

BREAST CANCER RISK FACTORS OF URBAN AND RURAL PEOPLE OF BANGLADESH

A dissertation is submitted for the partial fulfillment of the course Pharmaceutical Research of the Department of Pharmacy, East West University for the Degree of Masters of Pharmacy in Clinical pharmacy and Molecular Pharmacology

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Declaration by the Candidate

I, **Rabeya Akter**, hereby declare that this dissertation entitled “**Breast cancer risk factors of urban and rural people of Bangladesh**” submitted by me to the Department of Pharmacy, East West University, in the partial fulfillment of the requirements for the degree of Masters in Pharmacy (M. Pharm) is a confide record of original survey work carried out by me under the supervision and guidance of **Shamsun Nahar Khan, Ph.D.** Chairperson & Associate Professor, Department of Pharmacy, East West University.

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Certificate by the Supervisor

This is to certify that the dissertation entitled "**Breast cancer risk factors of urban and rural people of Bangladesh**" submitted to the Department of Pharmacy, East West University, in partial fulfillment to the requirements for the degree of Masters of Pharmacy (M. Pharm) was carried out by **Rabeya Akter (ID: 2013-1-79-025)** under my supervision and no part of this dissertation has been or is being submitted elsewhere for the award of any Degree/Diploma. I also certify that all the sources of information availed of this connection is duly acknowledged.

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This is to certify that the dissertation entitled "**Breast cancer risk factors of urban and rural people of Bangladesh**" is a genuine survey work carried out by **Rabeya Akter**, under the supervision of **Dr. Shamsun Nahar Khan, Ph.D.** Chairperson & Associate Professor, Department of Pharmacy, East West University. I further certify that no part of the survey has been submitted for any other degree and all the resources of the information in this connection are duly acknowledged.

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Dedication

**This Survey Paper is Dedicated
To
My Beloved Parents**

ABSTRACT

Breast cancer in women is a foremost health problem both in developed and developing countries. Breast cancer is rising at a faster rate in Bangladesh. The present research was a comprehensive study that was conducted to identify breast cancer risk factors of urban and rural people of Bangladesh. This was a survey based study where breast cancer patients of different locations, occupations were taken as volunteers. A questionnaire was made to observe the patients diagnostic reports, prescriptions etc. Data was analyzed using Microsoft Excel 2010. From this study, it was found that female adults (61%), marital age 16- 17 year (74%), starting menstrual age 11-12 year (90%), 1st child birth age 18-19 year (59%), menopausal age more than 45 (90%), OCP uses duration higher than 5 years (50%) were more susceptible to breast cancer than other. Here mainly urban and rural people are included who are suffering from breast cancer. Most of the respondents had incomplete or wrong information about breast cancer. The present situation can become more devastating if early attention is not given. So steps should be taken by policy makers and health professionals to educate the general female population about breast cancer. There is a limitation of this research that all social classes of cancerous patients are not included here for time consuming. At early stage, treatment of breast cancer is one of the best ways to stop spread of breast cancer. These study clearly the most common type breast cancer of urban and rural people of Bangladesh.

Key Words: Breast cancer, rural women, sign & symptoms, gene, tumor, risk factors, mechanism, chemotherapy, Treatment etc.

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**CHAPTER-ONE:
INTRODUCTION**

1.1 Cell

Our body is made up of millions of tiny cells and different parts of the body such as organs, bones, muscles, skin and blood are made up of from different specialized cells. Nucleus is the Centre of most of cells which contains thousands of genes made up from a chemical called DNA. These genes control the functions of the cell. From time to time most types of cell divide and multiply in the body. Old cells are replaced by new cells as old cells become damaged. A normal cell may become abnormal when one or more gene in the cell becomes damaged or altered. Then from the original cells lots of abnormal cells develop to form a group of abnormal cells leading to the formation of tumor. Sometimes tumor may lead to the formation of cancer (Kirkegaard et al., 2010).

1.2 Cancer

The word cancer is derived from the Latin word for crab because cancers are often very irregularly shaped, and because, like a crab, they “grab on and don’t let go”. Cancer is a term used for diseases in which abnormal cells divide without control and are able to invade other tissues. Cancer cells can spread to other parts of the body through the blood and lymph systems. The process of cancer spreading is called ‘metastases. Growth of cancer cell is different from normal cells. Cancer cells continue to grow and from new abnormal cells instead of dying. Due to the damage of DNA normal cells become cancer cells. DNA is present in every cell and conducts their functions. Normally when DNA is damaged in normal cells they rapidly repair the damage or die but in cancer cells the damage DNA is not repaired or dies. It produces new cells containing the damage which is not necessary for the body. The cancer develops inside the body (Sim, Seah and Tan, 2015).

1.3 Cancer among Women

The three most common cancers among women include:

- **Breast cancer:** First among women of all races and Hispanic origin populations. Second among white, black, Asian/Pacific Islander, and American Indian/Alaska Native women.

- **Lung cancer:** Second among white, black, and American Indian/Alaska Native women, and third among Asian/Pacific Islander and Hispanic women.
- **Colorectal cancer:** Second among Asian/Pacific Islander and Hispanic women and third among white, black, and American Indian/Alaska Native women.

1.3.1 The leading causes of cancer death among women are

- **Lung cancer:** First among white, black, Asian/Pacific Islander, and American Indian/Alaska Native women and second among Hispanic women.
- **Breast cancer:** First among Hispanic women and second among white, black, Asian/Pacific Islander, and American Indian/Alaska Native women.
- **Colorectal cancer:** Third among women of all races and Hispanic origin Populations (Lisa et al., 2012).

1.4 Breast cancer

Breast cancer is a kind of cancer that develops from breast cells. Breast Cancer usually starts off the inner lining of milk ducts or the lobules that supply them with milk. A malignant tumor can spread to other parts of the body. Someone with breast cancer may have cancer cells in just one part of the breast, which might be felt as a lump. The cancer can spread throughout one or both breasts. Sometimes breast cancer spreads to other parts of the body, like the bones, the liver, or elsewhere (Moya et al., 2004).

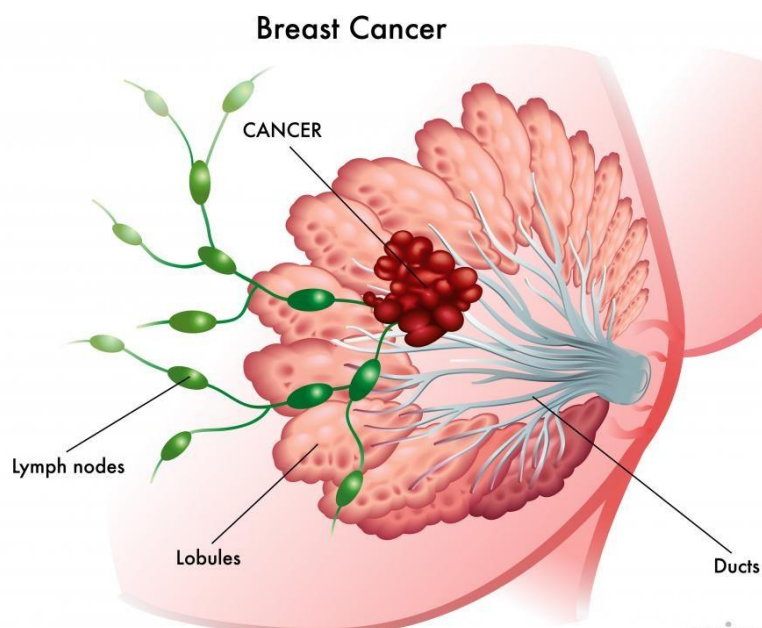


Figure-1: Breast Cancer overview

Tumors in the breast can be benign (not cancer) or malignant (cancer):

1.4.1 Benign tumors: Not harmful to body

- Infrequently assault tissues surrounding them
- Don't extend to other parts of the body
- Can be removed easily and normally don't grow back

1.4.2 Malignant tumors: May be life threatening

- Easily invade surrounding organs and tissues
- Spread to other parts of the body like bones or liver
- Hardly can be removed but grow back quickly (Peacey et al., 2006).

1.5 The anatomy of a female breast

A mature human female's breast consists of fat, connective tissue and thousands of lobules – tiny glands which produce milk. The milk of a breastfeeding mother goes through tiny ducts (tubes) and is delivered through the nipple. The breast, like any other part of the body, consists of billions of microscopic cells.

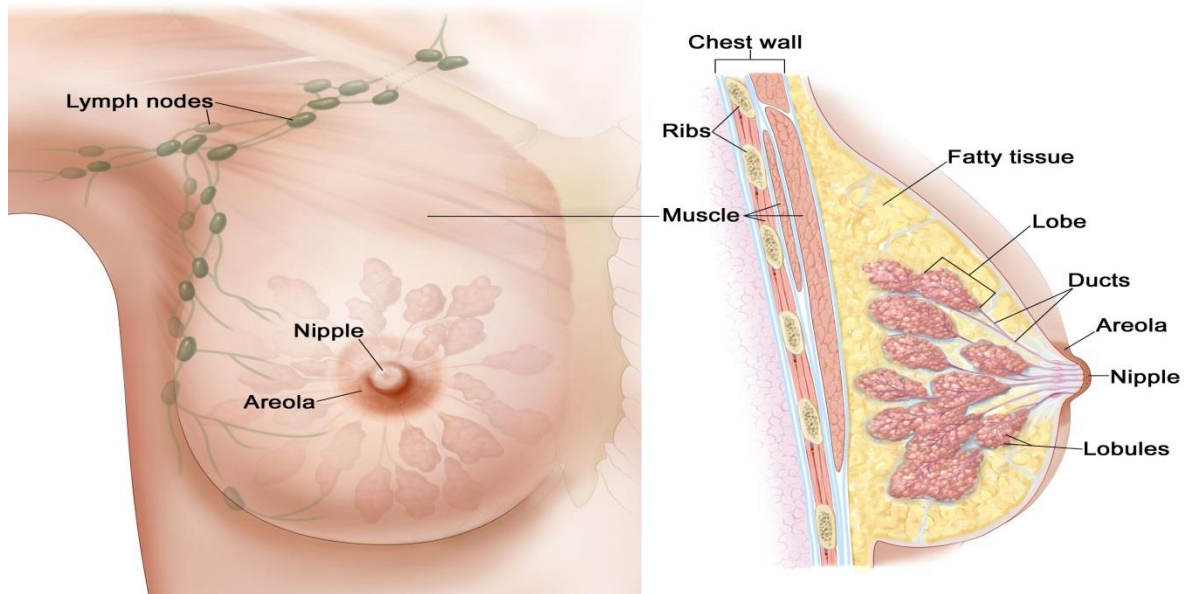


Figure-2: Anatomy of a female breast

These cells multiply in an orderly fashion – new cells are made to replace the ones that died. In cancer, the cells multiply uncontrollably, and there are too many cells, progressively more and more than there should be. Cancer that begins in the lactiferous duct (milk duct), known as ductal carcinoma, is the most common type. Cancer that begins in the lobules, known as lobular carcinoma, is much less common (Moya et al., 2004).

1.6 The Lymph System of the Breast

The lymph system, which is part of the immune system, is a network of lymph vessels and lymph nodes running throughout the entire body.

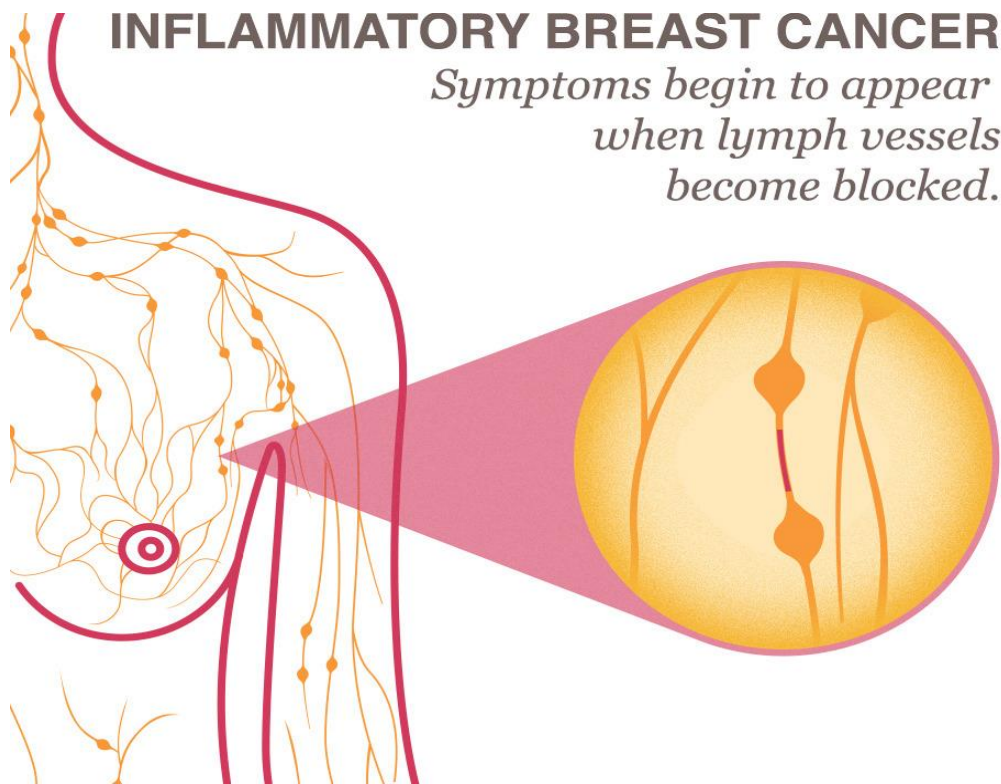


Figure-3: Lymph System of the Breast

Similar to how the blood circulatory system distributes elements throughout the body, the lymph system transports disease-fighting cells and fluids. Clusters of bean-shaped lymph nodes are fixed in areas throughout the lymph system and act as filters by carrying abnormal cells away from healthy tissue. The type of breast cancer is generally determined by the origin of the growth of cancer cells, which is almost always in the lobes, lobules, or ducts. When cancer is found in the nearby lymph nodes, it helps doctors identify just how far the cancer has spread. If the nearest nodes contain cancer, additional nodes are usually examined for the presence or absence of cancer cells to understand how far the disease has progressed. If 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. The more lymph nodes with breast cancer cells, the more likely it is that the cancer may be found in other organs as well. Because of this, finding cancer in one or more lymph nodes often affects the treatment plan. Still, not all women with cancer cells in their lymph

nodes develop metastases, and some women can have no cancer cells in their lymph nodes and later develop metastasis (Georgia et al., 2008).

1.7 Signs and symptoms of breast cancer

The most common symptom of breast cancer is a new lump or mass. A painless hard mass that has irregular edges are more likely to be cancerous, but breast cancers can be tender, soft, or rounded. They can even be painful. For this reason, it is important to have any new breast mass or lump or breast change checked by a health care professional experienced in diagnosing breast diseases (Georgia et al., 2008).

Signs and symptoms of breast cancer include:

- Early signs and symptoms
- Late signs and symptoms

1.7.1 Early signs and symptoms

- **Lump in the breast** – the most common first sign
 - The woman usually finds the lump.
 - Sometimes the lump is seen on a screening mammogram before it can be felt.
 - The lump is present all the time and does not get smaller or go away with the menstrual cycle.
 - The lump may feel like it is attached to the skin or chest wall and cannot be moved.
 - The lump may be hard, irregular in shape and very different from the rest of the breast tissue.
 - The lump may be tender, but it is usually not painful.

- Pain is more often a symptom of a non-cancerous (benign) condition, but should be checked by a doctor.(Barlow et al.,2002)
- **Lump in the armpit (axilla)**
 - Sometimes small, hard lumps in the armpit may be a sign that breast cancer has spread to the lymph nodes. Although these lumps are often painless, they may be tender. (Barlow et al.,2002)
- **Changes in breast shape or size** (Barlow et al., 2002)
- **Skin changes**
 - The skin of the breast may become dimpled or puckered. A thickening and dimpling of the skin is sometimes called orange peel skin.
 - Redness, swelling and increased warmth (signs that look like an infection) may be a sign of inflammatory breast cancer.
 - Itching of the breast or nipple may be a sign of inflammatory breast cancer.
 - Itchiness is often not relieved by ointments, creams or other medications (Barlow et al., 2002).
- **Nipple changes**
 - Some people's nipples are always pointed inward (inverted).Normal nipples that suddenly become inverted should be checked by a doctor.
 - Discharge from the nipples can be caused by many conditions, most of which are non-cancerous (benign).
 - Discharge from one nipple may be assign of breast cancer, especially if it appears without squeezing the nipple (is spontaneous) and is blood- stained).

- Crusting, ulcers or scaling on the nipple may be a sign of some rare types of breast cancer, such as Paget disease of the nipple (Barlow et al., 2002).

1.7.2 Late signs and symptoms

Late signs and symptoms occur as the cancer grows larger or spreads to other parts of the body, including other organs.

- Bone pain, jaundice
- Nausea
- Loss of appetite
- Headache, muscle weakness
- Buildup of fluid around the lungs(pleural effusion)shortness of breath, cough Double vision (Barlow et al., 2002).

1.8 Non-specific symptoms

A broad spectrum of non-specific cancer symptoms may include:

1.8.1 Persistent Fatigue:

Fatigue is one of the most commonly experienced cancer symptoms. Anemia is commonly the culprit — a condition that is associated with many types of cancer, especially types affecting the bowel. Fatigue is a symptom of both malignant and non-malignant conditions and should be evaluated by a physician(Barlow et al., 2002).

1.8.2 Unintentional Weight Loss:

Losing 10 pounds or more unintentionally definitely warrants a visit to the doctor. This type of weight loss can occur with or without loss of appetite. Remember, weight loss can be a symptom of cancer, but is also a symptom of many other illnesses, too(Barlow et al., 2002).

1.8.3 Pain:

Typically, pain is not an early symptom of cancer, except in some cancer types like those that spread to the bone. Pain generally occurs when cancer spreads and begins to affect other organs and nerves (Barlow et al., 2002).

1.8.4 Fever:

In relation to cancer, a fever that is persistent or one that comes and goes frequently can signal stress on the immune system. Fevers are commonly associated with types of cancer that affects the blood, like leukemia and lymphoma, but are also common in people whose cancer has spread (Barlow et al., 2002).

1.8.5 Bowel Changes:

Constipation, diarrhea, blood in the stools, gas, thinner stools, or just a general overall change in bowel habits, these symptoms are most commonly associated with colon cancer, but are also related to other cancer types (Barlow et al., 2002).

1.8.6 Chronic Cough:

In relation to cancer, a chronic cough with blood or mucus can be symptom of lung cancer (Barlow et al., 2002).

1.9 Types of breast cancer

Breast cancer can begin in different areas of the breast-the ducts, the lobules, or in some cases, the tissue in between. There are different types of breast cancer, including non-invasive, invasive, recurrent, and metastatic breast cancers (Agarwal et al., 2007).

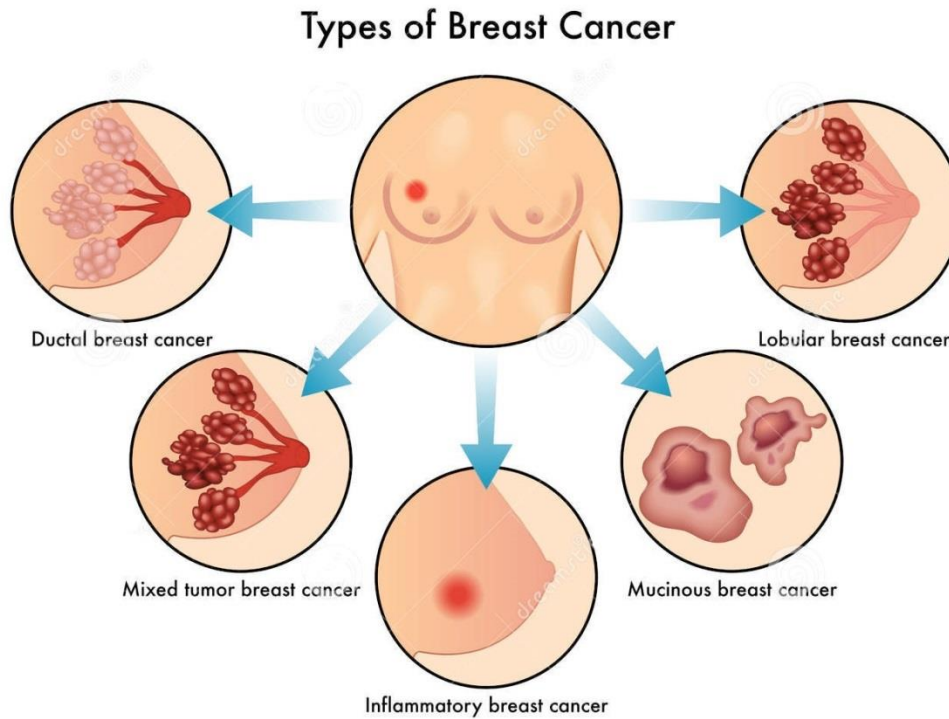


Figure-4: Types of breast cancer

1.9.1 Ductal Carcinoma In-Situ (DCIS)

The term “in situ” or “in place” refers to a very early form of cancer that has not spread. DCIS is a type of pre-cancer inside of the ductal system that has not attacked the nearby tissue. Currently, there is no way to determine if this type of breast cancer will go on to become invasive. This is a very common type of non-invasive cancer with 1 in 5 diagnosed as DCIS. Nearly all patients diagnosed with this type of pre-cancer can be cured (Agarwal et al., 2007).

1.9.2 Lobular carcinoma in situ (LCIS)

This is a very rare non-invasive tumor that most doctors believe will not develop into invasive cancer. LCIS is more of a “marker” or signal that breast cancer may develop. Described as an abnormal growth in the number of cells, LCIS has recently been renamed lobular neoplasia. Women who have these “markers” are at greater risk of developing breast cancer later in life (Agarwal et al., 2007).

1.9.3 Infiltrating Ductal Carcinoma (IDC)

IDC is the most common type of breast cancer. It starts in the milk ducts of breast and spreads to surrounding tissues. IDC could spread through the lymph system or bloodstream to other parts of body. Approximately 8 out of 10 invasive breast cancers are IDC (Agarwal et al., 2007).

1.9.4 Medullary Carcinoma

Medullary Carcinoma accounts for 15 % of all breast cancer types. It most frequently occurs in women in their late 40s and 50s, presenting with cells that resemble the medulla (gray matter) of the brain (Agarwal et al., 2007).

1.9.5 Infiltrating Lobular Carcinoma (ILC)

ILC is the second most common type of breast cancer after Infiltrating Ductal Carcinoma. It usually appears as a subtle thickening in the upper-outer section of the breast. ILC starts in the lobules or lobes and has a greater chance of spreading to other parts of the body. Usually positive for estrogen and progesterone receptors, these tumors respond well to hormone therapy. About 1 out of 10 invasive breast cancer is ILC (Agarwal et al., 2007).

1.9.6 Tubular Carcinoma

Tubular carcinoma cell has distinctive tubular structure when viewed under a microscope. This type of breast cancer is typically found in women aged 50 and above. It has an excellent 10 year survival rate of 95% (Agarwal et al., 2007).

1.9.7 Mucinous Carcinoma (Colloid)

Mucinous (Colloid) carcinoma is a rare type of invasive breast cancer that rarely spreads to lymph nodes. It is formed when cancer cell inside breast produce mucous. This mucous contains cancer cells that are very distinct from normal cells under a microscope. The mucous and cancer cell combined to form jelly- like tumors (Agarwal et al., 2007).

1.9.8 Paget's disease

Paget's disease of the breast is an eczema like change in the skin of the nipple. The nipple become itchy and scaly and does not get better. Studies have shown that 9 out of 10 women who experience these symptoms have an underlying breast cancer. Paget's disease can occur at any age but will more likely occur in women who are in their 50s (Agarwal et al., 2007).

1.9.9 Inflammatory Breast Cancer (IBC)

IBC is a rare and very aggressive type of cancer that accounts for 1-3% of all breast cancers. It causes the lymph vessels in the skin of the breast to become blocked. IBC usually grows in nests or sheets, rather than as a confined, solid tumor or palpable mass. This type of breast cancer is called "inflammatory" because the breast often looks swollen and red, or "inflamed" (Agarwal et al., 2007).

1.9.10 Rare Breast Cancer

All though most breast cancers are carcinomas – tumors that develop from epithelial (surface or lining) tissues – a very small number of breast cancers may arise from the muscle, fat, or connective tissues of the breast. Such cancers bare known as sarcomas. The rare types of sarcoma that occasionally are diagnosed within the breast include:

- **Angiosarcoma:** Also known as hemangiosarcoma; a cancer that is composed of cavity – lining and fiber- producing cells (Sally, Elizabeth and Gilchrist, 2003).
- **Cystosarcoma phylloides:** cancer that primarily affects middle – aged women who have histories of recurring fibro adenomas (Sally, Elizabeth and Gilchrist, 2003).

1.10 Breast cancer risk factors

1.10.1 General

- **Ageing:** on average, woman over 60 are more likely to be diagnosed with breast cancer. Only about 10 -15 percent of breast cancer occur in woman younger than 45.

However, this may vary for different races or ethnicities (Gore, DeGregori and porter, 2013).

A woman's Chances of Breast Cancer Increases With Age	
From age 30 to age 39	0.44% (1 in 227)
From age 40 to age 49	1.49% (1 in 67)
From age 50 to age 59	2.79% (1 in 36)
From age 60 to age 70	3.38% (1 in 26)

Table-1: Advancing age is a risk factor for Breast cancer (Peacey et al., 2006)

- **Gender:** Although nearly 2000 men will be diagnosed with breast cancer each year, breast cancer is 100 times more common in women. The national cancer institute estimates that over 190,000 women will be diagnosed with breast cancer annually (Gore, DeGregori and porter, 2013).

1.10.2 Genetics

- **Family history:** Having a family history of breast cancer, particularly with a mother, sister, or daughter who has or had breast cancer, may double the risk (Cuzick, J.2010).
- **Inherited factors:** Some inherited genetic mutations may increase your breast cancer risk. Mutations in the BRCA1 and BRCA2 genes are the most common inherited causes. Other rare mutations may also make some women more susceptible to developing breast cancer (Cuzick, J.2010).

1.10.3 Body

- **Obesity:** After menopause, fat tissue may contribute to increase in estrogen levels, and high levels of estrogen may increase the risk of breast cancer. Weight gain during adulthood and excess body fat around the waist may also play a role (Cuzick, J.2010).

- **Not having children:** Women who have had no children, or who were pregnant later in life (over age 35) may have a greater chance of developing breast cancer. Breast-feeding may help to lower your breast cancer risks (Cuzick, J.2010).
- **High breast density:** Women with less fatty tissue and most glandular and fibrous tissue may be at higher risk for developing breast cancer than women with less dense breasts (Cuzick, J.2010).
- **Certain breast changes:** Certain benign (noncancerous) breast conditions may increase breast cancer risk (Cuzick, J.2010).
- **Menstrual history:** Women who start menstruation at an early age (before 12) and/or menopause at an older age (after age 55) have a slightly higher risk of breast cancer. The increase in risk may be due to a longer lifetime exposure to the hormones estrogen and progesterone (Cuzick, J.2010).
- **Being tall:** If women's are taller than average, they are more likely to develop breast cancer than someone who's shorter than average. The reason for this isn't fully understood, but it may be due to interactions between genes, nutrition and hormones (Cuzick, J.2010).

1.10.4 Lifestyle

- **A sedentary lifestyle:** Physical activity in the form of regular exercise for 4 to 7 hours a week may help to reduce breast cancer risk (Cuzick, J.2010).
- **Heavy drinking:** The use of alcohol is linked to an increased risk of developing breast cancer. The risk increases with the amount of alcohol consumed (Cuzick, J.2010).
- **Calcium:** Some studies have found a relationship between calcium intake and lowered breast cancer risk (Cuzick, J.2010).
- **Brassica vegetables:** In a study published in the *Journal of the American Medical Association*, biomedical investigators found that Brassica vegetable intake

(broccoli, cauliflower, cabbage, kale and Brussels sprouts) was inversely related to breast cancer development. The relative risk among women in the highest decile of Brassica vegetable consumption (median, 1.5 servings per day) compared to the lowest decile (virtually no consumption) was 0.58. That is, women who consumed around 1.5 servings of Brassica vegetables per day had 42% less risk of developing breast cancer than those who consumed virtually none (Cuzick, J.2010).

- **Night work:** Several studies have suggested that women who work at night – for example, nurses on a night shift-may have an increased risk of developing breast cancer. This is a fairly recent finding, and more studies are looking at this issue. Some researchers think the effect may be due to changes in levels of melatonin, a hormone whose production is affected by the body’s exposure to light, but other hormones are also being studied (Cuzick, J.2010).
- **Mushrooms:** In 2009, a case-control study of the eating habits of 2,018 women suggested that women who consumed mushrooms had an approximately 50% lower incidence of breast cancer. Women who consumed mushrooms and green tea had a 90% lower incidence of breast cancer (Cuzick, J.2010).
- **Iodine deficiency:** The protective effects of iodine on breast cancer have been postulated from epidemiologic evidence and described in animal models (Cuzick, J.2010).

1.10.5 Previous treatments

- **Birth control pills:** Using oral contraceptives within the past 10 years may slightly increase the risk of developing breast cancer. The risk decreases over time once the pills are stopped (Benjamin et al., 2014).
- **Combined post-menopausal hormone therapy (PHT):** Using Combined hormone therapy after menopause increases the risk of developing breast cancer. Combined HT also increases the likelihood that the cancer may be found at a more advanced stage (Benjamin et al., 2014).

- **Diethylstilbestrol exposure (DES):** Previous use of DES, a drug commonly given to pregnant women from 1940 to 1971 to prevent miscarriage, may slightly increase the risk of developing breast cancer. Women whose mothers took DES during pregnancy may also have a slightly higher risk of breast cancer (Benjamin et al., 2014).
- **Radiation exposure:** Women who, as children or young adults, had radiation therapy to the end chest area as treatment for another cancer have a significantly increased risk for breast cancer (Benjamin et al., 2014).

1.10.6 Controversial or disproven factors

- **Antiperspirants:** Internet and e-mail rumors have suggested that chemicals in underarm antiperspirants are absorbed through the skin interfere with lymph circulation, cause toxins to build up in the breast, and eventually lead to breast cancer. Based on the available evidence there is little if any reason to believe that antiperspirants increase the risk of breast cancer (Benjamin et al., 2014).
- **Bras:** Internet and e-mail rumors and at least one book have suggested that bras cause breast cancer by obstructing lymph flow. There is no good scientific or clinical basis for this claim, and a recent study of more than 1,500 women found no association of bra use with breast cancer risk (Benjamin et al., 2014).
- **Induced abortion:** Several studies have provided very strong data that neither induced abortion nor spontaneous abortions (miscarriage) have an overall effect on the risk of breast cancer (Benjamin et al., 2014).
- **Breast implants:** Breast implants may be linked to a rare type of lymphoma called ‘anaplastic large cell lymphoma’. This lymphoma has rarely been found in the breast tissue around the implants. So far, though, there are too few cases to know if the risk of this lymphoma is really higher in women that have implants (Benjamin et al., 2014).

1.11 Causes of cancer

Cancers are primarily an environmental disease with 90-95% of cases attributed to environmental factors and 5-10% due to genetics. Environmental, as used by cancer researchers, means any cause that is not genetic, not merely pollution. Common environmental factors that contribute to cancer death include tobacco (25-30%), diet and obesity (30-35%), infections (15-20%), radiation (both ionizing and non-ionizing, up to 10%), stress, lack of physical activity, and environmental pollutants.

Many mutagens are also carcinogens, but some carcinogens are not mutagens. Alcohol is an example of a chemical carcinogen that is not a mutagen. In Western Europe 10% of cancers in males and 3% of cancers in females are attributed to alcohol(St. Louis et al., 2007).

1.12 Pathophysiology

Carcinogenesis and the Hallmarks of Cancer:

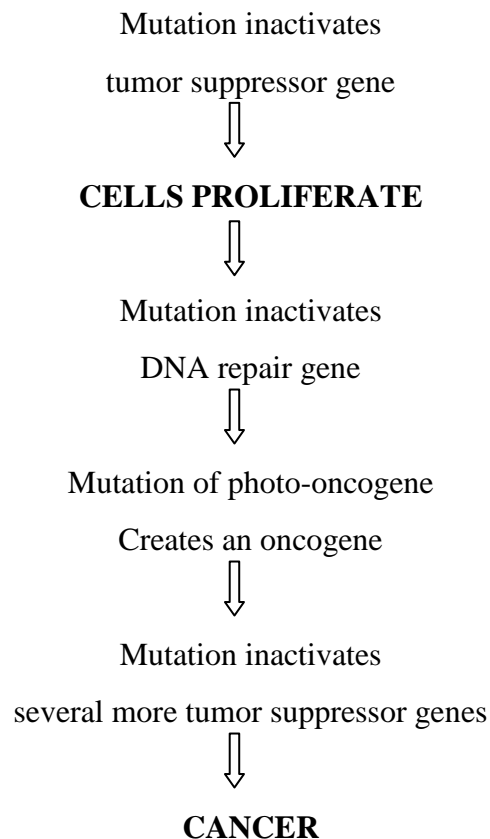


Figure: 1.12 Carcinogenesis and the Hallmarks of Cancer

Cancers are caused by a series of mutations. Each mutation alters the behavior of the cell somewhat. Cancer is fundamentally a disease of failure of regulation of tissue growth. In order for a normal cell to transform into a cancer cell, the genes which regulate cell growth and differentiation must be altered. The affected genes are divided into two broad categories. Oncogenes are genes which promote cell growth and reproduction. Tumor suppressor genes are genes which inhibit cell division and survival. Malignant transformation can occur through the formation of novel oncogenes, the inappropriate over-expression of normal oncogenes, or by the under-expression or disabling of tumor suppressor genes. Typically, changes in many genes are required to transform a normal cell into a cancer cell. The errors which cause cancer are self-amplifying and compounding. A further mutation in an oncogene might cause the cell to reproduce more rapidly and more frequently than its normal counterparts. A further mutation may cause loss of a tumor suppressor gene, disrupting the apoptosis signaling pathway and resulting in the cell becoming immortal. The transformation of normal cell into cancer is akin to a chain reaction caused by initial errors, which compound into more severe errors, each progressively allowing the cell to escape the controls that limit normal tissue growth. Once cancer has begun to develop, this ongoing process, termed clonal evolution drives progression towards more invasive stages (Stanley J et al., 1999).

1.13 Other Mechanism

The cell cycle is the period from one cell division to the next and can be divided into four phases. In G₁, the first phase, mutagenic stimulation results in activation of cell cycle dependent kinases like cyclin D1/CDK4 and Cyclin E/CDK2, which activate proteins that retain cells in a non-dividing state. Cells that are not stimulated to divide in G₁ enter into G₀ state and can remain quiescent for longer periods of time. However, activated cells will enter the second phase, S-phase, in which DNA is duplicated and here for the activity of cyclin A/CDK2 is required.

In G₂ phase cells ensure that the DNA is properly replicated and that the conditions are right for the final separation of sister chromatids and cytokinesis in M-phase or mitosis.

In cancer the transition from G1- phase to S- phase is often deregulated due to alter gene function. Continuous growth signaling can be a consequence of mutations in extra cellular receptors or intracellular signal transducers, like EOF receptor. However, it can also be due to applications of cell cycle activating proteins such as Cyclin D1 and cyclin E or loss of negative regulators of the cell cycle such as the CDK inhibitors p21 and p27. Also loss of a functional Retinoblastoma (Rb) protein, which inhibits cell cycle progression by inhibiting the E2F transcription factor family that is crucial for G1/S transition, is a frequent event in human cancers (L. Sobin & ChWittekind et al., 2002).

1.14 Stages of breast cancer

Stages are the process physician use to assess the size and location of a patient's cancer. This information is required for the determining the optimal form of treatment. Breast cancer is divided into 0 to stage IV according to the size and nature of spread (Metastasis),

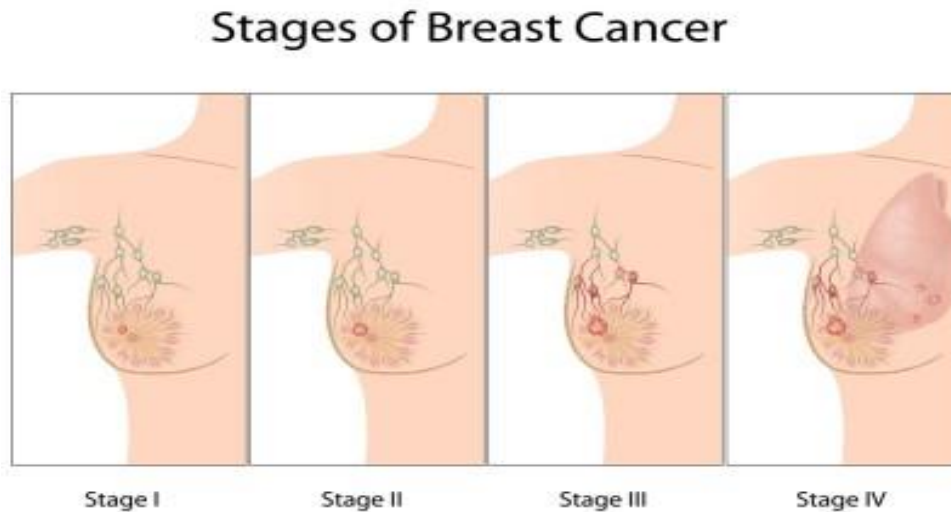


Figure-5: Stages of breast cancer

Stage 0: (Carcinoma in situ) Carcinoma in situ is very early breast cancer. In this stage cancer has not invaded into the normal breast tissue and is contained in either the breast duct (ductal Carcinoma in situ) or the breast lobule (lobular Carcinoma in situ).By definition, this

type of cancer is not invasive and is not able to travel to the lymph nodes or other parts of the body.

Stage I: In this stage the size is not more than 2 cm in diameter and has not spread to distant parts of the body.

Stage II: In this stage the tumor is larger than the stage 1 that means 2-5 cm in diameter. Like stage 1 it indicates that it has not spread to distant parts of the body but it may or not may be spread to axillary lymph nodes.

Stage II (a) Tumor size is >5 cm in diameter but has not spread to axillary lymph nodes.

Stage II (b) Tumor size is >2 cm in diameter but has spread to less than 4 axillary lymph nodes.

Stage III (Locally advance cancer): In this stage cancer spread to axillary lymph nodes.

Stage III (a) Tumor size is >5 cm and spread to axillary lymph nodes.

Stage III (b) Tumor size is >2 cm in diameter but the cancer has spread to axillary lymph nodes above the collar bones.

Stage IV: Tumor spread distant parts of the body like bones, liver and kidney (Gore, DeGregori and porter, 2013).

1.15 Classification of Cancer

Cancers are classified in two ways: by the type of tissue in which the cancer originates and by primary site, or the location in the body where the cancer first developed. Cancer classification based on histological type. The international standard for the classification and nomenclature of histologist is the International Classification of Diseases for Oncology from a histological standpoint there are hundreds of different cancers, which are grouped into six major categories:

- Carcinoma
- Sarcoma
- Myeloma

- Leukemia
- Lymphoma
- Mixed Types

1.15.1 Carcinoma

Carcinoma refers to a malignant neoplasm of epithelial origin or cancer of the internal or external lining of the body. Carcinomas, malignancies of epithelial tissue, account for 80 to 90 percent of all cancer cases. Carcinomas are divided into two major subtypes: adenocarcinoma, which develops in an organ or gland, and squamous cell carcinoma, which originates in the squamous epithelium. Adenocarcinomas generally occur in mucus membranes and are first seen as a thickened plaque-like white mucosa. They often spread easily through the soft tissue where they occur. Squamous cell carcinomas occur in many areas of the body. Most carcinomas affect organs or glands capable of secretion, such as the breasts, which produce milk, or the lungs, which secrete mucus, or colon or prostate or bladder (SB, Byrd DR et al., 2010).

1.15.2 Sarcoma

Sarcoma tumors usually resemble the tissue in which they grow. Examples of sarcomas are:

- Osteosarcoma or osteogenic sarcoma (bone)
- Chondrosarcoma (cartilage)
- Leiomyosarcoma (smooth muscle)
- Rhabdomyosarcoma (skeletal muscle)
- Mesothelial sarcoma or mesothelioma (membranous lining of body cavities)
- Fibrosarcoma (fibrous tissue)
- Angiosarcoma or hemangioendothelioma (blood vessels)
- Liposarcoma (adipose tissue)
- Glioma or astrocytoma (neurogenic connective tissue found in the brain)
- Myxosarcoma (primitive embryonic connective tissue)

- Mesenchymous or mixed mesodermal tumor (mixed connective tissue types)(SB, Byrd DR et al., 2010).

1.15.3 Myeloma

Myeloma is cancer that originates in the plasma cells of bone marrow. The plasma cells produce some of the proteins found in blood (SB, Byrd DR et al., 2010).

1.15.4 Leukemia

Leukemia's are cancers of the bone marrow. The word leukemia means "white blood" in Greek. The disease is often associated with the overproduction of immature white blood cells. These immature white blood cells do not perform as well as they should, therefore the patient is often prone to infection. Leukemia also affects red blood cells and can cause poor blood clotting and fatigue due to anemia. Examples of leukemia include:

- Myelogenous or granulocytic leukemia (malignancy of the myeloid and granulocytic white blood cell series)
- Lymphatic, lymphocytic, or lymphoblastic leukemia (malignancy of the lymphoid and lymphocytic blood cell series)
- Polycythemia vera or erythremia (malignancy of various blood cell products, but with red cells predominating)(SB, Byrd DR et al., 2010).

1.15.5 Lymphoma

Lymphomas develop in the glands or nodes of the lymphatic system, a network of vessels, nodes, and organs (specifically the spleen, tonsils, and thymus) that purify bodily fluids and produce infection-fighting white blood cells, or lymphocytes. The lymphomas are sub classified into two categories: Hodgkin lymphoma and Non-Hodgkin lymphoma. The presence of Reed-Sternberg cells in Hodgkin lymphoma diagnostically distinguishes Hodgkin lymphoma from Non-Hodgkin lymphoma (SB, Byrd DR et al., 2010).

1.15.6 Mixed Types

The type components may be within one category or from different categories. Some examples are:

- adenosquamous carcinoma
- mixed mesodermal tumor
- carcino sarcoma
- teratocarcinoma (SB, Byrd DR et al., 2010).

1.16 Diagnosis of Cancer

Early detection of cancer can greatly improve the odds of successful treatment and survival. Physicians use information from symptoms and several other procedures to diagnose cancer. Imaging techniques such as X-rays, CT scans, MRI scans, PET scans, and ultrasound scans are used regularly in order to detect where a tumor is located and what organs may be affected by it. Doctors may also conduct an endoscopy, which is a procedure that uses a thin tube with a camera and light at one end to look for abnormalities inside the body. Extracting cancer cells and looking at them under a microscope is the only absolute way to diagnose cancer. This procedure is called a biopsy. Physicians will analyze your body's sugars, fats, proteins, and DNA at the molecular level. Molecular diagnostics, biopsies, and imaging techniques are all used together to diagnose cancer.

After a diagnosis is made, doctors find out how far the cancer has spread and determine the stage of the cancer. The stage determines which choices will be available for treatment and informs prognoses. The most common cancer staging method is called the TNM system. T (1-4) indicates the size and direct extent of the primary tumor, for example- stages from 0 to 4, where lower numbers indicate that the cancer has spread less. While most Stage 1 tumors are curable, most Stage 4 tumors are inoperable or unbeatable (SB, Byrd DR et al., 2010).

1.17 Cancer treatment

Treatments for breast cancer usually fall into one of the following categories: surgery, radiation, chemotherapy, immune therapy, hormone therapy, or gene therapy. These treatments are either local or systemic. Local treatment such as surgery and radiation

therapy, removes, destroy or control cancer cells in specific areas. Systemic treatments, such as chemotherapy and hormone therapy, destroy or cancer throughout the body. Depending on condition, you may receive one treatment or a combination at the same time or in succession (Mahajan et al., 2013).

1.17.1 Surgery

Surgery is the oldest known treatment for cancer. If a cancer has not metastasized, it is possible to completely cure a patient by surgically removing the cancer from the body. This is often seen in the removal of the prostate or a breast or testicle (Mahajan et al., 2013).

1.17.2 Radiation

Radiation treatment, also known as radiotherapy, destroys cancer by focusing high-energy gamma rays on the cancer cells. This causes damage to the molecules that make up the cancer cells and leads them to commit suicide. It is used to early stage breast cancer along with surgery. It may be used to recur advanced breast cancer to control the disease or to treat symptoms such as pain (Mahajan et al., 2013).

1.17.3 Chemotherapy

Chemotherapy utilizes chemicals that interfere with the cell division process - damaging proteins or DNA - so that cancer cells will commit suicide. It is usually administered as a combination of drugs given orally or by injection. Chemotherapy enters the bloodstream and travels throughout your body. The treatment is most commonly used to decrease the chance that cancer will recur after surgery, shrink breast cancer after surgery when the tumor is larger or if it is inflammatory, and to control metastatic breast cancer which spread to other organs in the body (Mahajan et al., 2013).

1.17.4 Immunotherapy

Immunotherapy aims to get the body's immune system to fight the tumor. Local immunotherapy injects a treatment into an affected area, for example, to cause inflammation that causes a tumor to shrink. Systemic immunotherapy treats the whole body by administering an agent such as the protein interferon alpha that can shrink tumors (Mahajan et al., 2013).

1.17.5 Hormone therapy

Hormone therapy changes the hormonal environment in your body, which impacts the growth and behavior of some breast cancers. If breast cancer produces one of the hormone receptors- estrogen receptor (ER) or progesterone receptor (PR) then hormonal therapy is effective in treating early-stage, metastatic or advanced breast cancer and preventing recurrence (Mahajan et al., 2013).

1.17.6 Gene Therapy

The goal of gene therapy is to replace damaged genes with ones that work to address a root cause of cancer: damage to DNA. For example, researchers are trying to replace the damaged gene that signals cells to stop dividing (the p53 gene) with a copy of a working gene. Gene therapy is a very young field and has not yet resulted in any successful treatments (Mahajan et al., 2013).

1.18 Cancer Prevention

Cancer prevention is defined as active measures to decrease the risk of cancer. The vast majority of cancer risk factors are due to environmental factors, and many of these factors are controllable. Thus, cancer is largely considered a preventable disease. Greater than 30% of cancer is considered preventable by avoiding risk factors including: tobacco, overweight / obesity, an insufficient diet, physical inactivity, alcohol, sexually transmitted infections, and air pollution (Smith RA, et al., 2010).

1.18.1 Dietary

Dietary recommendations to reduce the risk of developing cancer, including: (1) reducing intake of foods and drinks that promote weight gain, namely energy-dense foods and sugary drinks, (2) eating mostly foods of plant origin, (3) limiting intake of red meat and avoiding processed meat, (4) limiting consumption of alcoholic beverages, and (5) reducing intake of salt and avoiding mouldy cereals (grains) or pulses (legumes)(Smith RA, et al., 2010).

1.18.2 Medication

The concept that medications could be used to prevent cancer is an attractive one, and many high-quality clinical trials support the use of such chemoprevention in defined circumstances. Aspirin has been found to reduce the risk of death from cancer. Daily use of tamoxifen or raloxifene has been demonstrated to reduce the risk of developing breast cancer in high-risk women by about 50%.

Vitamins have not been found to be effective at preventing cancer, although low levels of vitamin D are correlated with increased cancer risk (Smith RA, et al., 2010).

1.18.3 Vaccination

Vaccines have been developed that prevent some infection by some viruses that are associated with cancer, and therapeutic vaccines are in development to stimulate an immune response against cancer-specific epitopes. Human papillomavirus vaccine (Gardasil and Cervarix) decreases the risk of developing cervical cancer. The hepatitis B vaccine prevents infection with hepatitis B virus and thus decreases the risk of liver cancer (Smith RA, et al., 2010).

1.18.4 Screening

Cancer screening involves efforts to detect cancer after it has formed, but before any noticeable symptoms appear. This may involve physical examination, blood or urine tests, or medical imaging. Cancer screening is not currently possible for some types of cancers, and even when tests are available, they are not recommended to everyone (Smith RA, et al., 2010).

1.18.5 Possible harms from the screening test

Some types of screening tests, such as X-ray images, expose the body to potentially harmful ionizing radiation. There is a small chance that the radiation in the test could cause a new cancer in a healthy person. Screening mammography, used to detect breast cancer, is not recommended to men or to young women because they are more likely to be harmed by the test than to benefit from it (Smith RA, et al., 2010).

1.18.6 Possible harms from follow-up procedures

If the screening test is positive, further diagnostic testing is normally done, such as a biopsy of the tissue. If the test produces many false positives, then many people will undergo needless medical procedures, some of which may be dangerous (Smith RA, et al., 2010).

1.18.7 Whether the cancer will ever need treatment

Diagnosis of a cancer in a person who will never be harmed by the cancer is called over diagnosis. Over diagnosis is most common among older people with slow-growing cancers. Concerns about over diagnosis are common for breast and prostate cancer (Smith RA, et al., 2010).

1.18.8 Whether the test is acceptable to the patients

If a screening test is too burdensome, such as requiring too much time, too much pain, or culturally unacceptable behaviors, then people will refuse to participate (Smith RA, et al., 2010).

1.19 United States Cancer Statistics (USCS)

The current report provides state-specific and regional data for cancer cases diagnosed and for cancer deaths that occurred in 2007, the most recent year for which incidence data are available. It includes cancer incidence data obtained from registries in 49 states, 6 metropolitan areas, and the District of Columbia, covering 99% of the U.S. population. Mortality data from all states and the District of Columbia also were included and cover 100% of the U.S. population. These data are presented by race, sex, age, and primary site as well as by specific cancer types (U.S. Cancer Statistics Working Group. 2010).

1.20 Breast cancer: worldwide overview

Breast cancer is the most common cancer in women worldwide. It is also the principle cause of death from cancer among women globally. Despite the high incidence rates in Western countries, 89% of women diagnosed with breast cancer are still alive 5 years after their diagnosis, which is due to detection and treatment (parkin,2008).

The UK and USA have one of the highest incidence rates worldwide (together with the rest of North America and Australia/New Zealand), making these countries a priority for breast cancer awareness. View the map below to see how which country is impacted by breast cancer (Bray, McCarron and Parkin, 2004)

According to the World Cancer Research Fund which has been analyzing scientific evidence on cancer since 1990, breast cancer rates are highest in Belgium where 109.2 of every 100,000 people develop the disease. The UK has the 11th highest rate of breast cancer worldwide, ahead of other European countries including Italy and Germany. There appears to be a relatively strong correlation between a country's wealth and its breast cancer rates – several countries in Asia and central Africa have some of the lowest rates in the world. Despite this, there is a considerable gap between breast cancer rates in the UK (89.1 per 100,000 women) and in the US (76 per 100,000 women). (Boyle and Howell, 2010)

According to the American Cancer Society, breast cancer is less common at a young age (i.e., in their thirties), younger women tend to have more aggressive breast cancers than older women, which may explain why survival rates are lower among younger women 95% of new cases and 97% of breast cancer deaths occurred in women 40 years of age and older (Boyle and Howell, 2010).Source: American Cancer society (Boyle and Howell, 2010).

Breast Cancer Survival Rates	
5 years after diagnosis	89%
10 years after diagnosis	82%
15 years after diagnosis	77%

Table-2: Breast Cancer Survival Rates in the world

According to the American Cancer society, white women develop breast cancer at a higher rate than African-American women, but African-American women are more likely to get breast cancer before they are 40, and more likely to die from it at any age.

1.21 Situation of Breast Cancer in Bangladesh

Breast cancer is most common among women in Bangladesh. About 20,000 women die of breast cancer every year in Bangladesh, according to health experts. It is the 2nd leading cancer in women after cervical carcinoma (Rahim, 1986). Late presentation with advanced stage is the common feature of breast cancer patient in Bangladesh, when it is extremely difficult to manage the deadly disease. It is easily understandable that the incidence and mortality of breast cancer is growing at a fast rate. But as we do not have any cancer registry along with relevant data it is difficult to say the exact situation in Bangladesh. A survey done in 2001 showed that 22000 women were affected every year by breast cancer and 17000 (77%) of them died. However this figure is far more less than the real figure, simply because very few cases are diagnosed and reported. Many patients die with unnoticed cancer. There may be many reasons behind this, but studies in many other countries show that poor or no knowledge, ignorance, lack of awareness and misbelief is one of the leading causes of this fastest silent killer (Rahim, 1984).

Bangladesh is a Muslim country where more than 80% of the rural women are illiterate, brought up in a conservative Muslim value or old traditional customs, it is not very easy to visit a doctor or just inform the guardian either her husband or parents that she got a breast problem. Society is not very friendly and open to discuss about reproductive or a sexually transmitted disease especially among women. It is clearly understandable why late stage breast cancer is the hall mark presentation in Bangladesh. Health seeking behavior is one of the important aspects of late presentation. Several studies show that misconception and disbelief is a significant concept for delayed health seeking behavior in Bangladesh where educational level is low and more than 40% of people live below one dollar per day. Further, women are not self-dependent and cultural norms and religious values are unfavorable. Moreover government support is limited their delayed health seeking behavior is quite apparent. Most of the women are afraid of cancer. There is a general feeling of hopelessness and helplessness if they get cancer because they believe this is not curable and there is not much they can do until they wait for death (Robert, 2003).

**CHAPTER-TWO:
LITERATURE REVIEW**

2.1. Implementing Recommendations for the Early Detection of Breast and Cervical Cancer among Low-Income Women

In 2000, Herschel W. Lawson and his team have found that the risk for breast cancer increases with advancing age; other risk factors include personal or family history of breast cancer, certain benign breast diseases, early age at menarche, late age at menopause, white race, null parity, and higher socioeconomic status (Herschel W. Lawson et al. 2000).

2.2 Low levels of breast cancer risk awareness in young women: An international survey

At least a fifth of breast cancer cases in western countries were likely to be due to modifiable life style factors. Previous work has found that while women in western countries were aware that breast cancer can be hereditary, their knowledge of the influence of life style was poor. This survey investigated in the awareness of breast cancer risk factors in university students from 23 countries between 1999 and 2001. Data were collected on awareness of links with heredity, alcohol user, exercise, obesity, stress, smoking and diet. Almost a third of women were not aware that any of this factors influenced breast cancer. Just 57% were aware of the genetic link fewer than 1 in 20 women correctly identified alcohol, exercise or obesity as factors influencing breast cancer. Stress and smoking were the most commonly chosen life style risk factors although current data suggest that they have little actual impact on breast cancer risk (Victoria P. et al, 2001).

2.3 Knowledge, Attitude and Practice related to Breast Cancer: A Survey of Arabic Women

A cross-sectional questionnaire survey was conducted to evaluate knowledge, attitudes, barriers, and practices related to breast cancer screening among Arabic women. A convenience sample was selected from 1,750 women aged 45-65 years who, for any reason, attended primary health care (PHC) clinics in Al-Ain, United Arab Emirates (UAE). Of the 1,750 invited women, 1,445 agreed to participate; 78 were excluded from analysis because of histories of breast cancer. Breast self-examination (BSE) was practiced by 12.7% of the

study population, clinical breast examination (CBE) by 13.8% and mammography by 10.3%. Knowledge about breast cancer screening was low in the study population. Women were infrequently instructed about or offered screening for breast cancer by health professionals. Being employed was an independent predictor for participation in the three screening examinations. Health workers infrequently offered screening examinations and women lacked adequate knowledge about breast cancer screening. Acquired information about barriers to screening may help in the design of effective screening programs for Arabic women (Bener et al, 2001).

2.4 Breast Self-examination by Teenagers: Outcome to a teaching program

Teaching breast self-care as breast changes occur in the adolescent girl can influence positive behaviors such as performing breast self-examination and seeking regular professional breast examinations. Health promotion behaviors often are taught in high school, but little research has been performed on teaching breast health in a high school setting. Therefore, this descriptive study aimed to identify the beliefs, Knowledge and practice of breast self-examination in adolescent girls. A pre and posttest design was used to determine whether a teaching program would change beliefs, Knowledge and practice of breast self-examination. The result of this study demonstrates that a onetime intervention can be successful in increasing breast self-examination practice and the knowledge of breast self-examination and cancer in adolescents. Before the intervention, approximately 665 of students said they never examined there breast, and only 3% performed breast self-examination monthly. In 1 month after teaching, these percentages changed appreciably, with 32% of students reporting that they never practiced breast self-examination and 23% reporting that they practiced breast self-examination monthly (Ludwick and Gaczkowski, 2001).

2.5 Carcinoma Breast: A study in an urban hospital, Bangladesh

A clinical study of old and new 43 cases of carcinoma (Ca) breast were carried out at radiotherapy department, Faridpur Medical College Hospital, Faridpur from January 99 to June 2001 with a view to see the initial stage at presentation, to evaluate the modes of treatment, response to treatment and find out the survival period after presentation. All the

cases were under follow up. Female 97.68%, peak age incidence were (31-45 years) 48.84%, cytological proved 90.70%, stages were I, II, III, and IV 13.95%, 53.49%, 18.61% and 13.95% respectively. Infiltrating ductal carcinoma 79.06%, adeno-carcinoma was 4.65%, medullary carcinoma 4.65%. Treatment completed only in 39.53% of cases. No evidence of metastasis was found in 69.72% cases after completion of treatment. And one year survivals were 95.35%. 2.5 years survivals were 81.39% and more than 5 years survival were 4.65% and expired 18.61% (Ali et al.,2002).

2.6 Breast Cancer Risk-factor and Screening Awareness among Women Nurses and Teachers in Amman, Jordan

Madanat H. and Merrill R. performed a breast cancer awareness study of women in Jordan in 2002. This study used data from 163 nurses and 178 teachers surveyed in Amman to determine 2 dimensions of breast cancer awareness: general breast cancer awareness, defined as knowledge of risk factors associated with the disease and breast cancer screening awareness, defined as knowledge of breast self-examination and mammography. The survey instrument was based on 2 previously validated knowledge-based questionnaires in the literature (Breast cancer Knowledge Test and the comprehensive breast cancer Questionnaire). Analysis of covariance indicated that family history was associated with general breast cancer awareness. Profession, age, and family history significantly influenced breast cancer screening awareness. The average percentage of correct responses to general breast cancer awareness was adjusted for select covariates (adjusted means).The adjusted mean general awareness score for nurses was not significantly different from that of teachers ($P = .8470$). Nurses were more aware than teachers of the importance of breast cancer screening and its techniques. The adjusted mean screening awareness score for nurses was 88.3%, compared with 73.1% for teachers. These results provide important information about the level of breast cancer awareness among women nurses and teachers in Jordan and may be useful for developing future prevention and screening education programs (Madanat and Merrill, 2002).

2.7 The changing global patterns of female breast cancer incidence and mortality

One in ten of all new cancers diagnosed worldwide each year are a cancer of the female breast, and it is the most common cancer in women in both developing and developed areas. It is also the principle cause of death from cancer among women globally. We review the descriptive epidemiology of the disease focusing on some of the key elements of the geographical and temporal variations in incidence and mortality in each world region. The observations are discussed in the context of the numerous etiological factors, as well as the impact of screening and advances in treatment and disease management in high-resource settings (Bray, McCarron and Parkin, 2004).

2.8 Knowledge, Attitude and Practice Regarding Breast Cancer among Medical Students of Bangladesh.

Breast cancer in women is a major health burden both in developed and developing countries. It is the second leading cause of death in women worldwide as well as in Bangladesh. Recent global cancer statistics shows that global incidence is rising at a faster rate especially in developing countries like Bangladesh. But still breast cancer is not on the top of the priority list for the policy maker's donors and health professionals. But the prevailing situation can be more devastated if early attention is not given. To concentrate on this fast growing health problem we need to know the overall situation concerning incidence, prevalence, risk group, diagnostic and treatment status survival and mortality rate first to make a comprehensive policy to cope with breast cancer situation in Bangladesh. This proposed protocol study is designed to assess the knowledge attitude and practice regarding breast cancer in medical student in Bangladesh. This study population is not only the health professionals but also represent the higher educated population of Bangladesh. Their level of knowledge will reflect or give as an idea about the mass general lower educated population in Bangladesh. The proposed study will be conducted during February 2008 to May 2008 on 3rd year to 5th year medical students of different medical colleges of Bangladesh through a cross-sectional study. Data will be collected by a self-administered questionnaire (Muhammad, 2007).

2.9 Breast cancer follow-up: Literature review and discussion

This paper presents a review of the evidence for long-term breast cancer follow up to determine if routine clinical review post treatment for breast cancer has benefits for patients. There is little evidence that clinical review of patients beyond 3 years post-diagnosis leads to improved patients survival. Separate to survival there is a dearth of inquiry relating to the value of long-term clinical review of patient in terms of psychological outcomes, quality of life, patient satisfaction, access to specialist advice regarding management of symptoms, and reassurance. Regardless of supporting evidence, most breast units in the UK continue to undertake routine 6 monthly clinical reviews of patients up to a minimum of 5 years. A literature search for the period 1989 to Jan 2016 was undertaken using the CINAHL, MEDLINE, and Psych INFO databases. Keywords such as ‘cancer follow-up’, ‘cancer survivorship’, and ‘psychological outcome of cancer’ were utilized. Hand searching was also undertaken. Research to explore the concept of [point of need access, as well as the qualitative experiences of patients post-discharge, informational need at discharge and on-going psychosocial support is suggested. Ultimately this paper argues for a greater choice and involvement of patient in determining their future follow-up needs, providing the patient with a personalized package of care based on risk assessment and subsequent education programs to empower patients towards self-management following discharge (Sheppard, 2007).

2.10 Knowledge, Attitude and Practice Regarding Hospital Delivery among Rural Married Women in Northern Bangladesh

The descriptive cross sectional study was conducted on the married women in their reproductive age (15-40y) belonging to 211 households of Shitlai village of Kahalu thana of Bogra district in Bangladesh from January to April 2007. Using a semi-structured questionnaire, data were collected by door-to-door visits and through face-to-face interviews with the respondents. Considering the knowledge on safe motherhood and safe delivery, majority of the respondents (98.6%) mentioned that every pregnant mother should receive antenatal care, and 97.6% said that pregnancy is a period of risk. Regarding safety, 96.2% mentioned hospital delivery as safe, while 80.6% mentioned home delivery as a risk. Among

the respondents, 70.1 % said that ANC is important, 29.9% was found to be informed of child birth complications, 16.1% knew the duration of pregnancy, 8.1% knew the danger sign of pregnancy, 4.7% about emergency obstetric care (EOC), 4.3% about expected date of delivery (EDD), 2.4% about safe motherhood and 28.4% about the access of health facilities in the village. Among the respondents, 85.3% showed a positive attitude towards hospital delivery while 14.7% had a negative attitude. Study respondents delivered their index child in a hospital. Thus the study recommends to improve the knowledge, economic status, to change the decision making process through the launching of different activities with appropriate health programs (Yasmin et al., 2009).

2.11 Improving Breast Cancer Outcomes among Women in China: Practices, Knowledge, and Attitudes Related to Breast Cancer Screening.

Breast cancer is a major public health issue and the most commonly diagnosed cancer for women worldwide. Despite lower incidence rates than those living in Western countries, breast cancer incidence among Chinese women has increased dramatically in the past 20 years. Nevertheless, there is a paucity of studies reporting the attitudes toward and practices of breast cancer screening among Chinese women. This cross-sectional study examined in practices, knowledge, and attitude breast cancer screening (BCS) on a convenience sample of 400 Chinese women. Among study participants, 75% of the women never had a mammogram and the top three barriers reported were low priority, feeling OK, and lack of awareness/knowledge toward breast cancer screening. The results from the logistic regression model showed increased self-efficacy; having performed monthly self-exams, and having had clinical breast exam in the past two years were significant correlates while demographic variables were not correlated with screening behaviors. The findings provide a foundation to better understand beliefs and practices of Chinese women towards BCS and highlight the critical need for general public, health professionals, and the health care system to work collaboratively toward improving the quality of breast cancer care in this population (Wu, Liu and Chung, 2012).

2.12. Identifying Women's Knowledge about Risk Factors of Breast Cancer and Reasons for Having Mammography

In the year 2012, Inanc Guvenc and his team have found that some socio-demographic and obstetrical characteristics of women, their family history, and risk perceptions about breast cancer affect their knowledge and anxiety scores about breast cancer. They have identified a number of factors affecting mammography participation for women. The results of this study can be helpful in promoting screening for breast cancer (Inanc Guvenc et. al. 2012).

2.13. Comprehensive update on cancer scenario of Bangladesh

After one year later, Syed Md Akram Hussain mentioned that in women, cancer cervix uteri and breast cancer are most prevalent. Bangladesh has a unique National Cancer Control Strategy and Plan of Action 2009-2015 formulated with the assistance of WHO with an objective to develop and implement continuum of cancer care through a comprehensive cancer control program. Preventive measures taken to reduce the incidence of cancer include reduced tobacco smoking, change of dietary habit and reduced food adulteration, ensuring reproductive hygiene, increased physical activity, and reduced occupational hazard. Awareness buildup and media campaign are going on by organizing the general people, opinion leaders of the society, and boy and Girl Scout (Syed Md Akram Hussain et al. 2013).

2.14. Prediction of Breast Cancer Risk Level with Risk Factors in Perspective to Bangladeshi Women using Data Mining

In the same year, Ahmed K. et. al. has mentioned that about two million women are affected by 2nd most occurring deathful breast cancer due to them and their family member's unconsciousness and poverty. Most of the Bangladeshi women are uneducated and feel shy with society or husband to go doctor for checking breast cancer. So it also will be a good achievement of this work to find breast cancer with more efficiency. Breast cancer depends on some risk factors that may help to detect breast cancer using multi-layered approach (Ahmed K. et. al. 2013).

2.15 Practice breast self-examination among women attending primary health care in Kuwait

The Purpose of this study was to identify the proportion of women practicing BSE, factors that could affect its performance and explore women's awareness about its practice steps. The study design can be differentiated into two components. The first was a cross-sectional survey to determine the prevalence of BSE. Recruitment efforts resulted in 510 women. BSE was practiced by 109. The second component of the study was a case-control study to identify factors associated with BSE, whereas practicing subjects (control) were compared with a randomly selected similar number of non-practicing females (cases). The prevalence of BSE was 21%. Most of the socio –demographic variables have no significant effect on the practice of BSE. Practicing woman has sufficient level of knowledge about BSE, clinical breast examination, and mammography. They believed significantly that bloody discharge from the nipple, presence of masses in the breast, abnormal arm swelling, nipple retraction and discoloration of the breast were signs and symptoms of breast cancer. About 35% of practicing women in the current study performed correctly ≤ 6 steps out of 12 steps. Only 21% of women attending PHC had ever practiced BSE. Even a high proportion of them were not aware of the correct steps of the procedure. Health education programs are essential to encourage and improve women's practice of BSE (Al-Azmy et al., 2013).

2.16 A Study on Risk Factors on Breast Cancer among Patients attending the Tertiary Care Hospital, in Udupi District

A study was conducted by Ashok and Kamath to see the factors associated with breast cancer. To study the association between breast cancer and selected exposure variables and to identify risk factors for breast cancer. A hospital based case control study was conducted at Shirdi Sai Baba Cancer Hospital and Research Center, Manipal, Udupi District. Total 188 participants were included in the study, 94 case and 94 controls. All the study participants were between 25-69 years age group. The case and controls were matched by ± 2 years age range. Non vegetarian diet was one of the important risk factors. More than 7- 12 years of education had 4.84 times risk of breast cancer as compared with illiterate women. The Study suggests that non-vegetarian diet is the important risk factors for Breast Cancer and the risk

of breast cancer is more in educated women as compare with the illiterate women (Mahajan et al., 2013).

2.17 Breast Cancer and some Epidemiological Factors: A Hospital Based Study

A case control study was conducted from July 2009 to June 2010, in the National Institute of Cancer Research and Hospital, Dhaka, Bangladesh on 262 biopsy proven cases of breast cancer from National institute of Cancer Research and Hospital and 262 matched controls of acute diseases from Dhaka Medical College Hospital. Religion, residential status and age (± 2 years) were matched. Multivariate analysis showed that higher education, Personal income, history of induced abortion, history of breast feeding, OCP users, current smokers, personal history of breast disease, family history breast cancer and family history of other cancer were risk factors for breast cancer. Furthermore, having menarche at an early age, giving birth to an early age, early menopause, longer duration of breast feeding, parity of 2 and more and regular physical activity were shown to be protective factors. Physical inactivity, being menopause, positive family history of breast cancer and history of induced abortion were found important risk factors. Longer duration of breast feeding should be encouraged for its protective effect. Study revealed that the women who have one or more of the above risk factors should be given special attention for breast cancer prevention (jabeen et al. 2013)

2.18 Breast Cancer in South Asia: A Bangladesh Perspective

In 2014, a study was conducted to see the knowledge of breast cancer. South Asian countries are facing a hidden epidemic of breast cancer. As in other developing countries, due to lack of breast cancer awareness in Bangladeshi population and inadequate access to health care, the majority of the patients is diagnosed at the advanced stage of the disease. Early detection has a crucial impact on the overall treatment outcomes. To battle against breast cancer in resource-limited countries like Bangladesh, it is not feasible to set up a parallel health service system solely dedicated for cancer. Therefore, a cost- effective public health strategy needed, which reaches a large number of women in the country. Considering all these issues, we propose an innovative female-based primary healthcare approach focusing on awareness,

screening and early detection of breast cancer in Bangladesh. This preventive strategy could be a model for other resource-limited developing countries (Hossain and Karim-Kos, 2014).

2.19 A meta-analysis of the association between induced abortion and breast cancer risk among Chinese females

A study was conducted to evaluate the association between induced abortion (IA) and breast cancer risk among Chinese females. They searched three English databases (PubMed, Science Direct, and Wiley) and three Chinese databases (CNKI, WanFang, and VIP) for studies up to December 2012, supplemented by manual searches. Two reviewers independently conducted the literature searching, study selection, and data extraction and quality assessment of included studies. Random effects models were used to estimate the summary odds ratios (ORs) and the 95% confidence intervals (CIs). A total of 36 articles (two cohort studies and 34 case-control studies) covering 14 provinces in China were included in this review. Compared to people without any history of IA, an increased risk of breast cancer was observed among females who had at least one IA. No significant publication bias was found among the included studies (Egger test, $p=0.176$). The risk increased to 1.76 and 1.89 for people who had at least two IAs and at least three IAs, respectively. Subgroup analyses showed similar results to the primary results. Meta-regression analysis of the included studies found that the association between IA and breast cancer risk attenuated with increasing percent of IA in the control group. IA is significantly associated with an increased risk of breast cancer among Chinese females, and the risk of breast cancer increases as the number of IA increases. If IA were to be confirmed as a risk factor for breast cancer, high rates of IA in China may contribute to increasing breast cancer rates (Yeo et al, 2014).

2.20 Knowledge and Attitude of Saudi Female Students towards Breast Cancer: A cross-sectional study

In Saudi Arabia, females suffering from breast cancer often present late when their cancer has progressed to advanced stages. Hence the overall survival rate is low. Medical help-seeking behavior of females may be influenced by their awareness about breast cancer. Therefore, a cross-sectional study was designed to assess the knowledge, attitude and

practices of university students towards breast cancer. One hundred and fifty females from a university in Saudi Arabia completed a questionnaire intended to provoke their socio demographic information and knowledge, attitude and practices towards breast cancer. Data analysis was carried out using statistical package for the social sciences (SPSS) Version 19. Mean knowledge score was 16.6 out of 29. One hundred and six participants (70.7%) scored 50.0% and more. On the other hand, number of participants whose scores were below 50% was rather less (44; 29.3%). Variables like single, knowing of a friend/family member suffering from breast cancer or practice of breast self-examination were significantly related to participants' knowledge scores. 50.7% participants admitted to carry out the breast self-examination procedure. Only 13 study participants (8.7%) had clinical breast examination. None of the participants had undergone mammography. Female university students have mild knowledge of breast cancer symptoms and management. They are also not clear about etiology and risk factors associated with breast cancer. Practice of clinical breast examination and mammography was rare in the participants. There is a need to enhance their knowledge regarding breast cancer and emphasize the need of breast cancer screening programs (Latif, 2014).

2.21 Participation in breast screening programs: A review

Sally, Elizabeth and Gilchrist prepared a review article on Participation in breast screening programs in 2002. They had found that despite recommendations by the American Cancer Society and other organizations for use of screening mammography, data on reported utilization of this procedure by American women show that these guidelines were not being met. They reviewed published studies that reported participation rates or that examined factors associated with participation in selected breast screening programs. In general, women at high risk due to age and family or personal history of breast disease were not more likely to participate in breast screening programs than women without those risk factors. The one group of variables that was fairly consistently associated with participants was the practice of other preventive health behaviors. Women who expressed more cancer screening and its benefits also were more likely to complete mammography. Approaches to

increasing participation are discussed in the context of the literature on this subject (Vernon, Laville and Jackson. 2015).

2.22. Epidemiology, Risk Factors and Tumor Profiles of Breast Cancer in Bangladeshi Underprivileged Women

In 2015, M. Rahman et. al. have observed that breast cancer is also leading cause of cancer related death in the women population of Bangladesh particularly the poor and underprivileged . They also found that poverty, literacy and assorted risk factors have influenced the outcome of the breast cancer cases among Bangladeshi women. (M. Rahman et al., 2015).

**CHAPTER-THREE:
METHODOLOGY**

3.1 Aim of the study

The overall aim of the study was to develop a study plan for a cross sectional study to assess the knowledge and practice regarding breast cancer among female respondents in urban and rural areas of Bangladesh.

3.2 Objective of Study

The cancer situation in Bangladesh is extremely alarming, which is evident from some basic facts and figures. According to conservative estimate, presently there are over 1 million registered cancer patients in Bangladesh. Every year another additional 200,000 people are diagnosed with cancer. More than 50% of the affected people's lives are slowly but surely being suffered out due to the cancer not being diagnosed on time and due to lack of proper treatment.

The main objective of this study is to-

- Find out the environmental factors that are responsible for breast cancer
- To find out the level of knowledge regarding breast cancer among all kind of women
- To find out the presence of risk factors and symptoms associated with breast cancer among them
- Find out the main cause of breast cancer that is common in Bangladesh for urban and rural people.
- Find out the common treatment used in Bangladesh

3.3 Study Area

The study was conducted in National Institute of Cancer Research and Hospital Mohakhali, Dhaka-1212. The research study was carried out by maintaining the national laws and regulations of the Country and the Hospital.

3.4 Total Number of Patients

Data was collected from 100 female breast cancer patients.

3.5 Inclusion Criteria of patients

- In-patient
- Age of the respondent (all age range)
- Only Female respondent
- Patients willing to informed about their conditions
- Patients mainly give chemo therapy and surgery
- Patients at poverty level

3.6 Exclusion Criteria

- Unwilling to participate or unable to comply with protocol requirements
- Any male respondents
- Radiation therapy given to the cancer patients, were avoided

3.7 Procedure

- For collecting data, a self-administered questionnaire was prepared according to required information. Also a research protocol was prepared for permissions from the authorized members of the hospital. The completed questioner and the research protocol were recommended by the chairperson of department of pharmacy, East-West University. Then the questionnaire as well as the research protocol was send to the hospital authority and was getting permission for data collection. Doctor, nurses other medical stuffs gave permission to collect data from cancer patients.
- After collecting all the data, these data were set on the Microsoft Office Excel and filtered out according to the Gender. Age range, Occupation, Cancer types by body location, Habitual pattern, Site of living area, Site of living in urban, Site of living in rural, chemotherapy drugs, blood group, smoking habit etc. So some graphical representation were found that is the visually representation of the targeted subject.

**CHAPTER-FOUR:
RESULT & DISCUSSION**

4.1 Age of the Female Respondents:

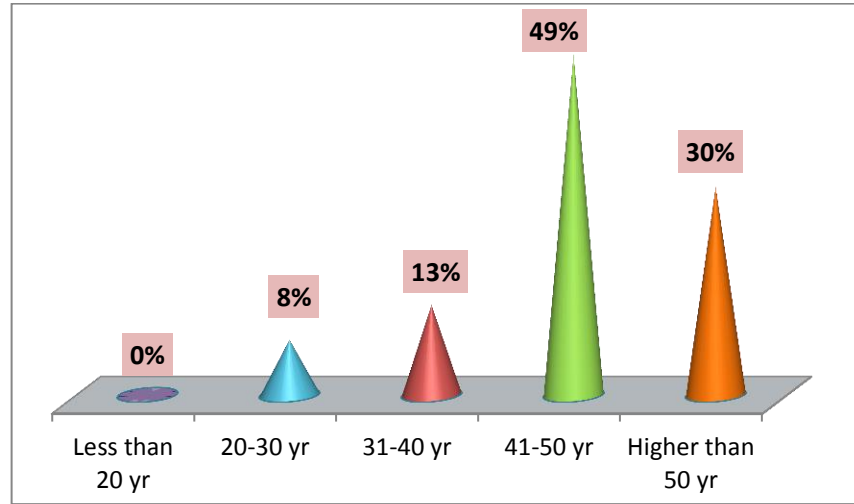


Figure-6: Age of the female respondents

In this survey based study, data were collected from 100 cancer patients (volunteers), 49% of the total cancer patients were between the ages of 41 to 50 years, 30% of the total patients were higher than 60 years of age, 13% patients were between the ages of 31-40 years, 8% patients were between the ages of 20-30 years and 0% patients were less than 20 years of age (Figure 6). From this study, it was determined that age between 41-50years were more susceptible to cancer rather than other.

4.2 Marital Status:

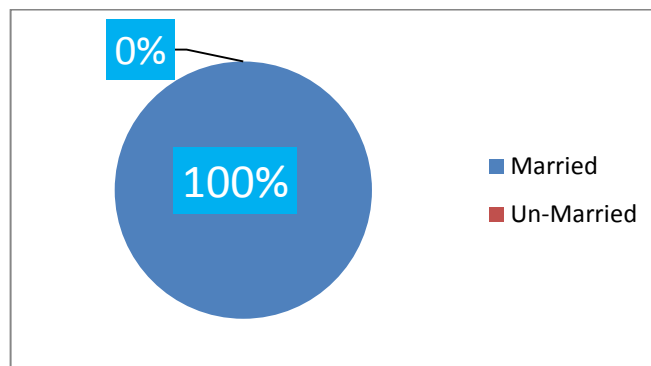


Figure-7: Marital Status of the respondents

Among 100 cancer patients, 100% were married patients and 0% was unmarried patients. Breast cancer was mainly found in married persons.

4.3 Living Areas:

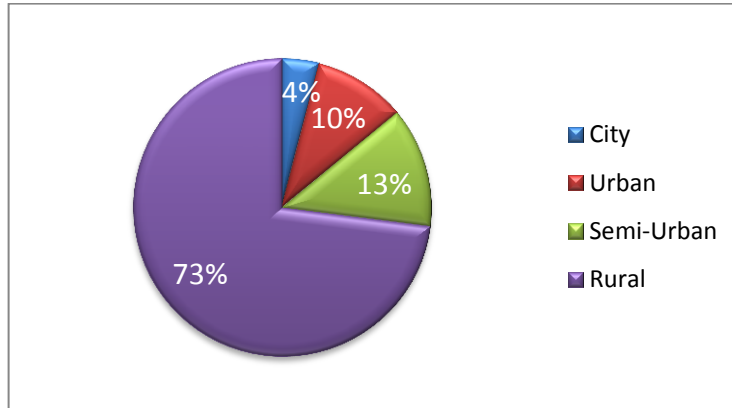


Figure-8: Living areas of the respondents

The data was collected from 100 cancer patients and these patients came from different districts of Bangladesh. Their living areas divided in four categories:

- City
- Urban
- Semi-Urban
- Rural

Among those 100 patients, 73% of the total patients came from rural areas, 13% of the total patients came from semi-urban, 10% of the patients came from urban areas and 4% of the patients came from cities. So rural people were mainly affected by breast cancer.

4.4 Education Qualifications of the Female Respondents:

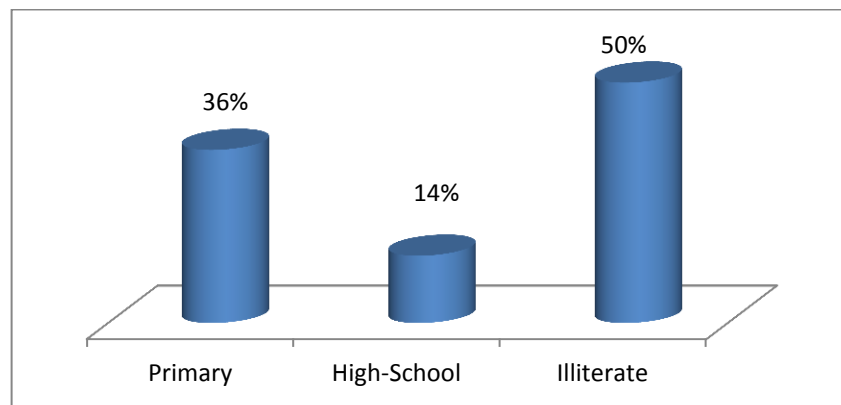


Figure-9: Education qualifications of the female respondents

Among 100 volunteers (cancer patients), 14% of them have passed high school, 36% of them finished primary education and 50% of them were illiterate. So illiterate people mainly affected by cancer because of their lacking awareness.

4.5 Occupation of the Female Respondents:

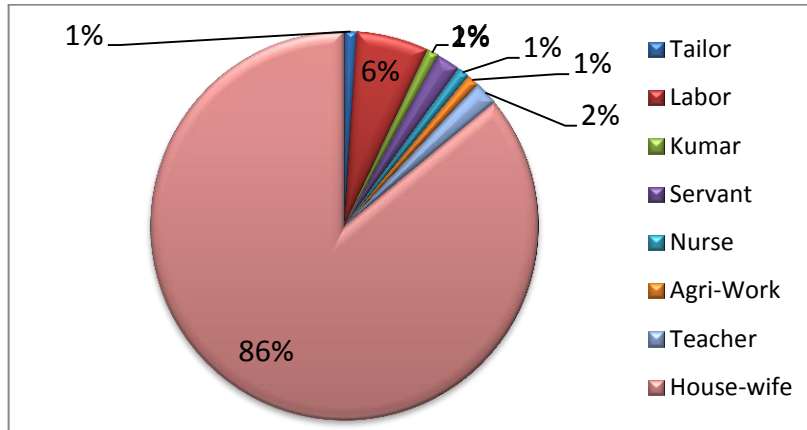


Figure-10: Occupation of the female respondents

Among 100 cancer patients, 6% of them were labor, 86% of them were housewives, 2% of them were servant, 2% of them were teacher, 1% of them were tailor, 1% of them were Kumar, 1% of them were nurse, 1% of them were agri-work. From our study it was found that house wives were mainly affected by breast cancer. The reason behind this may be their exposure largely outside environment.

4.6 Type of Work of the Female Respondents:

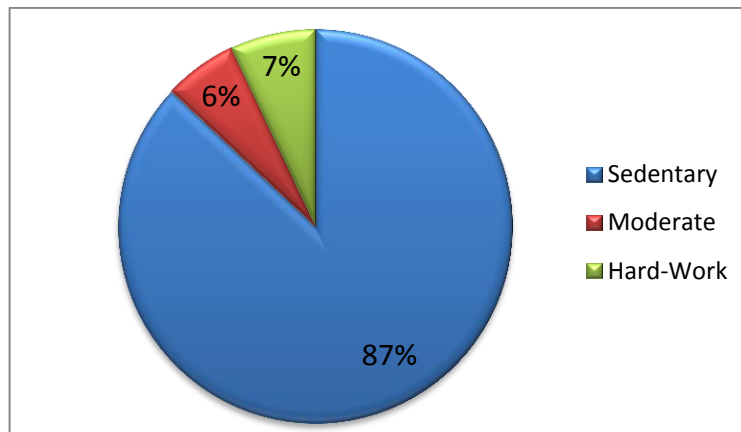


Figure-11: Type of work of the female respondents

Among 100 cancer patients, 87% of the patients were doing sedentary work, 7% of the patients were doing hard-work and 6% of the patients were doing moderate work. From this result it was seen that, sedentary work was the major cause of cancer incidents rather than the other work.

4.7 Habits of the Female Respondents:

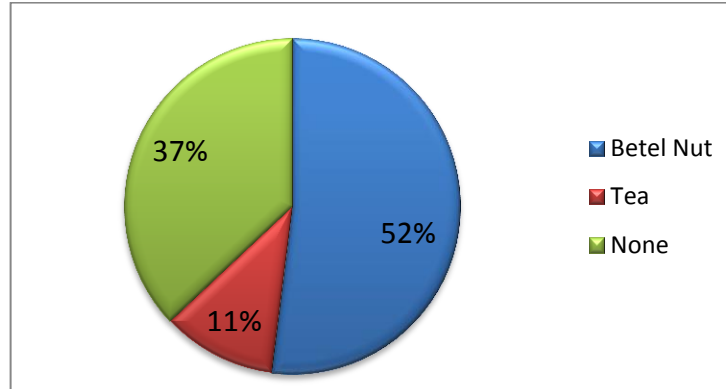


Figure-12: Habits of the female respondents

It was found that betel nut was taken by 52% of the cancer patients, tea was taken by 11% of the cancer patients and 37% of the cancer patients wasn't any habit. It was one type of important risk factor for causing cancer. It mainly caused mouth related cancer, gastrointestinal cancer etc.

4.8 Family History of the Female Respondents:

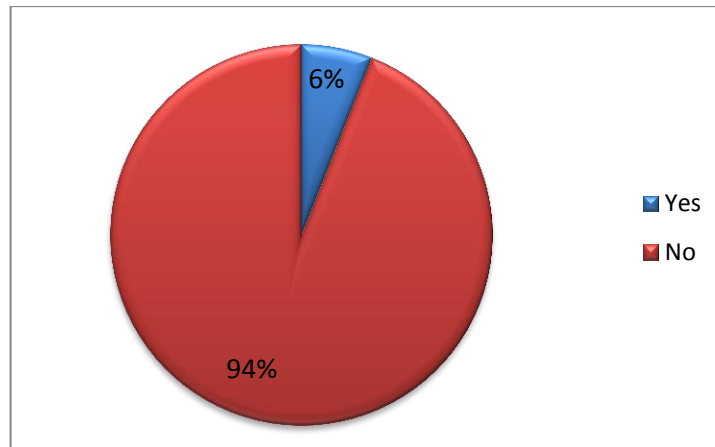


Figure-13: Family History of the female respondents

This study represent that, only 6% patients had cancer in their family history and large number 94% had no cancer in their family history. So that it was not a risk factor for breast cancer.

4.9 Blood Group of the Female Respondents:

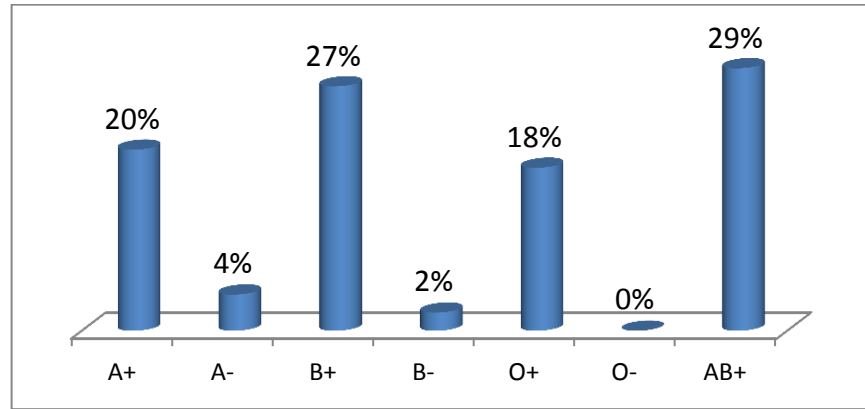


Figure-14: Blood groups of the female respondents

According to blood group, the percentage of patient is blood group A+ was (20%),A- (4%),B+ was (27%),B- was (2%),O+ was (18%).AB+ was (29%) and O- was(0%). From this percentage it can be seen that the number of AB+ patient are in highest. Mostly AB+ patients were affected by breast cancer.

4.10 Age of Starting Menstruation Period:

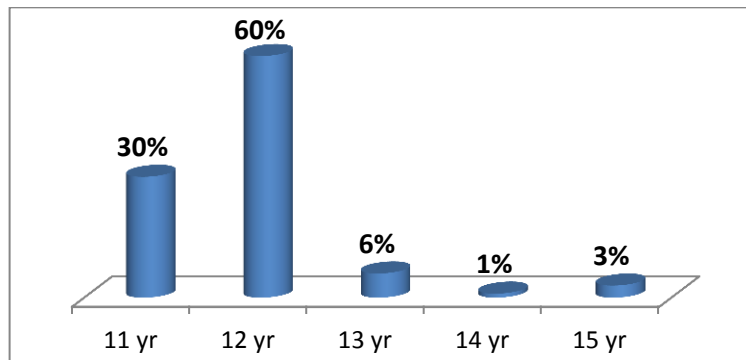


Figure-15: Age of starting menstruation period

In this study, the data was collected from 100 patients. Among them 60% of the breast cancer patients first period age was 12 year, 30% of the patients age was 11 year, 6% of the patients age was 13 year, 3% of the patients age was 15 year and 1% patient was 14 year

old. From our study it was found that period age 12 year were mainly affected by breast cancer. So it was one type of important risk factor for causing breast cancer.

4.11 Marriage Age of the Female Respondents:

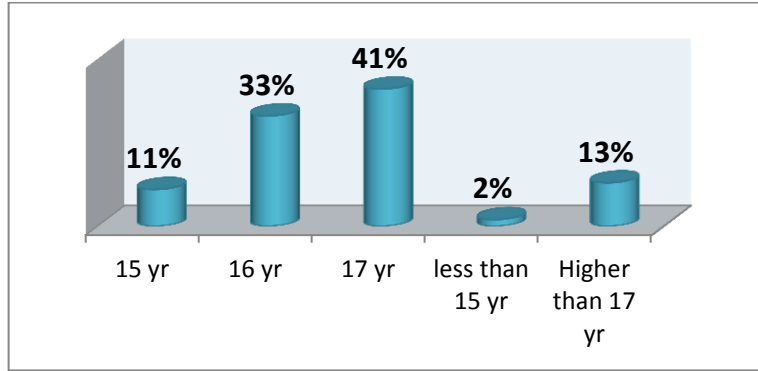


Figure-16: Marriage age of the female respondents

In this study, the data was collected from 100 patients. Among them 41% of the breast cancer patients marriage age was 17 year, 33% of the patients age was 16 year, 13% of the patients age was higher than 18 year, 11% of the patients age was 15 year and 2% patient was less than 15 year old. So it was one type of important risk factor for causing breast cancer. From our study it was found that marriage age between 16-17 year were mainly affected by breast cancer.

4.12 Age of 1st Child Birth of the Female Respondents:

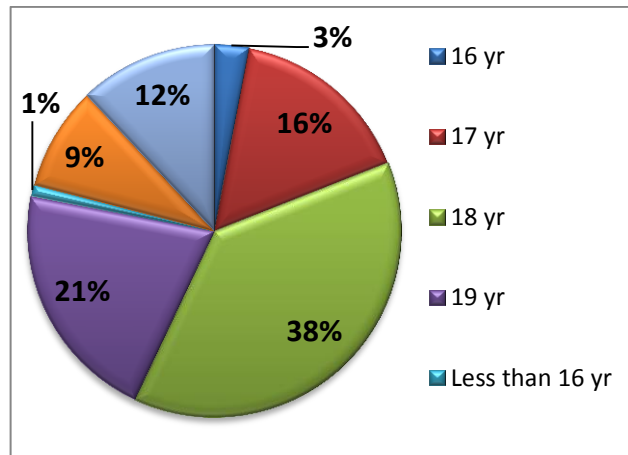


Figure-17: Age of 1st child birth of the female respondents

In this study, the data was collected from 100 patients. Among them 59% of the breast cancer patients age during their 1st child birth was 18-19 years, 20% of the patients was higher than 18 years, 19% of the patients age was 16-17 year and only 1% of the patient age was less than 16 year .So it was one type of important risk factor for causing breast cancer. From our study it was found that 1st child birth between 18-19 year were mainly affected by breast cancer.

4.13 Having Children:

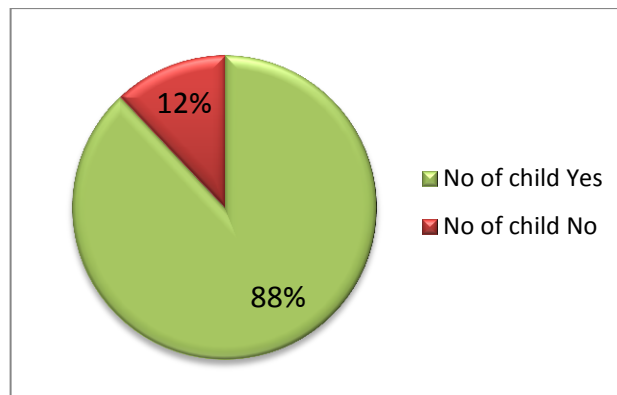


Figure-18: Having children of the respondents

Among all the respondents most of them had children (88%). A very few respondents (12%) had no children.

4.14 OCP Uses of the Female Respondents:

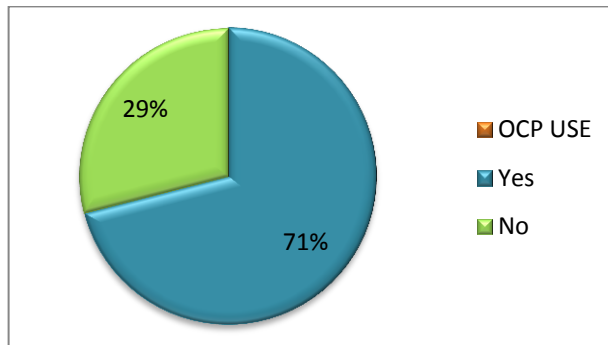


Figure-19: OCP uses of the female respondents

In this study, the data was collected from 100 patients. Among them 71% of the breast cancer patients was using OCP and 29% patients wasn't using OCP. From our study it was

found that OCP used women were mainly affected by breast cancer. So it was one type of important risk factor for causing breast cancer.

4.15 Duration of OCP Use:

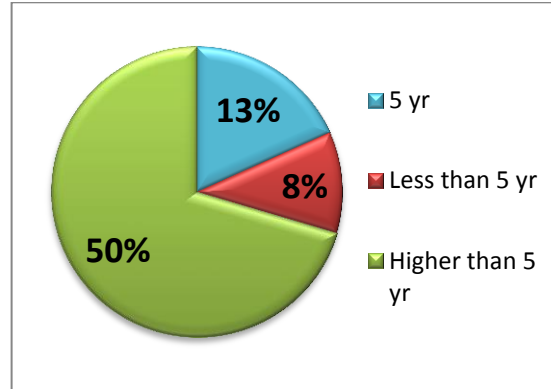


Figure-20: Distribution of patient according to duration of OCP use

In this study, the data was collected from 100 patients. Among them 50% of the breast cancer patients OCP used more than 5 year, 13% used around 5 years and 8% used age between 1-4 years that means less than 5 years. From our study it was found that women who were used OCP more than 5 years were mainly affected by breast cancer. So it was one type of important risk factor for causing breast cancer.

4.16 Menopausal Age of the Female Respondents:

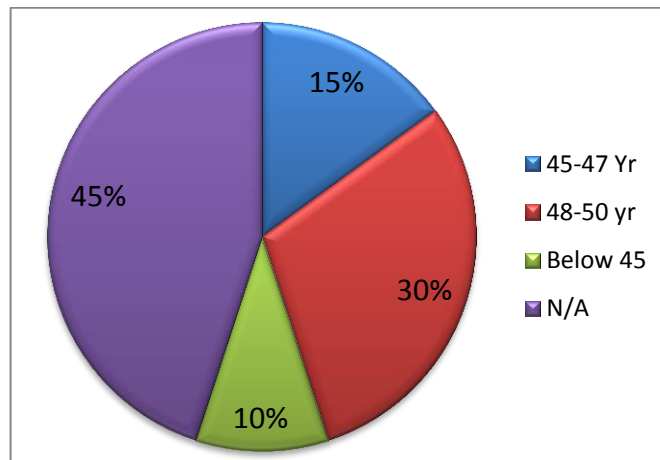


Figure 21: Menopausal Age of the female respondents

In this study, the data was collected from 100 patients. Among them 30% of the breast cancer patient menopausal age between 48-50 year, 15% was 45-47year, 10% was below 45 and 45%women's menopausal age were not applicable. From our study it was found that women's age is more than 45 years and still period cycle is going on were mainly affected by breast cancer. So it was one of the most important risk factor for causing breast cancer.

**CHAPTER-FIVE:
CONCLUSION**

At current situation, throughout the world as well as our country, number of breast cancer patient increased day by day. Breast cancer in women is a major health burden in Bangladesh. Respondents were found having a low level of knowledge scores on the sign and symptoms, diagnosis and treatment of breast cancer. The present study mainly gives an idea that there may be some correlation between breast cancer and different risk factors (Age, Sex, Environmental Risk factors, Occupation, Bad habit etc.) and the number of chemo patients urban and rural people of Bangladesh.

From this study the higher percentage of breast cancer cases was found for female adults (61%), marital age 16- 17 year (74%), starting menstrual age 11-12 year (90%), 1st child birth age 18-19 year (59%), menopausal age more than 45 (90%), OCP uses duration higher than 5 years (50%) were more susceptible to breast cancer than other. Chemotherapy mainly gives to large number of breast cancer patients. Here mainly urban and rural people are included who are suffering from breast cancer. Most of the respondents had incomplete or wrong information about breast cancer. There is a limitation of this research that all social classes of cancerous patients are not included here for time consuming. At early stage, treatment of breast cancer is one of the best ways to stop spread of breast cancer. In future there should be research done among the all social class's cancer patients. So that, identification of these factor will be more meaningful and give broad idea.

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