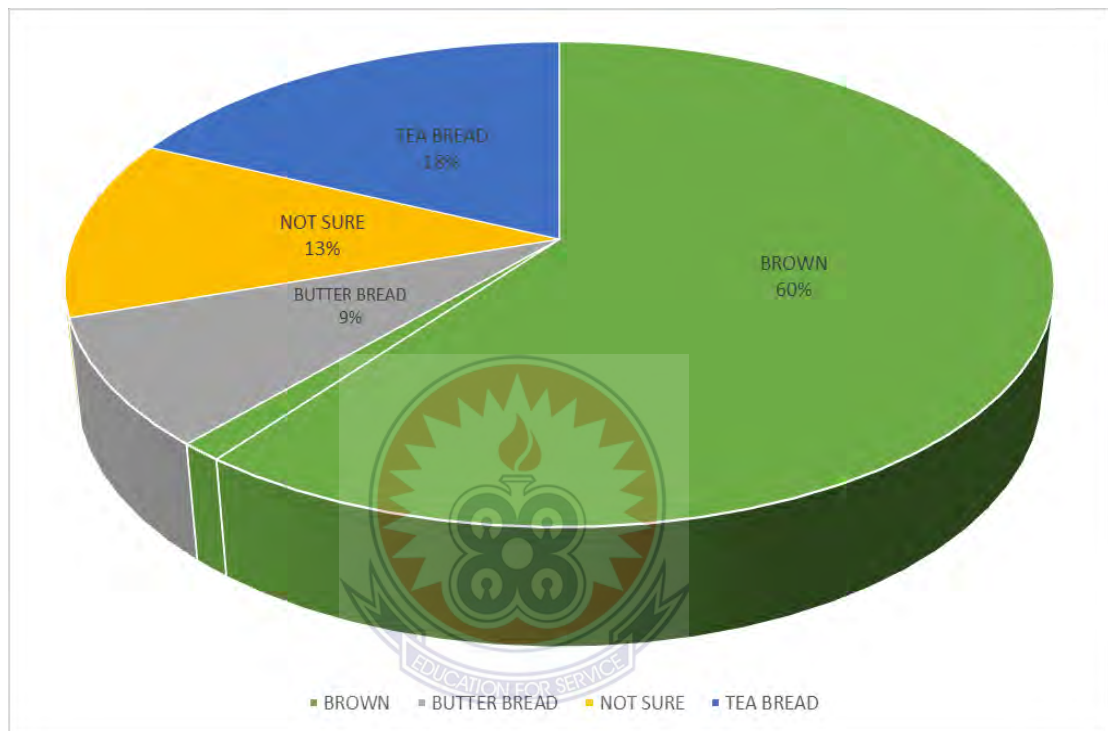
**Figure 4. 13: Respondents' Knowledge on Unsaturated Foods**

Results from Figure 4.13 show that majority of the respondents agreed that palm oil was the only oil that contain high amount of unsaturated fat. In a like manner, 64 (71%) of the respondents agreed that coconut oil is low in unsaturated fat. However, majority (46) of the respondents were not sure of the unsaturated fat content in soya bean oil.

**Table 4. 3: Respondents view on brown sugar**

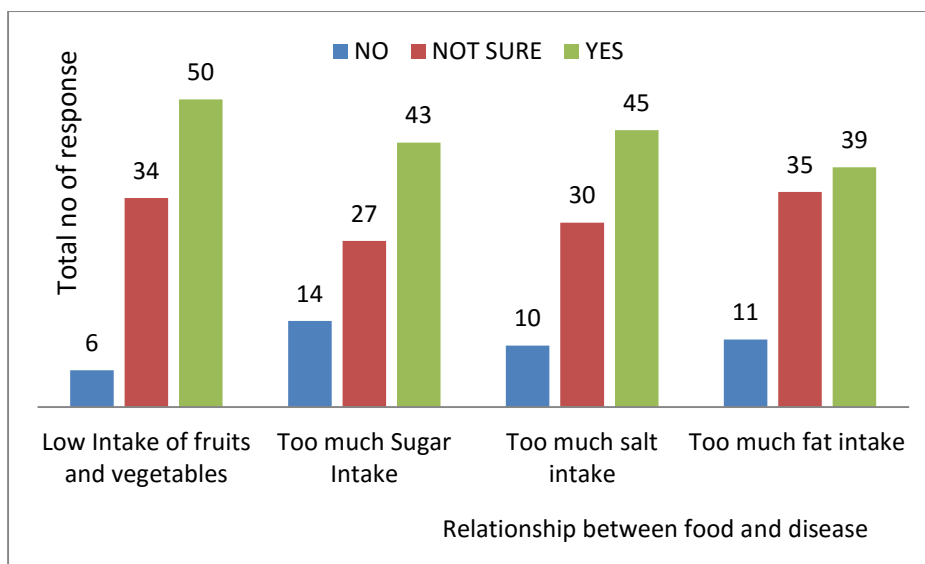
Brown Sugar an alternative for White Sugar	Response (%)
AGREE	64%
DISAGREE	12%
NOT SURE	24%
<b>Grand Total</b>	<b>100%</b>

Table 4.3 explains that 64% of total number of patients under this study agrees to the view that brown sugar is the best alternative (healthier) to white sugar, twelve percent (12%) disagreed to the statement, and 24% were not sure about brown sugar being the best alternative for white sugar.



**Figure 4. 14: Respondents' view on bread type with the most vitamins and minerals**

From Figure 4. 14, 50 (60%) of the respondents were of the view that brown bread contains the highest amount of vitamins and minerals compared to tea bread and butter bread. However, 10 (12%) of the respondents were not sure of the various bread types with the highest quantity of vitamins or minerals.



**Figure 4. 15: Relationship between Food and Health Problems or Disease**

From Figure 4.15, majority of the respondents revealed that they were aware of some major health problems or diseases that are related to the following: a low intake of fruits and vegetables 50 (56%), high amount of sugar consumed 43 (48%), high amount of salt consumed 45 (50%), and too much fat consumption 39 (43%). However, apart from constipation and diabetes which almost all of the respondents were able to provide as one health problem associated with the low consumption of fruits and vegetables, and high consumption of sugar respectively, none of them was able provide even a single health problem or condition that is associated with the following: the amount of salt that and fat one consumes.

#### ***Eating Habits of Breast Cancer Patients***

The eating habits of the respondents were also examined. Major areas that were considered included the following: frequency of fruits and vegetable intake ; intake of pulses and oily seeds; intake of sweets and alcohol; amount of water intake; inclusion of animal protein in diet; and frequency of exercise. The results are presented in Tables 4.4 and 4.5.

**Table 4.4: Overview on eating habits and food choice-before breast cancer disease treatment**

EATING HABIT	Percentage		
	Always	Once a while	Not At all
<b>Fruit intake</b>	21%	76%	3%
<b>Vegetable intake</b>	56%	39%	5%
<b>Alcohol</b>	-	22%	78%
<b>Sweets</b>	2%	34%	64%
<b>Exercise</b>	11%	61%	28%
<b>Pulse and oily seeds(per week)</b>	15%	75%	10%

**Table 4.5: Overview on eating habits and food choice-during breast cancer disease treatment**

EATING HABIT	Percentage		
	Always	Once a while	Not At all
<b>Fruit intake</b>	40%	59%	1%
<b>Vegetable intake</b>	59%	39%	2%
<b>Alcohol</b>		19%	81%
<b>Sweets</b>	1%	30%	69%
<b>Exercise</b>	10%	66%	24%
<b>Pulse and oily seeds(per week )</b>	14%	77%	9%

### *Intake of Fruits*

With regard to the frequency of fruits intake, majority of the breast cancer patients were found to be taking in fruits once in a while that is before and during the treatment of the breast cancer. This was represented by 76% and 59% for before and during the treatment of the breast cancer respectively. A slight spike (19%) from this is seen in the percentage of the breast cancer patients, who were found to be taking in fruits always (21%) before and (40%) during the treatment of the breast cancer. Table 4.5 indicates a drop in breast cancer patients who were found not to take fruits at all to 1% thus after starting treatment.

### ***Intake of vegetables***

Regarding the intake of vegetables, majority of the breast cancer patients were found to be taking in fruits always both before and during the treatment of the breast cancer. No change is seen in the respondents' responses on taking in vegetables once a while both before and during the treatment of breast cancer.

### ***Intake of Alcohol***

Results from Table 4.4 and Table 4.5 revealed that majority of the respondents did not take in alcohol before (78%) and during (81%) the treatment of the breast cancer. The percentage of patients who did take in alcohol once awhile also decreased from (22%) to (19%), respectively.

### ***Intake of Sweets***

Results from Table 4.4 and Table 4.5 shows that majority of the respondents took in low and no sweets before and during the treatment of the breast cancer respectively and this is constituted in percentages as follows;

*Low intake:* Before (34%) during (30%) and *No intake:* Before (64%) during (69%)

### **Frequency of Intake of Pulse and Oily Seeds in a Week**

The weekly intake of pulse and oily seeds by the respondents both before and during the treatment of the breast cancer was also examined in the analysis. The results are presented in Table 4.4 and Table 4.5 show that most of the respondents once in a while took pulse and oily seeds such as kidney beans, Bambara beans, soya beans, groundnuts, etc. both before and during the treatment of breast. This was represented by (75%) and (77%) of the respondents for before and during the treatment of breast cancer respectively. Those breast cancer patients who did take pulse and oily seeds occasionally constituted (10%) and (9%) of the respondents for both before and during the treatment of the breast cancer respectively. Only a few of the respondents,

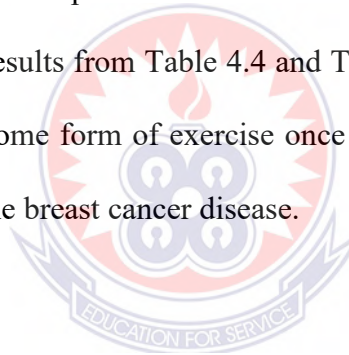


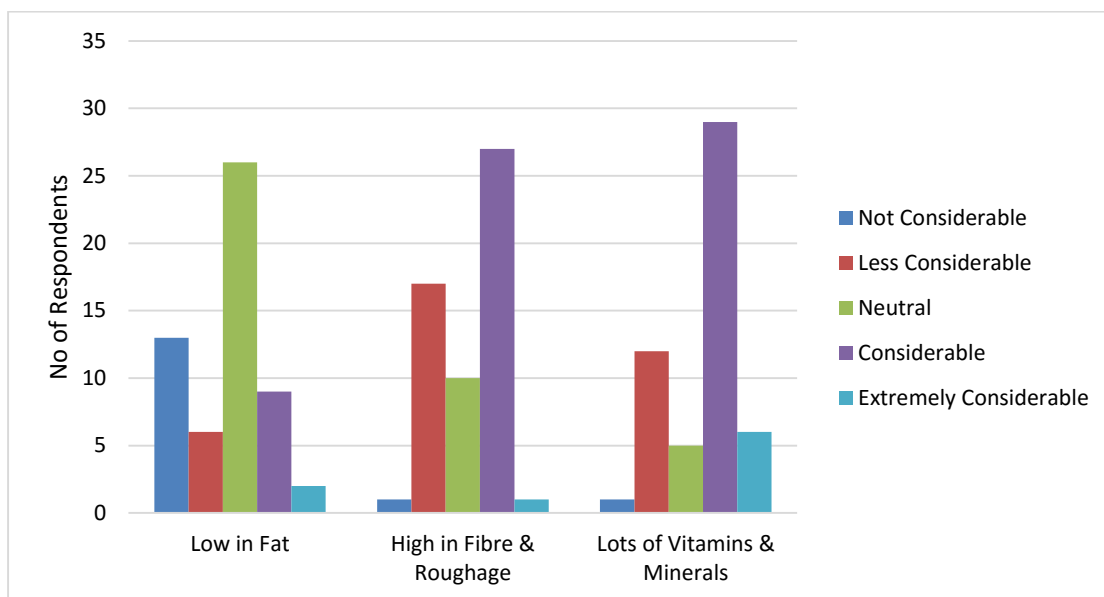
thus (15%) and (14%) took pulse and oily seeds very often both before and during the treatment of the cancer.

Change in Animal Protein preference before and during 64% of breast cancer patients in study still maintained their animal protein preference with 36% changing their preference. Also, 75% of the patient who changed their animal protein preference went in for fish as their sole animal protein source.

### **Frequency of Exercise**

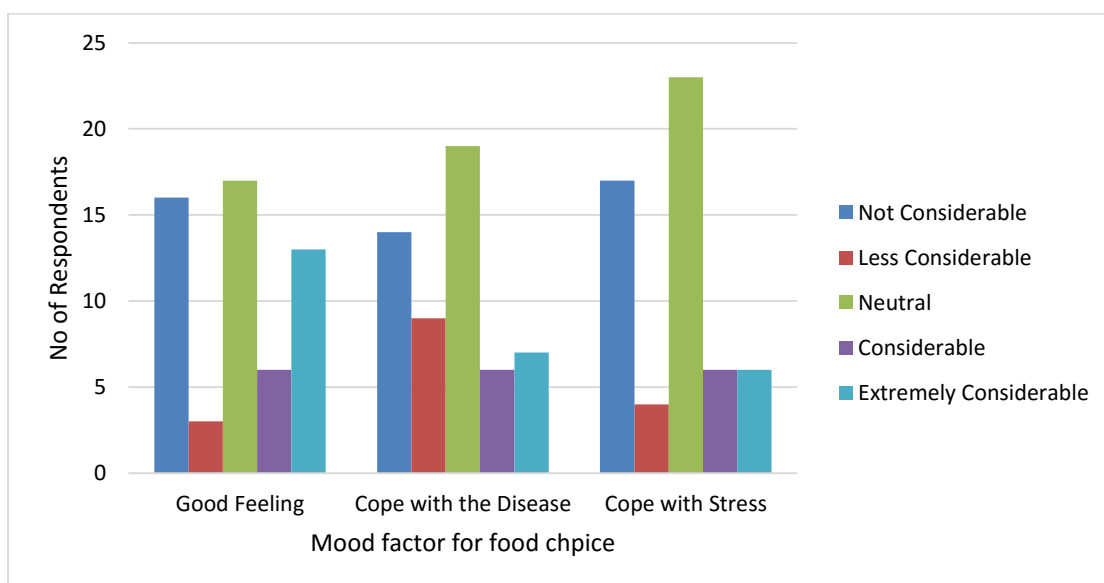
The last issue that was examined regarding the food choices and eating habits of the breast cancer patients was the extent to which they did exercise their body. The pattern of exercise by the respondents both before and during the treatment of the cancer was examined. Results from Table 4.4 and Table 4.5 show that majority of the respondents undertook some form of exercise once a while before (61%) and during (66%) the treatment of the breast cancer disease.





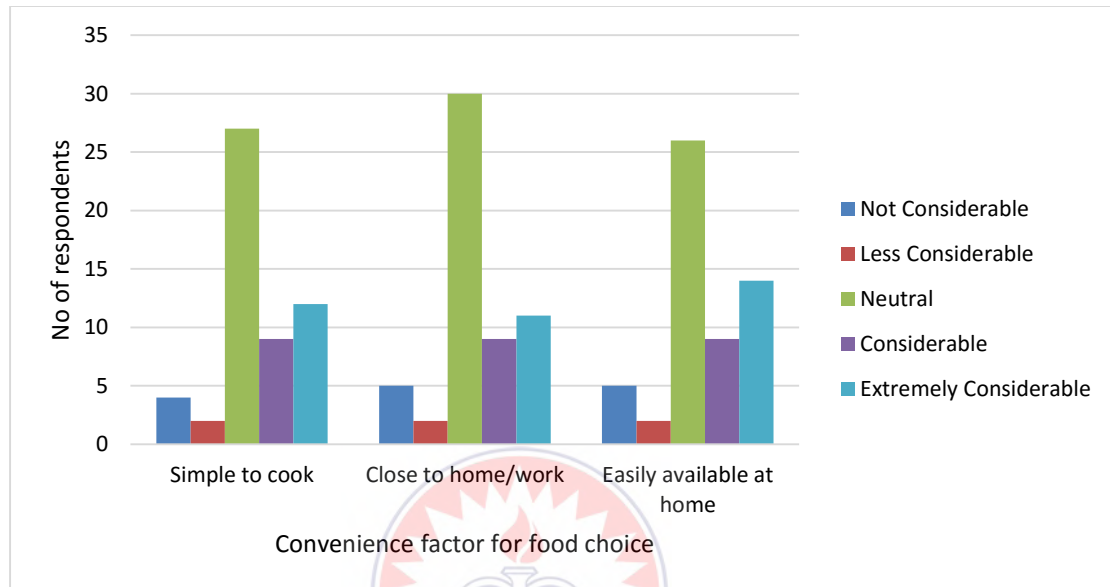
**Figure 4. 16: Health as a factor influencing food choice**

The Figure 4.16 shows that majority of the respondents gave a moderate rating when it comes to considering health as a factor in making a food choice. Forty seven, (52%) for low amount of fat and 34(38%) for high amount of vitamins and minerals. Also 40(44%) rated the extremely high the health factor in making a food choice with respect to high fibre and roughage amount in the food.



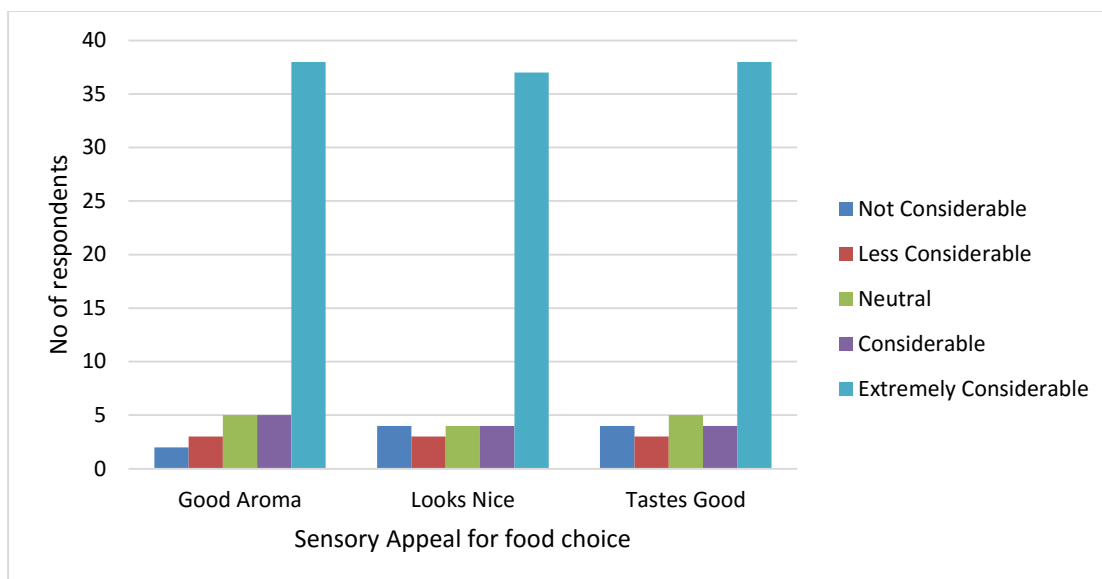
**Figure 4. 17: Mood and food choice**

The Figure 4.17 above shows that majority of the respondents assigned a moderate rating to the mood factor associated with making a food choice. 32(36%) for the feeling the food gives to the consumer, 34 (38%) associated with the ability for food to cope with diseases and 42 (47%) for food coping with stress thus reviving energy.



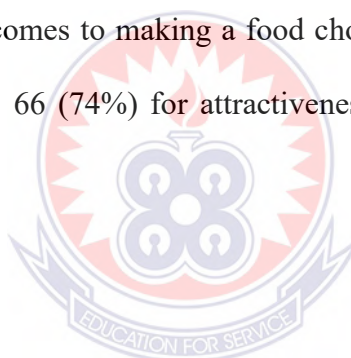
**Figure 4. 18: Convenience and food choice**

Figure 4.18 above shows that majority of the respondents assigned a moderate rating to the convenience factor (ease with which the food is made readily available) associated with making a food choice. Fifty two of the respondents (58%) for simplicity in cooking the food, 37(41%) associated with proximity to buying the food and 46(51%) for availability of the food at home.



**Figure 4. 19: Sensory appeal to make a food choice**

Figure 4.19 shows that majority of the respondents rated the sensory appeal factor extremely high when it comes to making a food choice. A total number of 65 (73%) were in for good aroma, 66 (74%) for attractiveness of meal and 63 (70%) for the taste of the food.





**Figure 4. 20: Price factor in making a food choice**

Figure 4.20 shows that majority of the respondents rated moderately the price factor they consider when making a food choice. The results were 48 (53%) for how expensive the food is and 42 (47%) for value received in exchange for the money spent.

**Table 4. 6: Impact of nutrition and the survival of breast cancer**

Comments on the role of Food in Breast Cancer Management	Positive Change after practicing good nutrition (relative to each patient)			Grand Total
	NO	NOT SURE	YES	
NO	12		10	22
NOT SURE	9	11	12	32
YES	7	2	26	35
<b>Grand Total</b>	<b>28</b>	<b>13</b>	<b>48</b>	<b>89</b>

In Table 4.6 the comments of patients on food as a measure to manage breast cancer as against patients who observed an improvement in their physical health after

practicing good nutrition. Twenty six patients (74%) of patients who commented ‘YES’ and 48 (54%) of patient who saw a positive change after practicing good nutrition) commented that food plays a major role in breast cancer management and hence saw improvement after practicing good nutrition. This indicates that patients with good and appropriate information on food playing a major role in managing breast cancer are most likely to see an improvement in their health condition after practicing good food nutrition. Some of the respondents revealed that they tend to feel much better when they consume lots of fruits and vegetables than fatty foods.

Some of the changes that were revealed by the respondents included: less fatigue, improved energy level, less depression, less pain in the breast and other parts of the body, improved appetite for food, healthy weight, and sound and long sleep.

### **Foods that Enhance the Survival of Breast Cancer Patients**

The final research question sought to find out the kinds of foods that improve the health conditions of breast cancer patients. First of all, the study sought to identify the kinds of foods that the respondents deem very helpful in managing their breast cancer condition. In response to this question, a greater number of the respondents revealed that consuming fruits and vegetables, low-fat foods, sugar-free drinks/fluids, and high-fibre content foods (bread, beans, fresh and dried fruits, etc.) enhance the overall health condition and the recovery of breast cancer patients.

Additionally, the respondents further revealed that regular physical activities and intake of highly nutritious foods have helped them maintain high level of energy. For example, one of the respondents had this to say “anytime that I undertake physical activity, say, take a short walk before breakfast or lunch, I am able to eat very well.” Some of the respondents also revealed that having been advised by their doctors to eat

often, even if little, they have been able to consume enough food every day despite a reduction in their appetite for food due to the treatment that they were currently undergoing.

In addition to this, most of the respondents revealed that drinking plenty water, eating high-fibre foods as breakfast and high consumption of roughage helps them to get rid of constipation as they are able to empty their bowel so easily. Others also revealed that herbal tea such as mint and ginger helps them to settle their stomach. Besides, most of the respondents revealed that the constant intake of fruits and vegetables, and the less consumption of fatty foods have been helping them to feel more energised ever, since they started receiving treatment for the breast cancer.

When asked to suggest foods that cancer patients should often consume to facilitate their recovery, a significant number of the respondents suggested the following foods: whole grains such as wheat, oats, rice, corn, etc.; vegetables such as cabbage, carrots, garlic, onion, shallot, tomatoes, etc.; legumes such as soybeans, pea, etc.; and cereals such as maize, rice, wheat, etc. On the flip side, the respondents suggested that breast cancer patients should avoid the consumption of the following: fatty foods; alcohol; highly saturated foods such as beef, cheese, cream, butter, margarine, etc.; and commercially packaged baked foods.

They also suggested that women should seek regular breast examination once a while and early medical treatment should they notice any unusual change in their breast.

## CHAPTER FIVE

### DISCUSSION

#### Overview

This chapter discusses the results of the study. The discussion has been presented in line with the research questions that guided the study. Detailed discussion of answers to each research question has been presented. Discussion on the demographic characteristics of the respondents has been presented first, followed by that of the main research questions.

#### Demographic Characteristics of the Respondents

The results revealed that the study was dominated by post-menopausal breast cancer patients. This is not very surprising as breast cancer is known to affect women who are mostly in their post-menopausal stage of life. For example, Hyman *et al.* (2002) contended that 75% of all breast cancer cases develop in post-menopause women and women who are 40 years and above. Also, Singletary *et al.* (2003), contended that women who experience the onset of menopause at the age of 55 years have a high risk of developing breast cancer. According to Komen (2013), after menopause stage, when the ovaries stop making oestrogen, most of a woman's oestrogen is produced from fat tissue. However, more fat tissue after menopause can increase a woman's chance of developing breast cancer as it raises oestrogen levels.

Also, women who are overweight tend to have higher blood insulin levels. Higher insulin levels have also been associated to some cancers, including breast cancer (Komen, 2013). The policy implication of the results as observed in the current study is that policies and strategies by the various stakeholders in the health that are geared towards improving the lives of breast cancer patients or creating awareness about



breast cancer should always have women who are in their post-menopausal stage as part of the target population. The reason is that this group of women have been found by the study to be mostly affected by the breast cancer ailment.

The results again reveal that majority of the breast cancer patients were into trading. In Ghana, most women, particularly those who are into petty trading are usually fond of putting money in their bra. However, this practice tends to increase their risk of contracting a number of infections and diseases, including breast cancer. Healthcare professionals should, therefore, educate women on the various health risks that come along with the keeping of money in the bra. When this is done, more women would be discouraged from keeping money in their bra, and this will greatly help to reduce their risk of getting breast cancer and other related infections consequentially.

With respect to the disease onset, the outcome of the study showed that majority of the respondents had the disease before the age of 40 years. This finding affirms an assertion by Adade (2015) that apart from the high percentages of reported cases of women with breast cancer who are between the ages of 50-65 years, more young women between the ages of 20-30 years are being diagnosed of the disease. This finding calls for the need to educate, especially young ladies on some of their current lifestyles that can increase their risks of getting breast cancer. For instance, most young ladies of today are fond of tattooing almost every part of their body, including their breast. However, tattooing one's breast can really increase her risk of getting breast cancer.

### **General Nutritional Knowledge of the Respondents**

Results of the study on the nutritional knowledge of the respondents revealed that the breast cancer patients had a moderate level of knowledge regarding the amount of

protein contained in the following foods: chicken, fish, beans and groundnuts. Out of the five questions that sought to assess their level of knowledge on the amount of protein contained in the aforementioned foods, majority of them had a considerable knowledge on questions asked with only a few of these respondents getting approximately three out of these five questions right. The results suggest the need to intensify education for breast cancer patients on the amount of protein contained in various foods so as to assist them in making healthy food choices.

As reiterated by Wardle, Parmenter and Waller (2000), nutrition knowledge is an essential factor in determining food choices. Similarly, a study conducted among middle aged men in France by Dallongeville *et. al* (2000) showed that the nutrition knowledge was related with specific patterns of food choice and nutrient intake, and concluded that nutrition knowledge influenced the respondents' dietary behaviour. Therefore, the average knowledge level of the respondents regarding to the amount of protein in the various foods can cause them to make poor dietary choices, a situation than can even aggravate their health condition.

With regard to the amount of roughage in white rice, cabbage, beans, and orange, the results of the study revealed that the breast cancer patients had an appreciable level of knowledge in relation to the amount of roughage contained in these foods. This is a very good observation. Foods that contain high amount of roughage greatly help in the prevention of constipation and other related health challenges. Therefore, it is expected that breast cancer patients be guided by their knowledge on roughage content in the various foods when making dietary choices. Notwithstanding, breast cancer patients need to be educated more on foods that are rich in roughage as not all of them were able to the answer the questions bothering on the amount of roughage contained in foods correctly.

Additionally, the results of the study indicated that the breast cancer patients had a considerable knowledge on monounsaturated fat oils such as coconut oil, olive oil, palm oil, sunflower oil, and soya bean oil. This observation is very encouraging as knowing the nature of these types of oil would, to a large extent, help the breast cancer patients in making good choices anytime they are cooking. Higher intake of olive oil for instance, has been found to be significantly related to a lower risk of developing breast cancer (Martin-Moreno *et al.*, 2013).

Further, most of the respondents were of the view that brown sugar is a healthy alternative to white sugar. In Ghana, the white sugar has been vilified and often described as dangerous to the health of humans. However, nutrition experts claim that excessive consumption of either white or brown sugar can pose a serious health threat as it can result in a number of sugar-related health issues like diabetes. The breast cancer patients need to be made aware of this as most of them may end up consuming an excessive amount of the brown sugar due to their belief that it is very healthy and that would not have any negative health implications on them.

Also, there is the need to educate breast cancer patients on the amount of vitamins and minerals that the various types of bread contain as well as the type of bread that is best for them. This is because a substantial number of them were of the view that brown bread contains the highest amount of vitamins and minerals compared to tea bread and butter bread. Educating them on the amount of vitamins and minerals that the various types of bread contain will help them to make healthy choices anytime they decide to go in for bread.

### **Level of Knowledge of the Respondents on Breast Cancer**

The results showed that the knowledge of the breast cancer patients on breast cancer, particularly on the causes of breast cancer was very low. This creates the need to educate all women on the causes of breast cancer. According to Wiafe-Addai (2013), about 60% of Ghanaian women who are diagnosed with breast cancer are usually found in the advanced stages of the disease. The meagre knowledge of breast cancer patients on breast cancer as observed in the current study might be one of the major causes for the late report of the disease to the hospital.

When women become conscious of the causes of breast cancer, many of them would stop doing certain things that make them more susceptible to getting the disease. Also, teaching women some of the basic symptoms of breast cancer could help in the early detection of the disease for the appropriate steps to be taken in a timely fashion. This will consequently help to stem the situation where patients wait till the disease gets out of hand before presenting it at the hospital for treatment. As reiterated by Zaney (2015), it is essential for women to know basic breast cancer detection procedures to enable them detect the signs of a possible breast cancer at an early stage for treatment. In a similar fashion, the US Breast Cancer Organisation (2015) contends that breast cancer may be successfully treated if it is detected early enough. Komen (2013) also posits that nearly all women diagnosed at the early stage of breast cancer can be cured.

The outcome of the study again showed that a few of the breast cancer patients were not sure whether or not there is a record of breast cancer in their families. Family history of breast cancer has been found to be one of the major risk factors associated with breast cancer. According to Komen (2013), breast cancer risk is easily developed by women whose close blood relatives have the diseases. Komen further posits that

having one first-degree relative (mother, sister, or daughter) with breast cancer approximately doubles a woman's risk. Having two first-degree relatives increases a woman's risk of getting breast cancer about 3-fold. It is, therefore, very fundamental for every woman to be abreast with her family history of breast cancer so as to enable her know her chances of also getting the diseases. When this is done, she would be able to take appropriate preventive measures at the right time.

## **Respondents' Knowledge on the Relationship between Food and Health**

### **Problems or Diseases**

The outcome of the study with respect to the respondents' knowledge on the relationship between certain foods and their related health problems or diseases showed that apart from diseases associated with high sugar intake and low fruit intake, the breast cancer patients did not have sufficient knowledge on the relationship between the other foods and their related health problems or diseases. The policy implication of these findings is that women, especially breast cancer patients should be educated on the association between certain health problems or diseases, and the kind of food they consume. This will help them to know the best foods to consume at all times.

## **Food Choices and Eating Habits of Breast Cancer Patients**

### ***Frequency of Fruits Intake***

With regard to the frequency of fruits intake, the results of the study suggested that the frequency of fruits intake by the breast cancer patients was not encouraging, considering the less significant change in fruit intake after patients started treatment. The breast cancer patients are, therefore, encouraged to step up their consumption of fruits. This is because their failure to consume fruits on regular basis may deny them

of the nutritional benefits of fruits. The American Cancer Society's guidelines on diet, nutrition and cancer prevention admonish all cancer patients to take five or more servings of fruits and vegetables each day.

Studies also suggest that women who eat more fruits have a lower risk of developing breast cancer (American Cancer Society, 2010). This may be due to the fibre and antioxidants content in them. Also, if a person changes his or her diet to include more fruit and vegetables, as well as more starchy carbohydrates, he or she will almost certainly eat less fat. As a result, the person will be more likely to keep his or her weight within a healthy range. This helps to reduce one's risk of getting breast cancer (American Cancer Society, 2010).

#### *Types of Vegetables Eaten by the Breast Cancer Patients*

The results of the study suggested that the frequency of fruits intake by the breast cancer patients was a bit encouraging; approximately 60% of the patients had a vegetable in their daily diets. The breast cancer patients are, therefore, encouraged to step up their consumption of vegetables. The consumption of vegetables enhances the survival of breast cancer patients. Hence, the breast cancer patients should continue with these good practices so as to enhance their health condition.

Although the mode in which the respondents did take in these vegetables was not examined in the current study, the American Cancer Society (2010) posits that juicing can actually add variety to one's diet, and can also serve as a good way to get vegetables and fruits, particularly if the person has trouble chewing or swallowing. The American Cancer Society again posits that juicing helps the body to absorb some of the nutrients in vegetables and fruits. Cancer patients are, therefore, advised to buy juice products that are 100% vegetable or fruit juices and pasteurized to remove harmful germs. This, according to the American Cancer Society (2010), is better for

everyone, especially for people who have weak immune systems, such as those receiving chemotherapy.

#### *Frequency of Intake of Pulse and Oily Seeds in a Week*

Results of the study showed that the breast cancer patients rarely consumed pulses and oily seeds such as kidney beans, Bambara beans, soya beans, and groundnuts. The breast cancer patients, especially those who were found never to have been eating meals made of pulses and oily seeds both before and during the treatment of the breast cancer are encouraged to make an effort to include at least one of these pulses and oily seeds in their diet so as to benefit from their nutritional value. According to the American Cancer Society (2010), beans are high in healthy fats and proteins, which make them a good addition to any diet regimen. Soya beans, for instance, offer a number of health benefits to individuals who include them in their diet.

Also, a recent review of five cohort studies examining soy products and breast cancer survival reported that soy product intake was associated with better survival and lower risk of recurrence (Chi *et al.*, 2013). The vitamin D status may be also important with regard to breast cancer risk and survival. It has been hypothesized that a low vitamin D status worsens breast cancer prognosis (Jacobs *et al.*, 2011; Vrieling *et al.*, 2013).

#### *Alcohol Intake of Breast Cancer Patients*

The results of the study suggest that a few of the respondents had once a while been drinking alcohol both before and during the treatment of the breast cancer. This observation is still quite worrying despite the numbers recorded. This is because alcohol consumption by breast cancer patients can severely impair their health and further hinder their overall recovery from the disease. As revealed by the American Cancer Society (2011), there is a direct relationship between alcohol intake and the risk of getting a number of cancers, including breast cancer. Again, heavy alcohol

consumption significantly increases the risk of recurrence among the subset of breast cancer survivors, including those who are postmenopausal, obese, and have HR-positive breast cancer (Irwin *et al.*, 2011). According to the American Cancer Society (2010), for patients who have already been diagnosed of breast cancer, alcohol intake could surge the risk of developing new cancers.

Apart from the breast cancer patients, women in particular should be discouraged from drinking alcohol as it makes them very prone to a number of ailments. As reiterated by Komen (2013), regularly taking alcohol increases one's risk of getting breast cancer. The more drinks that one takes in a day, the greater one's risk of getting breast cancer will be (Komen, 2013). Compared with those who do not take in alcohol, women who take just one alcoholic drink a day have a very small increase in risk. Those who consume two to five drinks daily have about 1½ times the risk of women who do not drink alcohol. Excessive alcohol intake is also known to increase the risk of developing several other types of cancer (Komen, 2013). The size, alcohol content and number of drinks one takes often affects one's risk of breast cancer. All types of alcohol including wine, beer, and spirits are associated with an increased risk of developing breast cancer (Komen, 2013).

In a like manner, the American Cancer Society (2010) contends that alcohol use can lead to worse outcomes among breast cancer patients, particularly among overweight or obese women. Although moderate alcohol intake can have helpful effects on the heart, those benefits need to be compared to the risks, including the possible effects on cancer risk (American Cancer Society, 2010). Also, the cancer type and stage (extent), including the type of treatment should be taken into consideration when deciding whether to drink alcohol during treatment. Most drugs used to treat cancer



are broken down by the liver, and alcohol, by causing liver inflammation, could impair drug breakdown, increasing the side effects.

The American Cancer Society (2010) advises breast cancer patients who cannot shun alcohol completely to take only a little during the treatment of breast cancer so as to prevent interactions with the drugs used to treat cancer. However, it will be best to avoid or limit alcohol if you are starting treatment that will put you at risk for mouth sores, such as head and neck radiation or many types of chemotherapy (American Cancer Society, 2010).

#### *Inclusion of Animal Protein in Diet*

The outcome of the study revealed that before the treatment of the breast cancer, majority of the respondents often included meat (specifically chicken and beef) in their diet. However, most of them shifted from the excessive consumption of aforementioned foods to fish. The shift might have been occasioned by the advice from their doctors to consume more fish. The findings are in tandem with some recommendations by the American Cancer Society (2010) on diet for breast cancer patients. According to the American Cancer Society (2010), breast cancer patients should limit the intake of highly saturated fat foods such as beef, lamb, organ meats, cheeses, cream, butter, ice cream; decrease the intake of food containing trans fatty acids, such as commercially prepared baked goods, crackers and margarine; increase the intake of poultry, fish and vegetarian proteins such as legumes and lentils. According to the American Cancer Society (2010), increasing the consumption of fish to three times per week, for instance, will increase omega-3-polyunsaturated fat intake, and these fatty acids can prevent the growth of breast tumours.

### *Water Intake*

The amount of daily water intake by the respondent was found to be quite okay as most of them were found to be drinking more than four (4) glasses of water a day. However, there is more room for improvement as the figure falls below the minimum number of eight (8) glasses of water a day as recommended by dieticians. Accordingly, the breast cancer patients are encouraged to increase their daily intake of water to at least eight glasses a day. Increasing their daily intake of water to at least eight glasses a day can help them to reap the full benefits that are associated with good amount of water consumption. Symptoms such as fatigue (extreme tiredness), light-headedness, dry mouth, a bad taste in the mouth, and nausea can be caused by dehydration (loss of fluid from the body). To help avoid these problems, the American Cancer Society (2010) recommends that cancer patients should try to take in enough fluids. This is especially important if the patient is losing fluid as a result of vomiting and diarrhoea. According to the American Cancer Society (2010), healthy adult men need about 3.7 litres of water a day, while women need about 2.7 litres.

### *Sweet Intake*

The result of the study on the sweet intake by the respondents is quite encouraging as a significant number of the participants in the study was found to be consuming very low and no sweets before and during the treatment of breast cancer respectively. Sweets mostly contain high amount of sugar. Hence, the continuous or excessive consumption of sweets can lead to a host of sugar-related conditions such as diabetes, a situation that can even worsen the plight of breast cancer patients.

According to the American Cancer Society (2012), sugar consumption has not been proven to directly increase the risk of developing cancer or having it get worse (progress). However, sugars and sugar-sweetened drinks and foods add large amounts

of calories to the diet which causes weight gain, which in the long run can affect cancer outcomes. Also, most foods and drinks that are high in added sugar do not offer many nutrients and may replace more nutritious food choices. For this reason, limiting the intake of foods and drinks with added sugar is admonished (American Cancer Society, 2010).

### **Frequency of Exercise**

The results of the study revealed that a huge fraction of the respondents did undertake some (about once or twice in two weeks) form of exercise or no exercise at all, both before and during the treatment of the breast cancer. The results call for the need to educate breast cancer patients on the crucial role that regular exercise play in their survival. The American Cancer Society's guidelines on diet, nutrition and cancer prevention even encourages all cancer patients to be physically active, achieve and maintain a healthy weight; be moderately active for at least 30 minutes or more on most days of the week. As indicated by Goodwin *et al.* (1998), exercise has been proven to play a major role in weight management of cancer survivors. Being overweight has been shown to reduce survival. Overweight and obese women with breast cancer have poorer survival compared with thin women (Kroenke *et al.*, 2005; Chlebowski *et al.*, 2006). All these underscore the need for breast cancer patients to undertake regular exercise.

According to Chlebowski *et al.* (2006), moderate weight loss by breast cancer patients is associated with reduced cancer recurrence. Several other studies have also linked elevated insulin, insulin resistance, the metabolic syndrome, and abdominal obesity to more aggressive breast cancers and a greater risk of recurrence and death in breast cancer survivors (Duggan *et al.*, 2011; Healy, *et al.*, 2010).

Apart from breast cancer patients, women in general are advised to undertake regular exercise even if mild so as to prevent themselves from becoming overweight or obese. According to Komen (2013), being overweight or obese after menopause, for instance, increases a woman's chances of getting breast cancer. According to Komen, before menopause, the ovaries of a woman produce most of her oestrogen, and the fat tissue produces a small amount of oestrogen. After menopause, thus when the ovaries stop making oestrogen, most of a woman's oestrogen comes from fat tissue. However, more fat tissue after menopause can increase a woman's chance of getting breast cancer as it raises oestrogen levels. Also, women who are overweight tend to have higher blood insulin levels. Higher insulin levels have also been linked to some cancers, including breast cancer (Komen, 2013).

Physical activity is also related to increased progression-free survival and reduced recurrence, cancer mortality, and all-cause mortality in colorectal and breast cancer survivors (Ballard-Barbash *et al.*, 2012; Meyerhardt *et al.*, 2011; Richman *et al.*, 2011). A study carried out by Inoue-Choi *et al.* (2013) in Iowa showed that among survivors of all types of cancer, adherence to recommendations by the American Institute for Cancer Research on physical activity was tied to lower rate of breast cancer mortality among breast cancer patients. According to Irwin *et al.* (2013), exercise is probably the most strongly associated with improved outcomes.

Another study carried out by the American Cancer Society (2010) revealed that people who undertake higher levels of physical activity after diagnosis lived longer and had less chance of the cancer recurring. According to the American Cancer Society (2010), physical activity is known to prevent heart and blood vessel disease, diabetes, and osteoporosis. Therefore, cancer patients should try to live a physically active lifestyle.

All the above discussions underpin the need for women to take exercise very seriously. To rebuild muscle strength to recover, physical strength is required. According to Getz *et al.* (2010), since breast cancer treatment can make patients grow weary, they are often less likely to participate in physical activity. But then, physical activity can actually be a successful way to fight the exhaustion. According to the American Cancer Society (2010), exercise is not only safe during cancer treatment, but it also improves physical functioning of many aspects of quality of life. Moderate exercise has been proven to improve fatigue (extreme tiredness), anxiety, and self-esteem. It also contributes to heart and blood vessel fitness, muscle strength, and body composition regarding fat, bone, or muscle.

According to Cho *et al.* (2014), physical activity is the most well-established lifestyle factor related with breast cancer survival among breast cancer patients. A large collaborative work of four cohort studies including 13,302 breast cancer patients by Beasley *et al.* (2012) in the United States revealed that breast cancer survivors who met the physical activity outlines from the U.S. Department of Health and Human Services of 10 metabolic equivalent-hours/weeks for 18 to 48 months post diagnosis had a lower risk of dying. The American College of Sports Medicine (as cited in Schmitz *et al.*, 2010) advises that although physical activity's impact on mortality and cancer recurrence are unclear, cancer survivors still should be admonished to avoid inactivity since strong evidence supports benefits to functioning and quality of life

#### *Food choice*

From the outcome of the study, a substantial number of the respondents rated foods that are appealing to the sensory nerves paramount as compared to other factors that affect food choice. However, the moderately rated food choice that affects their health, giving more priority to food with high fibre and roughage contents. The latter

response rating given by the respondents support an advice by Getz *et al.* (2010) that breast cancer patients would have to take in the kinds of food that would help them to maintain a healthy weight during the cancer treatment. According to the American Cancer Society (2010), diet of less fat in particular, may reduce the chance of the cancer recurring. This effect is strongest in women whose cancers are oestrogen receptor negative.

The responses are also in keeping with one of the American Cancer Society's guidelines on diet, nutrition and cancer prevention which states that all cancer patients should eat foods from plant sources which include cabbage, oranges, cereals, whole grains, white rice, pasta, or beans several times a day.

### **Foods that Enhance the Survival of Breast Cancer Patients**

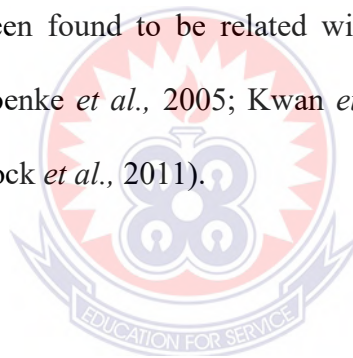
Most of the respondents in the current study also revealed that they had experienced some improved changes in their health condition after observing good nutritional standards that were recommended by their doctor, and therefore attributed their survival largely to good nutrition. These findings compare very well with an assertion by the American Cancer Society (2010) that adequate dietary intake can improve the nutritional status of almost all cancer survivors. According to the American Cancer Society, even though cancer treatment may cause fatigue, regular physical activity during treatment should be encouraged to improve appetite, stimulate digestion, prevent constipation, maintain energy level and muscle mass, and provide relaxation or stress reduction. Also, Karen (2014) posits that adhering recommendations on appropriate nutrition and physical activity can really promote the long-term health and quality of life of breast cancer patients.

According to Pekmezi and Demark-Wahnefried (2011), good nutrition coupled with regular physical activity leads to improved fitness, strength, and quality of life and reduced fatigue and sleep disturbances among survivors of various cancer types. For instance, an analysis of six interventional trials proved that early-stage cancer survivors who were not undertaking exercise/physical activity experienced a reduction in fitness levels, while those under supervised exercise programmes following treatment noticed some form of improvements (Jones *et al.*, 2011). Also, adequate food consumption and physical activity are vital to the recovery phase (Brown *et al.*, 2011). Other empirical studies have revealed that compared with less activity, moderate exercise such as brisk walking for two and a half to six hours per week is linked with 25% to 50% reduction in breast cancer mortality and recurrence (Holick, Newcomb, & Trentham-Dietz, 2008; Ballard-Barbash *et al.*, 2012; Beasley *et al.*, 2012).

The respondents in the current study also revealed that food plays a vital role in the management of breast cancer. For instance, most of them revealed that they tend to feel much better when they consume lots of fruits and vegetables than fatty foods. Eating very well during breast cancer treatment helps one to stay strong by providing the body the needed nutrients. A healthy diet, thus a diet with a variety of foods such as lots of fruits and vegetables and regular protein gives a woman the reserves of nutrients that she needs to keep her strength while she is receiving treatment for breast cancer. The reserves also help to build one's body tissues and keep the immune system strong enough to help fight off the infection. Besides, a healthy diet can be found to help manage treatment of side effects. According to Meyerhardt *et al.* (2007), a healthy diet characterized by a high consumption of fruits, vegetables,

poultry, and fish, has been realised to better cancer-specific outcomes or overall mortality.

Also, American Cancer Society (2010) states that many healthful compounds are found in vegetables and fruits, and it is possible that these compounds would work together to create helpful effects on recurrence or survival for breast, prostate, and ovarian cancers. Food is indeed the best source of vitamins and minerals. Kwan *et al.* (2009) also posit that high intake of vegetables, fruits, fibre and low consumption of fat have been found to reduce the risk of breast cancer recurrence or mortality among women with early breast cancer development. Other studies suggest that a healthy dietary pattern, including high consumption of fruits and vegetables, whole grain, poultry, and fish has been found to be related with a lower risk of breast cancer recurrence or death (Kroenke *et al.*, 2005; Kwan *et al.*, 2009; Nechuta *et al.*, 2013; Thomson *et al.*, 2011; Rock *et al.*, 2011).





## **CHAPTER SIX**

### **SUMMARY, CONCLUSIONS, RECOMMENDATIONS AND SUGGESTION FOR FURTHER RESEARCH**

#### **Summary**

This chapter deals with the summary of the research process, key findings, conclusions, recommendations as well as a suggestion for further research.

#### **Summary of the Research Process**

The aim of this study was to examine and explain the relationship between healthy eating practices and the management of breast cancer. Cross sectional survey research design was used for the study. The research design used helped the researcher to obtain varying views on nutritional knowledge, food choices and eating habits of patients with breast cancer and the kinds of foods that enhance their survival. The cross-sectional survey further helped to gather the needed information for the study. This helped the researcher to comprehensively assess how healthy eating practices controls breast cancer among breast cancer patients. A total number of 90 breast cancer patients participated in this study. There were nine (9) premenopausal, thirty (30) menopausal, and forty-two (42) post-menopausal cancer patients. Both the purposive and stratified sampling techniques was used in the selection of respondents for the study. Questionnaires and interview guide were used for the collection of data for this study. The Statistical Package for Social Sciences (SPSS) was the statistical software used for the data analysis. All the research questions were answered using frequencies and percentages. And the results were presented in tables and figures.

## **Key Findings**

First of all, the study gathered that general nutritional knowledge of the breast cancer patients was not encouraging. The respondents exhibited a moderate level of nutritional knowledge when it comes to the amount of protein in such foods as fish, beans and groundnuts. Other areas that breast cancer patients seemed to have moderate level of knowledge were fat and cholesterol content in foods, the amount of vitamins and mineral contained in the various forms of bread, and the nutritional value of brown and white sugar.

Also, the study found out that the breast cancer patients had inadequate knowledge on breast cancer, particularly on the risk factors of breast cancers. Most breast cancer patients appeared to have just heard about the existence of breast cancer, but did not seem to have any in-depth knowledge on the disease.

Additionally, the study found out that apart from sugar and fruits, the breast cancer patients did not have sufficient knowledge on the relationship between other foods and their related health problems. Although they were generally aware that some foods are associated with some health problems, they had no idea what these health problems were.

With regard to food choices, the study found out that foods that were appealing to the sensory nerves were rated paramount which gives a clear indication on the type of foods the breast cancer patients have been consuming. Many breast cancer patients consumed these fruits once in a while. When it comes to the consumption of vegetables, the study revealed that all the breast cancer patients were found to have included vegetables in each meal serving. Again, the study revealed that most of the breast cancer patients were found to have barely taken pulses and oily seeds such as

kidney beans, Bambara beans, and soya beans before. Regarding the intake of alcohol, only a few of the breast cancer patients were found to be drinking alcohol. With regard to the intake of animal protein, most of the respondents were found to be consuming mostly meat (chicken and beef) before treatment but switched to consuming fish during treatment. Additionally, the study revealed that a significant number of the respondent did take in just 1-4 glasses of water in a day. None of the respondents were found to be taking in sweets while a few of the respondents were found not to have undertaken any exercise before.

Finally, study found out that cereals, fruits, low-fat foods, sugar-free fluids/drinks, less salty and spicy foods, vegetables and high fibre content foods boost the survival of breast cancer patients. Consumption of these foods together with physical activities were found to be linked to less fatigue, improve energy level, improved appetite for food, healthy weight and sound sleep among the breast cancer patients.

## **Conclusion**

The findings of this study therefore imply that:

A large number of people with breast cancer have low level of knowledge on breast cancer as a disease. Apart from being aware about the existence of breast cancer, a substantial number of breast cancer patients do not have any idea regarding the causes or risk factors of breast cancer. Some breast cancer patients also have erroneous view about breast cancer as they believe the disease has a spiritual cause and can also be cured using herbal medicine.

More so, majority of breast cancer patients have absolutely no knowledge of specific health problems that are associated with certain foods. Precisely, most breast cancer

patients do not even know a single health problem that is associated with the excessive consumption of salt and fat

Breast cancer patients have inadequate knowledge on nutrition. This low level of knowledge on nutrition on the part of breast cancer patients is seen particularly in areas of protein, salt, fat, and cholesterol content in foods as well as the healthy alternative when it comes to the various forms of sugar and bread.

Pawpaw, banana, apples, grapes, oranges, and watermelon are the main fruits consumed by the breast patients, while carrot, cabbage, cucumber, lettuce and tomatoes are the main vegetables that they usually consume. However, they do not usually eat pulses and oily seeds such as kidney beans, Bambara beans, and soya beans. A few of the breast cancer patients, despite their condition, consume alcohol. Chicken and fish are the principal animal proteins that they consume. They are below the normal daily water intake requirement thus they usually take in 1-4 glasses of water in a day. They, however, hardly take in sweets.

The cost of food was one major factor that influenced their choice of food in the sense that even though some considered the value they received in exchange for the money spent on making healthy food choices, most of them made food choices based on how expensive the food was in relation to their economic status.

Food that enhance the survival of breast cancer patients include cereals (maize/corn, oat, rice), fruits, low-fat foods, sugar-free fluids/drinks and herbal tea, less salty and spicy foods, vegetables and foods that are very rich in fibre.

## **Recommendations**

Based on the findings of this study, we recommend the following measures:

The Ministry of Health (MOH) should collaborate with the various cancer treatment centres in Ghana to educate breast cancer patients on nutrition and major cause of breast cancer. This will help breast cancer patients to be aware of the amount of protein, salt, fat, cholesterol, etc. contained in the various foods, especially those ones that they usually consume on daily basis. This will help the breast cancer patients to make healthy food choices at all times. Also, an overview of the disease broadens their horizon and hence following all recommended steps (e.g. detection procedures) to avoid the disease or suppress its impact.

All stakeholders in the health sector such as the Ministry of Health, Non-Governmental Organizations (NGOs), researchers, among others should join forces and further collaborate with the media to undertake a massive education drive on breast cancer across the country so as to provide all women with adequate information on breast cancer. The education should not just focus on creating awareness about the existence of breast cancer, but should also focus on enlightening women on the menace and breast cancer detection procedures that they can perform by themselves. Also, breast cancer treatment centres that exist in the country should be made known to women and how they can benefit from them.

Women, especially breast cancer patients should be educated on the association between certain health problems or diseases and the kind of food they consume. This will help them to know what food and the quantity to consume at all times. Once again, the education should be spearheaded by the Ministry of Health in collaboration with other stakeholders in the health sector.

The breast cancer patients should be encouraged to step up their consumption of fruits as most of them were found to be eating fruits just once in a while. Also, the doctors at the various cancer treatment centres should advise breast cancer patients not to be drinking alcohol as excessive consumption of alcohol could be detrimental to their health. The doctors at the various cancer treatment centres should again encourage the breast cancer patients to be more active by engaging in, at least, mild physical activities. Additionally, the doctors should encourage the breast cancer patients to drink more water and also add a bit of pulses and oily seeds to their diet as these are known to improve the health of all cancer patients, including breast cancer patients.

Breast cancer patients should be encouraged to consume more of cereals (maize/corn, oat, rice), fruits, low-fat foods, sugar-free fluids/drinks and herbal tea, less salty and spicy foods, vegetables and foods that are very rich in fibre as these foods have been found to enhance their survival.

Dieticians, nutritionist and home-economist should collectively generate, educate and encourage the use of a meal planning guide so that breast cancer patients can have the skills in developing healthy meals regardless of their economic status.

There's also the need for Breast cancer awareness campaign in relation to healthy eating habits as some of the respondents who took part in the study were below 40 years

### **Suggestion for Further Research**

A similar study should be conducted at other cancer treatment centres in Ghana so as to generate enough findings to facilitate sound policy implementation.

## REFERENCES

- Adade, A. (2015). *Prevalence of breast cancer in Ghana: A case of the Greater Accra Region*. Unpublished thesis, University of Ghana, Legon.
- American, B. (2011). Breast Self Examination. Retrieved on 15/07/2016 from [https://www.breastcancer.org/symptoms/testing/types/self\\_exam](https://www.breastcancer.org/symptoms/testing/types/self_exam)
- American Cancer Society (1996). *Guidelines on Nutrition and Physical Activity for Cancer Survivors*. Atlanta: American Cancer Society.
- American Cancer Society (2004). *Eating Well, Staying Well During and After Cancer*. Atlanta: American Cancer Society.
- American Cancer Society (2010). *Guide to Complementary and Alternative Cancer Methods*. Atlanta: American Cancer Society.
- American Cancer Society (2011). *Global cancer facts and figures* (2<sup>nd</sup> ed.). Atlanta: American Cancer Society.
- American Cancer Society (2012). *Breast Cancer Signs and Symptoms*. Atlanta: American Cancer Society.
- American Cancer Society (2013). *Breast Cancer Facts & Figures 2011-2012*. Retrieved January 22, 2017, from <http://www.cancer.org/Research/CancerFactsFigures/BreastCancerFactsFigures/ACSPC-030975.html>
- American Cancer Society (2015). *Cancer Treatment & Survivorship Facts & Figures 2014-2015*. Retrieved March 8, 2016, from <http://cancer.org/acs/groups/content/@research/documents/document/acspc-042801.pdf>.
- American Cancer Society (2016). *Cancer Facts and Figures 2016*. Atlanta: American Cancer Society.
- American Institute for Cancer Research (2013). *Reducing Cancer Risk: American Institute for Cancer Research Recommendations*. Retrieved January 15, 2017, from [www.aicr.org/patients-survivors/aicrs-guidelines-for-cancer.html](http://www.aicr.org/patients-survivors/aicrs-guidelines-for-cancer.html)
- American Institute for Cancer Research [AICR] (2007). *Food, Nutrition, Physical Activity, and the Prevention of Cancer: a Global Perspective*. Washington, DC: Institute for Cancer Research.
- American Institute for Cancer Research [AICR] (2012). *AICR's guidelines for cancer survivors*. Retrieved December 19, 2016, from <http://www.aicr.org/patients-survivors/aicrs-guidelines-for-cancer.html>.
- American Society of Clinical Oncology [ASCO] (2017). *Challenges and strategies for breast cancer survivorship care*. Retrieved December 14, 2017, from <https://am.asco.org/daily-news/challenges-and-strategies-breast-cancer-survivorship-care.html>

- American Cancer Society (2015). *Cancer Treatment and Survivorship*. Retrieved March 8, 2016, from <http://cancer.org/acs/groups/content/@research/documents/document/acspc-042801.pdf>.
- Ballard-Barbash, R., Friedenreich, C. M., Courneya, K. S., Siddiqi, S. M., McTiernan, A., & Alfano, C. M. (2012). Physical activity, biomarkers, and disease outcomes in cancer survivors: a systematic review. *Journal of National Cancer Institute, 104*(11), 815-840.
- Basic, J., & Erdelez, S. (2014). Active and passive acquisition of health related information on the Web by college students. *Proceedings of the American Society for Information Science and Technology, 51*(1), 1-5.
- Beasley, J. M., Kwan, M. L., Chen, W. Y., Weltzien, E. K., Kroenke, C. H., & Lu, W. (2012). Meeting the physical activity guidelines and survival after breast cancer: findings from the after breast cancer pooling project. *Breast Cancer Research and Treatment, 131*, 637-643.
- Beasley, J. M., Newcomb, P. A., Trentham-Dietz, A., Hampton, J. M., Bersch A. J., & Passarelli, M. N. (2011). Post-diagnosis dietary factors and survival after invasive breast cancer. *Breast Cancer Research and Treatment, 128*, 229-236.
- Belle, F. N., Kampman, E., McTiernan, A., Bernstein, L., Baumgartner, K., & Baumgartner, R. (2011). Dietary fibre, carbohydrates, glycemic index, and glycemic load in relation to breast cancer prognosis in the HEAL cohort. *Cancer Epidemiology, Biomarkers & Prevention, 20*, 890-899.
- Blanchard, C. M., Denniston, M. M., Baker, F., Ainsworth, S. R., Courneya K. S., Hann, D. M., Gesme, D. H., Reding, D., Flynn, T., & Kennedy J. S. (2003). *Do adults change their lifestyle behaviours after a cancer diagnosis? American Journal of Health Behaviour, 27*(3), 246-256.
- Bland, M. (2011). *An Introduction to Medical Statistics* (3<sup>rd</sup> ed.). Oxford: Oxford University Press.
- Bloch, A. S. (1990). Nutrition and physical activity during and after cancer treatment: An American Cancer Society guide for informed choices. *CA: A Cancer Journal for Clinicians, 33*(5), 28-34.
- Boateng, G. (2014, July 14). Breast Cancer Support Network Formed. *Daily Graphic*, p. 12.
- Brown, J. K., Byers, T., Doyle, C., Aziz, N., Eldridge, B., Hamilton, K., & Sawyer, K. A. (2001). Nutrition and physical activity during and after cancer treatment: An American Cancer Society guide for informed choices. *CA: A Cancer Journal for Clinicians, 53*(5), 268-291.
- Centre for Disease Control (2010). *Cancer among women*. Retrieved December 28, 2016, from <https://www.cdc.gov/cancer/dcpc/data/wo-men.htm>



- Chi, F., Wu, R., Zeng, Y. C., Xing, R., Liu, Y., & Xu, Z. G. (2013). Post-diagnosis soy food intake and breast cancer survival: a meta-analysis of cohort studies. *Asian Pacific Journal on Cancer Prevention*, 14, 2407-2412.
- Chlebowski, R. T., Blackburn, G. L., & Thomson, C. A. (2006). Dietary fat reduction and breast cancer outcome: interim efficacy results from the Women's Intervention Nutrition Study. *Journal of National Cancer Institute*, 98(24), 1767-1776.
- Cho, O. H., Yoo, Y. S., & Kim, N. C. (2014). Efficacy of comprehensive group rehabilitation for women with early breast cancer in South Korea. *Nursing & Health Sciences*, 8(3), 140-146.
- Clegg-Lamprey, J. N. (2012). Hormone Receptor and Her-2 Expression in Breast Cancers among Sub-Saharan African Women. *Breast Journal*, 14(5), 510-1
- Clegg-Lamprey, J. N. (2013, October 18). Breast Awareness: Women's Health. *The Mirror*, p. 15.
- Clegg-Lamprey, J. N. (2014, October 30). Examine Your Breast. *Daily Graphic*, p. 20.
- Dallongeville, J., Marecaux, N., Fruchart, J. C., & Amouyel, P. (2000). Cigarette smoking is associated with unhealthy patterns of nutrient intake: a meta-analysis. *Journal of Nutrition*, 128(9), 1450-7
- Demark-Wahnefried, W., Rimer, B. K., & Winer, E. P. (2000). Weight gain in women diagnosed with breast cancer. *Journal of American Diet Association*, 97, 519-526.
- Duggan, C., Irwin, M. L., & Xiao, L. (2011). Associations of insulin resistance and adiponectin with mortality in women with breast cancer. *Journal of Clinical Oncology*, 29(1), 32-39.
- Eisinger-Watzl, M., Wittig, F., Heuer, T., & Hoffmann, I. (2014). Customers Purchasing Organic Food - Do They Live Healthier? Results of the German National Nutrition Survey II. *European Journal of Nutrition & Food Safety*, 5(1), 59-71. <https://doi.org/10.9734/EJNFS/2015/12734>
- Friedlander, M., & Thewes, B. (2003). Counting the costs of treatment: The reproductive and gynaecological consequences of adjuvant therapy in young women with breast cancer. *Internal Medicine Journal*, 33(8), 372-379.
- Furst, T., Connors, M., Bisogni, C. A., Sobal, J. & Falk, L. W. (1996). *Food Choice: A Conceptual Model of the Process*. PMID: 8800481  
DOI:10.1006/appe.1996.0019 <https://pubmed.ncbi.nlm.nih.gov/8800481/>

- Getz, G., Höfling, H., Mesirov, J., Tibshirani, R., Golub, T., Meyerson, M., & Lander, E. (2010). *Technical Comment on 'The consensus coding sequence of human breast and colorectal cancers' by Sjöblom et al. Technical Report*. Retrieved January 11, 2016, from [statweb.stanford.edu/~tibs/ftp/ParmigianiComment.pdf](http://statweb.stanford.edu/~tibs/ftp/ParmigianiComment.pdf)
- Green Leaves Herbal Health. (2012). The Lymphatic System. Retrieved on 20/07/2016 from <http://greenleavesherbalhealth.co.uk/wp-content/uploads/2012/07/lymphatic-system-new.jpg>
- Goodwin, P., Esplen, M. J., Butler, K., Winocur, J., Pritchard, K., Brazel, S., Gao, J., & Miller, A. (1998). Multidisciplinary weight management in loco-regional breast cancer: Results of a Phase II study. *Breast Cancer Research and Treatment*, 48(1), 53-64.
- Harnack, L., Block, G., Lane, S., (1997). Influence of Selected Environmental and Personal Factors on Dietary Behaviour for Chronic Disease Prevention: A Review of the Literature Author links open overlay panel. *Journal of Nutrition Education, Volume 29, Issue 6, November 1997, Pages 306-312 Journal of Nutrition Education*.
- Hawkes, C. (2013). *Promoting healthy diets through nutrition education and changes in the food environment: an international review of actions and their effectiveness*. Food and Agriculture Organization (FAO).
- Healy, L. A., Ryan, A. M., & Carroll, P. (2010). Metabolic syndrome, central obesity and insulin resistance are associated with adverse pathological features in postmenopausal breast cancer. *Clinical Oncology (R Coll Radiol)*, 22(4), 281-288.
- Hillis, S.J. (2015). *How A Healthy Population Acquires Nutrition and Exercise Information: A Mixed Methods Study*. (Theses and Dissertations, University of Nebraska) [Retrieved: 5/10/16 from <http://digitalcommons.unl.edu/cehsdiss/255>]. Unpublished
- Hillner, B. E., Ingle, J. N., Chlebowski, R. T., Gralow, J., Yee, G. C., Janjan, N. A., Cauley, J. A., Blumenstein, B. A., Albain, K. S., Lipton, A., & Brown, S. (2003). American Society of Clinical Oncology 2003 update on the role of bisphosphonates and bone health issues in women with breast cancer. *Journal of Clinical Oncology*, 21(21), 4042-4057.
- Holick, C. N., Newcomb, P. A., & Trentham-Dietz, A. (2008). Physical activity and survival after diagnosis of invasive breast cancer. *Cancer Epidemiology, Biomarkers & Prevention*, 17(2), 379-386.
- Hollis, J. H. & Henry, C. J. K. (2007) Dietary variety and its effect on food intake of elderly adults, <https://doi.org/10.1111/j.1365-277X.2007.00796.x>Citations: 31. James H. Hollis, PhD, Institute of Agriculture, Food and Land Use, Queen's University Belfast, David Keir Building, Stranmillis Road Belfast BT9 5AG, UK. Tel.: 028 9097 6547, Fax: 028 9097 6513, Email: [j.hollis@qub.ac.uk](mailto:j.hollis@qub.ac.uk)

- Holmes, M. D., & Kroenke, C. H. (2004). Beyond treatment: Lifestyle choices after breast cancer to enhance quality of life and survival. *Women's Health Issues, 14*(1), 11-13.
- Holmes, M. D., Chen, W. Y., Feskanich, D., Kroenke, C. H., & Colditz, G. A. (2005). Physical activity and survival after breast cancer diagnosis. *The Journal of the American Medical Association, 293*(20), 479-2486.
- Homan, S. G., Kayani, N., & Yun, S. (2016). *Risk Factors, Preventive Practices, and Health Care Among Breast Cancer Survivors*. Retrieved March, 3, 2016, from <http://dx.doi.org/10.5888/pcd13.150377.html>
- Howard, B. A., & Gusterson, B. A. (2000). Human breast development. *Journal of Mammary Gland. Biology. And. Neoplasia, 5*(2), 119-137. <https://doi.org/10.1016/j.canep.2012.02.007><https://journals.sagepub.com/doi/full/10.1177/2158244016635255><https://scholar.google.com/scholar?oi=bibs&hl=en&cluster=949819729030512156>. First/published: 24/April/2015/<https://doi.org/10.1002/meet.2014.14505101149>
- Hunter, D. J., Willett, W. C. (1996). Nutrition and breast cancer. *Cancer Causes Control, 7*, 56-68.
- Hyman, E., Kauraniemi, P., Hautaniemi, S., Wolf, M., Mousses, S., Rozenblum, E., Ringner, M., Sauter, G., Monni, O., & Elkahoun, A. (2002). Impact of DNA amplification on gene expression patterns in breast cancer. *Cancer Research, 62*, 6240-6245. .
- Iddrisu, M.A., Danquah, M. & Quartey, P. (2017). *Paying for education among households in Ghana: Is there any Role for Households Resources and Contextual Effects?* Retrieved on November 3, 2017 from <http://ieads.repaec.org/a/eme/ijdipp/ijdi-02-2017-0017.html>
- Irwin, M. L., Varma, K., & Alvarez-Reeves, M. (2011). Randomized controlled trial of aerobic exercise on insulin and insulin-like growth factors in breast cancer survivors: the Yale Exercise and Survivorship study. *Cancer Epidemiology, Biomarkers & Prevention, 18*(1), 306-313.
- Jacobs, E. T., Thomson, C. A., Flatt, S. W., Al-Delaimy, W. K., Hibler, E. A., Jones, L. A., & Pierce, J. P. (2011). Vitamin D and breast cancer recurrence in the Women's Healthy Eating and Living (WHEL) Study. *The American journal of clinical nutrition, 93*(1), 108-117.
- Johns Hopkins Medicine (2014). *Health conditions and anatomy of the breast*. Retrieved December 5, 2016, from [http://www.hopkinsmedicine.org/healthlibrary/conditions/breast\\_health/anatomy\\_of\\_the\\_breasts\\_85,P00132.html](http://www.hopkinsmedicine.org/healthlibrary/conditions/breast_health/anatomy_of_the_breasts_85,P00132.html)
- Johnson, S. L. & Birch, L. L. (1994) *American Academy of Pediatrics, Parents' and Children's Adiposity and Eating Style, 94*(5)653-661; <https://pediatrics.aappublications.org/content/94/5/653.short>

- Jones, L. W., Liang, Y., & Pituskin, E. N. (2011). Effect of exercise training on peak oxygen consumption in patients with cancer: a meta-analysis.. *Journal of Nutrition and Cancer*, Volume 24, 1995 - Issue 3, *Oncologist*, 16(1), 112-120
- Kappel, M. L. (2013). It's not the model that matters: still lost in transition. *Journal of Oncology Practice*, 9, 128-129.
- Karen, C. (2014). *Caring for today's cancer survivors*. Retrieved November, 14, 2015, from <http://www.todaysdietitian.com/newarchives/080114p42.shtml>
- Karthus, M., & Frieler, F. (2004). Eating and drinking at the end of life: Nutritional support for cancer patients in palliative care. *Wiener Medizinische Wochenschrift*, 154(9), 192-198.
- Kong, Q. & Lillehei, K. O. (2009). The effect of health benefit information on consumers health value, attitudes and intentions. PMID: 9848469 DOI: 10.1016/s0306-9877(98)90036-6 <https://pubmed.ncbi.nlm.nih.gov/9848469/> *Appetite* Volume 52, Issue 3, June 2009, Pages 568-579
- Klaus, G., Wills, J., Laura, F. C., Lähtenmäki, L., Scholderer, J., Storcksdieck, S., & Bonsmann, G. (2012). Socio-demographic and attitudinal determinants of nutrition knowledge of mfood /shoppers /in /six European /countries. <https://doi.org/10.1016/j.foodqual.2012.04.007>
- Komen, S. (2013). *Breast cancer statistics*. Retrieved October 11, 2016, from <http://ww5.komen.org/BreastCancer/Statistics.html>
- Korle BU Teaching Hospital [KBTH] (2013). *Centres and Departments*. Retrieved December 12, 2016, from <http://kbth.gov.gh/centres-and-departments/radiotherapy-department.html>
- Kroenke, C. H., Fung, T. T., Hu, F. B., & Holmes, M. D. (2005). Dietary patterns and survival after breast cancer diagnosis. *Journal of Clinical Oncology*, 23, 9295-9303.
- Kwan, M. L., Weltzien, E., Kushi, L. H., Castillo, A., Slattery, M. L., & Caan, B. J. (2009). Dietary patterns and breast cancer recurrence and survival among women with early-stage breast cancer. *Journal of Clinical Oncology*, 27, 919-926.
- Labriola, D., & Livingston, R. (1999). Possible interactions between dietary antioxidants and chemotherapy. *Oncology*, 13, 1003-1008.
- Lagua, R. & Claudio, T. (2004). *Nutrition and Diet Therapy Reference Dictionary*, ISBN 10: 0813810027 / ISBN 13: 9780813810027, Published by Wiley-Blackwell, <https://www.abebooks.com/servlet/BookDetailsPL?bi=22640987859&searchurl=an%3Dlagua%2Bclaudio%26sortby%3D17%26tn%3Dnutrition%2Bdiet%2Btherapy%2Breference%2Bdicti>

- Lanford, C. (2011). Clinical features and diagnosis of small-vessel vasculitis. *Cleveland Clinic Journal of Medicine*, 79, 53-526.
- Ledesma, S. (2013). *Nutrition and Breast Cancer*. Retrieved September, 2, 2016, from [cancer.ucsf.edu/\\_docs/crc/nutrition\\_breast.pdf](http://cancer.ucsf.edu/_docs/crc/nutrition_breast.pdf)
- Lissoni, P., Barni, S., & Mandala, M. (1999). Decreased toxicity and increased efficacy of cancer chemotherapy using the pineal hormone melatonin in metastatic solid tumour in patients with poor clinical status. *European Journal of Cancer*, 35, 1688-1692
- Lone, T., Pence, D., Levi, A., Chan, K K. & Bianco - Simeral, S. (2009). Journal of Foodservice, Marketing healthy food to the least interested consumers. First published: 02 April 2009 <https://doi.org/10.1111/j.1745-4506.2009.00131.x> Citations: 10 Todd A. Lone, Department of Agricultural Economics, California State University, Fresno, 5245 North Backer Avenue M/S PB 101, Fresno, CA 93740- 8001, USA. Under a Creative Commons license <https://www.sciencedirect.com/science/article/pii/S0195666315002743>
- Mahan, L. K., & Escott-Stump, S. (1996). *Krause's Food, Nutrition & Diet Therapy*. Philadelphia, PA: *W.B. Saunders*.
- Martin-Moreno, J. M., Harris, M. E., Breda, J., Møller, L., Alfonso-Sanchez, J. L., & Gorgojo, L. (2013). Enhanced labelling on alcoholic drinks: reviewing the evidence to guide alcohol policy. *European Journal of Public Health*, 23(6), 1082-1087.
- McTiernan, A. (2004). Physical activity after cancer: Physiologic outcomes. *Cancer Investigation*, 22(1), 68-81.
- Med/Hypotheses. (1998)/Nov;51(5):405-9./doi:10.1016/s0306-9877(98)90036-6. Antioxidant Inhibitors for Cancer Therapy
- MedicineNet (2010). Anatomy of the breast. Retrieved on 12/06/2016 from <https://www.medicinenet.com/image-collection/torn-meniscus-picture/picture.htm>
- Meyerhardt, J. A., & Niedzwiecki, D., & Hollis, D. (2007). Association of dietary patterns with cancer recurrence and survival in patients with stage III colon cancer. *Journal of the American Medical Association*, 298(7), 754-764.
- Meyerhardt, J. A., Heseltine, D., & Niedzwiecki, D. (2011). Impact of physical activity on cancer recurrence and survival in patients with stage III colon cancer: findings from CALGB 89803. *Journal of Clinical Oncology*, 24(22), 3535-3541.
- Miller, D. L. & Cassady, B. (2015). The effects of nutrition knowledge on food label use. *A review of the literature Author links open overlay panel* <https://doi.org/10.1016/j.appet.2015.05.029> Get rights and content
- Monsen, E. R. (2000). Dietary reference intakes for the antioxidant nutrients: Vitamin C, vitamin E, selenium, and carotenoids. *Journal of the American Dietetic Association*, 100, 637-640.

- National Cancer Institute [NIC] (2004). *Breast Cancer (PDQ): Treatment*. Retrieved December 16, 2004, from <http://www.cancer.gov/cancertopics/pdq/treatment/breast/healthprofessional/allpages.html>
- National Cancer Institute [NIC] (2004). *Cancer Facts: Complementary and Alternative Medicine*. Retrieved September 13, 2016, from [http://cis.nci.nih.gov/fact/9\\_14.htm](http://cis.nci.nih.gov/fact/9_14.htm)
- National Cancer Institute [NIC] (2004). *Genetics of Breast and Ovarian Cancer (PDQ) Health Professional Version*. Retrieved January 12, 2016, from <http://www.cancer.gov/cancertopics/pdq/genetics/breast-and-ovarian/healthprofessional.html>
- National Cancer Institute [NIC] (2015). *Colon Cancer PDQ: Treatment*. Retrieved November 5, 2016, from <http://www.cancer.gov/cancertopics/pdq/treatment/colon/healthprofessional.html>
- Nechuta, S. J., Caan, B. J., & Chen, W. Y. (2013). Soy food intake after diagnosis of breast cancer and survival: an in-depth analysis of combined evidence from cohort studies of US and Chinese women. *The American Journal of Clinical Nutrition*, *96*(1), 123-132.
- Nechuta, S., Caan, B. J., Chen, W. Y., Kwan, M. L., Lu, W., & Cai, H. (2013). Post diagnosis cruciferous vegetable consumption and breast cancer outcomes: a report from the after breast cancer pooling project. *Cancer Epidemiology, Biomarkers & Prevention*, *22*, 1451-1456.
- Obasola, O.I., & Agunbiade, O.M. (2016). Online health information seeking pattern among undergraduates in a Nigerian university. *SAGE Open*, *6*(1), 2158244016635255.
- Parmenter, K., & Wardle, J. (1999). Development of a general nutrition knowledge questionnaire for adults. *European Journal of Clinical Nutrition*, *53*(4), 298-308.
- Pekmezci, D. W., & Demark-Wahnefried, W. (2011). Updated evidence in support of diet and exercise interventions in cancer survivors. *Acta Oncologica*, *50*(2), 167-178.
- Pierce, J. P., Stefanick, M. L., & Flatt, S. W. (2007). Greater survival after breast cancer in physically active women with high vegetable-fruit intake regardless of obesity. *Journal of Clinical Oncology*, *25*(17), 2345-2351.
- Pine, C. M., Pitts, N. B., & Nugent, Z. J. (1997). British Association for the Study of Community Dentistry (BASCD) guidance on sampling for surveys of child dental health. A BASCD coordinated dental epidemiology programme quality standard. *Community Dental Health Journal*, *14*(1), 10-17.
- Ray, W. J. & Klesges, R. C. (2006). Influences on the Eating Behavior of Children. *The Memphis State Prevention Center, Department of Psychology, Memphis State University, Memphis, Tennessee 38152*

- Richman, E. L., Kenfield, S. A., Stampfer, M. J., Paciorek, A., Carroll, P. R., & Chan, J. M. (2011). Physical activity after diagnosis and risk of prostate cancer progression: data from the cancer of the prostate strategic urologic research endeavour. *Cancer Research*, *71*(11), 3889-3895.
- Rivadeneira, D. E., Evoy, D., & Fahey, T. J. (2008). Nutritional support of the cancer patient. *CA: A Cancer Journal of Clinicians*, *48*, 69-80.
- Rock, C. L., Doyle, C., & Demark-Wahnefried, W. (2012). Nutrition and physical activity guidelines for cancer survivors. *CA: A Cancer Journal of Clinicians*, *62*(4), 243-274.
- Rock, C. L., Natarajan, L., & Pu, M. (2008). Longitudinal biological exposure to carotenoids is associated with breast cancer-free survival in the Women's Healthy Eating and Living Study. *Cancer Epidemiology, Biomarkers & Prevention*, *18*(2), 486-494.
- Rock, C. L., Saxe, G. A., & Ruffin, M. T. (2011). Nutrition and survival after the diagnosis of breast cancer: A review of the evidence. *Journal of Clinical Oncology*, *20*(15), 3302-3316..
- Schmitz, K. H., Courneya, K. S., & Matthews, C. (2010). College of Sports Medicine roundtable on exercise guidelines for cancer survivors. *Medical Science Sports Exercise*, *42*(7), 1409-1426.
- Shakkour, E. (2007). *The Relationship Between Nutritional Knowledge and Application*, Published 2007 <https://www.semanticscholar.org/paper/The-Relationship-Between-Nutritional-Knowledge-and-Shakkour/9f0733927f19b33961cb355e0b4f74e96aa6092e>
- Shils, M. E., Olson, J. A., Shike, M., & Ross, A. C. (1999). *Modern Nutrition in Health and Disease* (9<sup>th</sup> ed.). Baltimore, MD: *Williams & Wilkins*.
- Siegel, E. M., Ulrich, C. M., Poole, E. M., Holmes, R. S., Jacobsen, P. B., & Shibata, D. (2010). The effects of obesity and obesity-related conditions on colorectal cancer prognosis. *Cancer Control*, *17*(1), 52-57.
- Singletary, S. E., Greene, F. L., & Sobin, L. H. (2003). Classification of isolated tumor cells. *Cancer*, *98*(12), 2740-2741.
- Slatter, M. L., O'Brien, E. & Motomi, M. (1995). Disease heterogeneity: Does it impact our ability to detect dietary associations with breast cancer? Pages 213-220 | Received 25 Apr 1995, Accepted 24 Jul 1995, Published online: 04 Aug 2009 Download citation <https://doi.org/10.1080/01635589509514410>
- Spanhake, S. J. (2015). *How a healthy population acquires exercise and nutrition information: A mixed methods study Hillis*. The University of Nebraska - Lincoln, ProQuest Dissertations Publishing, 2015. 3738351
- Steptoe, A., Pollard, T. M., & Wardle, J. (1995). *Development of a measure of the motives underlying the selection of food: The Food Choice Questionnaire*. *Appetite*, *25*(3), 267-284. <https://doi.org/10.1006/appe.1995.0061>

- Teegarden, D. Romieu, I., Sophie, A. & Lelièvre (2012). *Redefining the impact of nutrition on breast cancer incidence: is epigenetics involved?* Cited by 23 Access Volume 25, Issue 1 June 2012, pp. 68-95DOI: <https://doi.org/10.1017/S0954422411000199> Published online by Cambridge University Press: 02 July 2012
- Tetteh, L. (2004). *Knowledge and perception of breast cancer: Its influence on adherence to breast self-examination*. Unpublished dissertation, University of Ghana, Accra.
- Thomson, C. A., Rock, C. L., Thompson, P. A., Caan, B. J., Cussler, E., & Flatt, S. W. (2011). Vegetable intake is associated with reduced breast cancer recurrence in tamoxifen users: a secondary analysis from the Women's Healthy Eating and Living Study. *Breast Cancer Research and Treatment*, 125, 519-527.
- Tromp, D. M., Brouha, X. D. R., Hordijk, G. J., Winnubst, J. A. M., Gebhardt, W. A., Van der Doef, M. P. & De Leeuw, J. R. J. (2005). Medical care-seeking and health-risk behavior in patients with head and neck cancer: the role of health value, control beliefs and psychological distress. *Health Education Research*, Volume 20, Issue 6, December 2005, Pages 665–675, <https://doi.org/10.1093/her/cyh031> Published: 29 April 2005, <https://academic.oup.com/her/article/20/6/665/601696>
- Tudoran, A., Olsen, O., Dopicoa D, C. (2009): The effect of health benefit information on consumers health value, attitudes and intentions. Volume 52, Issue 3, June 2009, Pages 568-579 <https://www.sciencedirect.com/science/article/abs/pii/S0195666309000117>.
- United States Breast Cancer Organisation (2015). *The five Steps of breast self-examination*. Retrieved December 12, 2016 from [http://www.breastcancer.org/symptoms/testing/types/self\\_exam/bse\\_steps.html](http://www.breastcancer.org/symptoms/testing/types/self_exam/bse_steps.html)
- Vrieling, A., Buck, K., Seibold, P., Heinz, J., Obi, N., & Flesch-Janys, D. (2013). Dietary patterns and survival in German postmenopausal breast cancer survivors. *British Journal of Cancer*, 108, 188-192.
- Wade, J., & Schimpff, S. (2009). Epidemiology and prevention of infection in the immune-compromised host. In R. Rubin, & L. Young (Eds.), *Clinical Approach to Infection in the Compromised Host*, (pp. 5-40). New York: Plenum Press.
- Wardle, J., Parmenter, K., & Waller, J. (2000). Nutrition knowledge and food intake. *European Journal of Clinical Nutrition*, 53(4), 298-308..
- Warren, A., & Devine, J. (2006). Is a cancer diagnosis a trigger for health behaviour change? Findings from a prospective, population-based study. *British Journal of Cancer*, 108(11), 2407-2412.
- Whitney, E. & Rolfes, S. R (2016), *Understanding Nutrition 15th edition*. Belmont, C.A Wadsworth Publishing.



- Wiafe-Addai, B. (2013, May 8). Peace and Love Hospital Extends Breast Screening to Rural Areas. *The Ghanaian Times*, p. 11.
- World Health Organisation [WHO] (2000). Global cancer rates could increase by 50% to 15 million by 2020. Retrieved November, 12, 2016, from <http://www.who.int/mediacentre/news/releases/2003/pr27/en/>
- World Health Organization (2017). *New perspectives on global spending for universal health coverage*. Retrieved on December 12, 2017 from <c:/users/hp/Downloads/New%20Perspectives%20Global%20Spending%20for Universal%20Health%20Coverage%20>
- Yale Cancer Centre, (2008). Ghana: Breast Cancer - -Early Detection Saves Lives. Retrieved October, 13, 2016, from <http://allafrica.com/stories/201507241907.html>
- Youlten, D. R., Cramb, S. M., Dunn, N. A. M, Muller, J.M., Christopher, M., Pyke, C. M, & Baade, P.D. (2012). *The descriptive epidemiology of female breast cancer: An international comparison of screening, incidence, survival/and/mortality*/<https://www.sciencedirect.com/science/article/abs/pii/S187778211200029X>
- Zaney, A. (2015). Effect of breast cancer radiotherapy and cigarette smoking on risk of second primary lung cancer. *Journal of Clinical Oncology*, 26(3), 392-398.
- Zelle, S. G., Nyarko, K. M., Bosu, W. K., Aikins, M., Niëns, L. M., Lauer, J. A., & Baltussen, R. (2012). Costs, effects and cost- effectiveness of breast cancer control in Ghana. *Tropical Medicine & International Health*, 17(8), 1031-1043.





**RESPONDENT KNOWLEDGE ON THE RELATIONSHIP BETWEEN  
FOOD AND HEALTH PROBLEMS OR DISEASES**

18. Are you aware of major problems or diseases that are related to a low intake of fruits and vegetables?

- a. Yes
- b. No
- c. Not sure

19b. If yes, what diseases or health problem do you think are related to how much intake of fruits and vegetables

.....

19. Are you aware of major health problems or diseases that are related to how much sugar people eat?

- a. Yes
- b. No
- c. Not sure

20b. If yes, what diseases or health problem do you think are related to sugar intake.

.....

20. Are you aware of major health problems or diseases that are related to how much salt people eat?

- a. Yes
- b. No
- c. Not sure

21b. If yes, what diseases or health problem do you think are related to salt intake.

.....

21. Are you aware of major health problems or diseases that are related to the amount of fat people eat?

- a. Yes
- b. No
- c. Not sure

22b. If yes, what diseases or health problem do you think are related to fat intake

**SECTION FOUR: EATING HABITS OF BREAST CANCER PATIENT**

	<b>EATING HABITS OF BREAST CANCER PATIENTS</b>	
	<b>BEFORE</b>	<b>DURING</b>
22. What types of fruits were you eating?		
23. How many times do you eat fruits in a day?		
24. What types of vegetables do you eat often?		
25. How often do you eat meals made of pulse and oily seeds in a week? (E.g. kidney beans, Bambara beans, soya beans, groundnuts, etc.)		
26. What alcoholic beverage do you normally take?		
27. Which animal protein foods do you include in your meals?		
28. How often do you exclude cereal and whole grain foods in your diet?		
29. How often do you use salt cure foods (fish / meat)?		
30. How many glasses of water do you drink in a day?		
31. How often do you eat sweet in a week?		
32. How often do you exercise in a week?		

**SECTION FIVE: FACTORS INFLUENCING FOOD CHOICE**

It is essential to me that the food I eat on a typical day:						
Factors	Items	Ratings				
		1	2	3	4	5
Health	Is low in fat					
	Is high in fibre and roughage					
	Contains a lot of vitamins and minerals					
Mood	Makes me feel good					
	Helps me to cope with the disease					
	Helps me cope with stress					
Convenience	Can be cooked very simply					
	Can be bought in shops close to where I live or work					
	Is easily available at home					
Sensory Appeal	Smells nice					
	Looks nice					
	Tastes good					
Price	Is not expensive					
	Is good value for money					

33. Do you have any problem when you eat a particular foods?    a. Yes [ ]    b. No [ ]

27b. If yes mention the type of food and the aftermath when you consume that food.  
 .....  
 .....

34. Which of the following have you experienced after breast cancer management that limits your food intake? a. Anorexia (without appetite) [ ] b. Problem with food digestion [ ]  
c. Diarrhea [ ] d. Mouth problems [ ] e. Vomiting [ ] f. Constipation [ ] g. Pain [ ] h. Depression [ ]

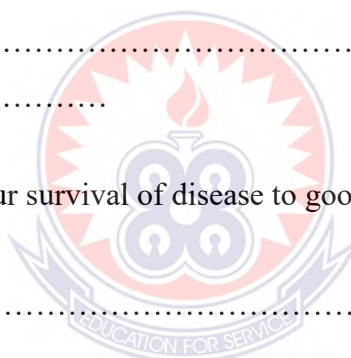
**SECTION SIX: THE ROLE OF NUTRITION IN THE MANAGEMENT OF BREAST CANCER.**

35. Which food have you discovered to be helpful in managing breast cancer?  
.....  
.....

36. Have you experienced any change after practicing good nutrition? a. Yes [ ] b. No [ ]  
a. Please elaborate.

.....  
.....

37. Will you attribute your survival of disease to good nutrition? a. Yes [ ] b. No [ ]  
a. Please elaborate.....



38. Which food would you recommend or avoid by Breast Cancer patients undergoing Breast Cancer treatment in order of preference?

**Food to avoid**

**Food to increase**

- |         |       |
|---------|-------|
| 1. .... | ..... |
| 2. .... | ..... |
| 3. .... | ..... |
| 4. .... | ..... |

39. Do you think the food you eat has a role to play in your management of Breast Cancer?  
.....  
.....

40. Do you think these help to reduce the chances of getting Breast Cancer? (answer each)

	High	Low	Not sure
a. Eating more fibre			
b. Eating less sugar			
c. Eating more fruits and vegetables			
d. Eating less fat			
e. Eating less salt			

