

Household Economic Burden of Breast Cancer Disease in Female Population



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3. Literature Review is relevant and comprehensive.
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DEDICATION

I DEDICATE THIS RESEARCH TO MY BELOVED Parents, MY
HUSBAND, MR. YASIR QURESHI AND MY LOVING DAUGHTER

IRHA YASIR

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ABSTRACT

The objective of this study is to measure the economic burden of breast cancer disease in female population. Breast cancer is most common cancer all over the world. This fatal disease in women of the low, middle and high-income countries has created heavy economic burden on the household. It is the most common cancer affecting women with the estimated life time risk for 1 woman out of 8 women (1/8). About 1.3 million women are diagnosed with breast cancer worldwide each year, with total of 465,000 deaths. The prevalence of the disease is increasing with the age of the patients. 80% of the women diagnosed with this disease are over fifty years of the age. Reproductive factors, such as early menarche, late menopause, and late age at first childbirth are among the most important risk factors for female breast cancer patients. Breast cancer forces a huge economic burden on households. therefore, the policy makers and health planners are interested in understanding the economic cost of illness to measure the allocation of resources to the cancer institutions and hospitals as allocation to nuclear medicines disease categories and to evaluate the possible costs and benefits. From a social side breast cancer is a disease that in addition to contributing to mortality and disability increases a major public and private economic burden. convenient sampling used for data collection with the total sample size of 225. the interviews of breast cancer patients were conducted in the two-hospital situated in the capital territory of Islamabad, Nuclear Medicine, Oncology & Radiotherapy Institute and Surgical Center. The methodology of the study is based on two section which is descriptive statistics and empirical estimations. The study has used OLS (Ordinary Least Square) estimation technique to determine the factors influencing breast cancer cost. The study found that, stage and treatment duration is increasing the breast cancer cost and the inflow of cancer patients coming into these hospitals from region of Punjab, Azad Jammu Kashmir (AJk), Sindh, Baluchistan, Islamabad. Most of the respondents reported high intangible burdens including fear, pain emotional suffering and family management having breast cancer majority of the patients experienced a lot of psychological problems due to their illness.

CHAPTER 1

INTRODUCTION

1.1 Background of the study

Breast cancer is most common cancer all over the world. This fatal disease in women of the low, middle and high-income countries has created heavy economic burden on the household. It is the most common cancer affecting women with the estimated life time risk of 1 in 8 women. About 1.3 million women are diagnosed worldwide yearly, with 465,000 deaths. Prevalence increase with age, 80% of women diagnosed with the disease is aged over fifty years.

Breast cancer is the common cancer in women both in the developed and less developed world. It is estimated that worldwide over 508 000 women died in 2011 due to breast cancer. Frequencies differ greatly worldwide from 19.3 per 100,000 women in Eastern Africa to 89.7 per 100,000 women in Western Europe. In most of the emerging regions the incidence rates are under 40 per 100,000.

Reproductive factors, such as early menarche, late menopause, and late age at first childbirth are among the most important risk factors for breast cancer. Exogenous hormones also act as a risk factor for breast cancer. Oral contraceptive and hormone replacement therapy users are at greater risk. On the Indian scene, the five common cancers in both sexes were cancers of the breast, cervix uteri, lip-oral, lung and colorectal, comprising 47.2% of the 28 cancers reported. Further, death due to these five cancers is 302,124. Both worldwide and on the Indian scene, breast scene is dismal with more than 20% increase in breast cancer since 2008 with 1.7 million new cases identified in women in 2012; and there were 6.3 million women survive with breast cancer in the last five years. Breast cancer is also the main reason of cancer deaths

among women (521,817 deaths in 2012) and the most frequent diagnosed cancer among women in 140 of 184 countries. It now represents 1 in 4 of all cancers in women. For the first time, breast cancer is the leading cancer in India and cause of cancer death. The impact of the primary diagnosis, culture, religion and psychosocial and psychological features of the disease are not well established. Current figures show that in Pakistan breast cancer affects both young and middle-aged women. The etiology of breast cancer is complex and can comprise various indicative factors such as diet, genetics, chemicals and environmental factors. In Pakistan, it is estimated that germ line mutations in the BRCA1 and BRCA2 genes account for account for 5% of breast cancer cases. Recently it was shown that in Pakistani families with several cases of breast cancer the incidence of BRCA1 or BRCA2 mutations was 42.8% and 11.9% for single cases of breast cancer. Thus, Pakistani women who carry either of these deleterious mutations face a lifetime risk of developing early onset breast cancer. Breast cancer forces a huge economic burden on households, so policy makers and health planners are interested in understanding the economic cost of illness to measure the allocation of resources to the cancer institutions and hospitals as allocation to nuclear medicines disease categories and to evaluate the possible costs and benefits. From a social side breast cancer is a disease that in addition to contributing to mortality and disability increases a major public and private economic burden.

Pakistan Cancer rank by type

Type of Cancer	Rate	World Rank
Breast Cancer	19.33	58
Oral Cancer	9.40	10
Lung Cancer	7.81	121
Stomach Cancer	6.66	97

Cervical Cancer	6.56	78
Esophagus Cancer	6.17	42
Lymphomas	4.85	106
Colon-Rectum Cancer	4.08	149
Luekemia	3.61	112
Bladder Cancer	2.86	80
Other Neoplasm's	1.57	147
Pancreas Cancer	0.90	172
Uterin Cancer	0.51	142
Skin Cancer	0.31	170

Menhas, R., & Umer, S. (2015). Breast Cancer among Pakistani Women. *Iranian journal of public health, 44(4)*, 586-587.

1.2. Problem statement

It is estimated that each year more than 83,000 cases of breast cancer are reported in Pakistan. Nearly 40,000 women die, just due to the breast cancer. Breast cancer cost so high that frightens all patients from seeking treatment. There are various economic implications following the diagnosis of breast cancer confirmed, that breast cancer is a prominent disease in terms of the cost. Diagnosing the disease includes the procedure of mammogram, magnetic resonance imaging, and biopsies etc. which are all costly investigations. Treatments also involve a lot of interventions which is expensive. Interventions may comprise surgery, chemotherapy and radiotherapy. Chemotherapy and radiotherapy are very cost intensive and existing in only a few government hospitals. The high cost creates serious economic budget and force the family to sell assets for the treatment of the cancer. The economic burden deteriorates when complications arise with the treatment. This research thesis will take care of different interventions in prevention, control and treatment seeking the approximated technology for economic cost of treatment.

1.3. Study objective

The objective of the study are:

¹ Measure the tangible cost (direct and indirect cost) and investigate the determinants of direct cost of breast cancer in female population.

² Analyze the intangible cost (fear, pain, emotional suffering, family management) of breast cancer patients

1.4. Research questions

1. What is the direct cost of breast cancers at different stages of illness?
2. What are the determinants of direct cost of breast cancer in female population?
3. What type of indirect cost is associated with breast cancer patients?
4. What is the intangible cost associated with breast cancer patients?

1.5. Significance of the study

In developing countries, such as Pakistan government provide minimum help and in whole cost in the limited cases, especially tangible cost is paid by patients and her family. There is a fraction data available from other developing countries facing a same situation. The attention of government, policy makers and other investors must therefore be drawn to the application of affordable and handy breast cancer care. Estimating the economic burden of this disease is a way to attain this goal. This study will provide general view of the economic burden of breast cancer on the patient and his family which may inform government and policy makers to make informed decision-making allocation of the resources. To the nuclear medicines the study will

¹ To meet this objective both descriptive and inferential analysis is used. Regression analysis technique is used to analyze the dynamic of cost associated with breast cancer patients.

² As the indirect cost is latent variable that is not directly measurable, so for the analysis of this intangible cost, we used different indicators for the construction of index and then using that index

provide workable ground for the research in economics of nuclear medicines and treatment of their determinants.

CHAPTER 2

LITERATURE REVIEW

Introduction:

This chapter includes two major sections, where section one is focused on theoretical literature, which explore all the relevant definitions and background of important concepts. Section two is based on empirical studies, conducted by previous researchers

2.1. Theoretical Literature Review

2.1.1. Definition of Breast cancer

Cancer is caused by changes to genes that control the way our cells functions, especially how they grow and divide. Cancer is the uncontrolled growth of abnormal cells is termed cancer cells, malignant cells, or tumor cells. A tumor is an abnormal lump or growth of cells. When the cells in the tumor are normal, it is benign. When the cells are abnormal and can grow uncontrollably, they are cancerous cells, and the tumor is malignant. Breast cancer is a disease in which cells in the breast grow out of control. There are different kinds of breast cancer. The kind of breast cancer depends on which cells in the breast turn into cancer. Breast cancer can begin in different parts of the breast. A breast is made up of three main parts: lobules, ducts, and connective tissue. The lobules are the glands that produce milk. The ducts are tubes that carry milk to the nipple. The connective tissue (which consists of fibrous and fatty tissue) surrounds and holds everything together. Most breast cancers begin in the ducts or lobules.

So, breast cancer is due to blockage of milk into veins and it is caused by genetic and environmental factors (unhealthy life style, shorter breastfeeding etc.). Breast cancer can spread outside the breast through blood vessels and lymph vessels. When breast cancer spreads to other parts of the body, it is said to have metastasized. Invasive breast

cancer is when the cancer cells break out from inside the lobules or ducts and invade nearby tissue, increasing the chance of spreading to other parts of the body. Non-invasive breast cancer is when the cancer is still inside its place of origin and has not broken out. Breast cancer can also affect men, but it is less common in men than in women.

The most common kinds of breast cancer are

2.1.1.1 Invasive ductal carcinoma.

The cancer cells grow outside the ducts into other parts of the breast tissue. Invasive cancer cells can also spread, or metastasize, to other parts of the body.

2.1.1.2 Invasive lobular carcinoma.

Cancer cells spread from the lobules to the breast tissues that are close by. These invasive cancer cells can also spread to other parts of the body. Less common kinds of breast cancer are Paget's disease, mucinous and inflammatory breast cancer.

2.1.1.3 Paget's disease

Paget's (PAJ-its) disease of the breast is a rare form of breast cancer. Paget's disease of the breast starts on the nipple and extends to the dark circle of skin (areola) around the nipple. Doctors don't know what causes Paget's disease of the breast. The most widely accepted theory is that the disease results from an underlying ductal breast cancer. The cancer cells from the original tumor then travel through milk ducts to the nipple and its surrounding skin. Another theory is that the disease can develop independently in the nipple.

2.1.1.4 Mucinous

Mucinous carcinoma or mucin-producing carcinoma is a type of invasive ductal carcinoma. The distinguishing feature of mucinous carcinoma (sometimes called colloid cancer) is the production of mucus. At the cellular level mucinous carcinoma appears as ‘islands’ of malignant cells within ‘lakes’ of mucus. Tumors for this cancer type can grow very large and are often softer to the touch.

2.1.1.5 Inflammatory breast cancer

Inflammatory breast cancer is a rare and very aggressive disease in which cancer cells block lymph vessels in the skin of the breast. This type of breast cancer is called “inflammatory” because the breast often looks swollen and red, or inflamed.

2.1.2 Stages of Breast Cancer

Cancer is staged according to the size of the tumor and whether it has spread to lymph nodes or other parts of the body. Breast cancer disease categorized into four main stages (stage i, ii, iii, and iv) and one of the most important factors in predicting survival from breast cancer is the stage at diagnosis. The four main stages at diagnosis of breast cancer are usually defined according to the Tumor, Node, and Metastasis (TNM) system and thus are further categorized into early (TNM stage group I and II), advanced (stage groups III and IV) and metastatic for the purpose of analysis (Seneviratne et al., 2016).

2.1.2.1 Screening of Breast Cancer

Screening based on Breast self-examination, mammography, ultrasound, MRI, and biopsy. There is a way to diagnose breast cancer at early stage to avoid the high cost of breast cancer. Breast self-examination is a screening method used in an attempt to detect breast cancer. Monthly BSE can help detect abnormalities or changes that may be sign of cancer. BSE was once promoted heavily as a means of finding cancer at a more

curable stage. Self-examination is encouraged during all phases of a woman's adult life; a woman who regularly and carefully performs the examination is better able to detect small abnormalities than is a woman who is not familiar with her own breasts.

The method involves the woman herself looking at and feeling each breast for possible lumps, distortions or swelling. A variety of methods and patterns are used in BSE. Most methods suggest that the woman stand in front of a mirror. She looks in a mirror for visual signs of dimpling, swelling, redness, lump on or near the breast. This is usually repeated in several positions, such as while having hands on hips, and then again with arms held overhead.

A national survey of 361 breast cancer survivors, which was published in the 'journal of women's health', reported that 25 percent of cases were detected through self-examination. Keep in mind that many factors contribute to breast tissue change. These can include a woman's age, her menstrual cycle, hormones and medications. Therefore it is important to do BSE at the regular basis. BSE is not a replacement for a doctor's visit or mammogram and should not be relied upon as a diagnosis. It is a way for you to be aware of changes in your body.

Mammogram is an X-ray of the breast. Commonly used for initial breast cancer screening. It produces images that can help to detect any lumps or abnormalities. Can help differentiate between a solid mass or a fluid-filled cyst. This can show whether the cells are cancerous, and if so which type of cancer it is, including whether or not the cancer is hormone-sensitive. Scan involves injecting a dye into the patient, so find out how far the cancer has spread. Diagnosis gives us information about the size of tumor, how far it has spread, whether it is invasive or non-invasive, whether it has metastasized. Stages will affect the chances of recovery and will help decide on the breast treatment options.

2.1.3 Treatment of Breast Cancer

Treatment of breast cancer depends on its type, stage, patient's age, overall health, sensitivity to hormone. The main options include radiation therapy, surgery, and biological therapy, or targeted drug therapy, hormone therapy.

2.1.3.1 Surgery

Surgery is a medical operation used to remove tumors. Surgery is further divided into four categories.

2.1.3.2 Removing the breast cancer (lumpectomy)

During a lumpectomy, which may be referred to as breast-conserving surgery or wide local excision, the surgeon removes the tumor and a small margin of surrounding healthy tissue. A lumpectomy may be recommended for removing smaller tumors. Some people with larger tumors may undergo chemotherapy before surgery to shrink a tumor and make it possible to remove completely with a lumpectomy procedure.

2.1.3.3 Removing the entire breast (mastectomy)

A mastectomy is an operation to remove all of your breast tissue. Most mastectomy procedures remove all of the breast tissue — the lobules, ducts, fatty tissue and some skin, including the nipple and areola (total or simple mastectomy). Newer surgical techniques may be an option in selected cases in order to improve the appearance of the breast. Skin-sparing mastectomy and nipple-sparing mastectomy are increasingly common operations for breast cancer.

2.1.3.4 Removing a limited number of lymph nodes (sentinel node biopsy)

To determine whether cancer has spread to your lymph nodes, your surgeon will discuss with you the role of removing the lymph nodes that are the first to receive the lymph drainage from your tumor. If no cancer is found in those lymph nodes, the chance of

finding cancer in any of the remaining lymph nodes is small and no other nodes need to be removed.

2.1.3.5 Removing several lymph nodes (axillary lymph node dissection)

If cancer is found in the sentinel lymph nodes, your surgeon discusses the issue with you and some time with family members. The removing of additional lymph nodes in your armpit is some time compulsory for better health conditions.

2.1.3.6 Removing both breasts

Some women with cancer in one breast may choose to have their other (healthy) breast removed (contralateral prophylactic mastectomy) if they have a very increased risk of cancer in the other breast because of a genetic predisposition or strong family history. Most women with breast cancer in one breast will never develop cancer in the other breast. Discuss your breast cancer risk with your doctor, along with the benefits and risks of this procedure.

2.1.3.7 Complications of breast cancer surgery

Complications of breast cancer surgery depend on the procedures you choose. Breast cancer surgery carries a risk of pain, bleeding, infection and arm swelling (lymphedema). You may choose to have breast reconstruction after surgery. Discuss your options and preferences with your surgeon. Consider a referral to a plastic surgeon before your breast cancer surgery. Your options may include reconstruction with a breast implant (silicone or water) or reconstruction using your own tissue. These operations can be performed at the time of your mastectomy or at a later date

2.1.4 Therapy types

2.1.4.1 Radiation therapy

Controlled doses of radiation are targeted at the tumor to destroy the cancer cells. Used from around a month after surgery, along with chemotherapy, it can kill any remaining cancer cells. Each session lasts a few minutes, and the patient may need three to five sessions per week for 3 to 6 weeks, depending on the aim and the extent of the cancer. The type of breast cancer will dictate what type of radiation therapy, if any, is most suitable. Adverse effects include fatigue, darkening of the breast skin, and irritation of the breast skin.

2.1.4.2 Hormone blocking therapy

Hormone blocking therapy is used to prevent recurrence in hormone-sensitive breast cancers. These are often referred to as estrogen receptive (ER) positive and progesterone receptor (PR) positive cancers. Hormone blocking therapy is normally used after surgery, but it may sometimes be used beforehand to shrink the tumor. It may be the only option for patients who cannot undergo surgery, chemotherapy, or radiotherapy. The effects normally last for up to 5 years after surgery. The treatment will have no effect on cancers that are not sensitive to hormones. Hormone treatment may affect a woman's future fertility.

2.1.4.3 Biological treatment:

Targeted drugs destroy specific types of breast cancer. Examples include trastuzumab (Herceptin), lapatinib (Tykerb), and bevacizumab (Avastin). These drugs are all used for different purposes. Treatments for breast and other cancers can have severe adverse effects. The patient should discuss with a doctor the risks involved and ways to minimize the negative effects, when deciding on treatment. Adverse effects include fatigue, lymphedema, darkening of the breast skin, and irritation of the breast skin.

There is no sure way to prevent breast cancer, but some lifestyle decisions can significantly reduce the risk of breast and other types of cancer like avoiding excess alcohol consumption, following a healthy diet with plenty of fresh fruit and vegetables, getting enough exercise, maintaining a healthy body mass index (BMI)

2.2 Empirical Literature Review

Humans have known about breast cancer for a long time. For example, the Edwin Smith Surgical Papyrus describes cases of breast cancer first time in 1600 BC. In ancient Greece, people made votive offerings in the shape of a breast to the god of medicine. And Hippocrates described the stages of breast cancer in the early 400s B.C.E. In the first century A.D. doctors experimented with surgical incisions to destroy tumors. They also thought that breast cancer was linked with the end of menstruation. This theory may have prompted the association of cancer with older age Brechin (2012).

Breast cancer survival rates vary greatly worldwide, ranging from 80% or over in North America, Sweden and Japan to around 60% in middle-income countries and below 40% in low-income countries (Coleman et al., 2008). The low survival rates in less developed countries can be explained mainly by the lack of early detection programs, resulting in a high proportion of women presenting with late-stage disease, as well as by the lack of adequate diagnosis and treatment facilities. Several risk factors for breast cancer have been well documented. However, for the majority of women presenting with breast cancer it is not possible to identify specific risk factors (IARC, 2008; Lacey et al., 2009). They conclude that 21% of all breast cancer deaths worldwide are attributable to alcohol use, overweight and obesity, and physical inactivity. This proportion was higher in high-income countries (27%), and the most important contributor was overweight and obesity. In low- and middle-income countries, the proportion of breast cancers attributable to these risk factors was 18%, and physical

inactivity was the most important determinant (10%). Breastfeeding has a protective effect (IARC, 2008, LACEY et al., 2009).

From 1980 to 2010, deaths in reproductive aged –women increased 1.5% per year for breast cancer. Today there are 2.3 maternal deaths for every death from either breast or cervical cancer in women between the ages of 15 and 49 in the developing world. By 2025, we expect maternal deaths to fall and deaths from breast and cervical cancer to rise so that they are nearly equal among of reproductive age.

Women diagnosed with early stage of breast cancer disease have an excellent prognosis while those with metastatic disease at diagnosis have a 5-year survival of around 20% (Seneviratne et al., 2014; Wang et al., 2012).

Breast cancer is a malignant tumor that grows in the cells of the breast. A malignant Tumor is a group of cancer cells that can invade surrounding tissues or spread (Metastasize) to distant areas of the body. The actual cause is unknown though several predisposing factors exist. The disease occurs almost entirely in women, but occasionally affects men. Cancer starts when cells begin to grow out of control (Akhtari-Zavare, L, Juni, Md Said, & Ismail, 2015; Suami, Pan, Mann, & Taylor, 2008).

Breast cancer is hormone related, and the factors that modify the risk of this cancer when diagnosed pre-menopausal and when diagnosed post-menopausal vary (Stewart & Wild, 2015)

Therefore, the cost of productivity losses of breast cancer in developing countries will increase. According to the suggestions of WHO and the Breast Health Global Initiative (BHGI), low- and middle-income countries should prioritize the efforts to downstage breast cancer through population awareness and improved equitable access to care (zendehdel 2013).

A study conducted in South Korea reveals that breast cancer is a disease which is economically costly. The top three concerns that have the greatest economic impact globally are lung cancer (USD88 billion). It was further observed that the yearly economic burden of breast cancer was increasing. The economic burden of breast cancer was USD668.49 million in 2007 and increased annually until 2010, thus USD773.98 million in 2008, USD777.22 million in 2009, and USD940.75 million in 2010, which was 1.4 times greater than the cost incurred in 2007. This means that the socioeconomic costs incurred by breast cancer increased by approximately 40.7% from USD668.49 million in 2007 to USD940.75 million in 2010(Kim et al., 2015). A variety of treatment is available for patients with breast cancer, which differ in safety, efficacy and cost. Therapeutic options for a given patient depend on several different factors including age, menopausal status, general health, tumor location, tumor cell type, and breast size. The most important factor is the stage of cancer since the cost increases if the disease is diagnosed in an advanced stage (Meneses, Azuero, Hassey, McNees, & Pisu, 2012)

2.2.1 Literature Review with Reference to Pakistan

The incidence of breast cancer in Pakistan is one of the highest reported from Asia, accounting for one third of all female cancers. As in other developing countries, the majority of patients with breast cancer presents with advanced disease and have inferior survival. Pakistan is a developing country in which 0.7% of GNP is allocated to health care according to the Economic Survey of Government of Pakistan, 2001. Cancer treatment is confined to major cities only; consequently, patients from rural areas have to travel an average of 300kilometers for treatment. Free hospitalization is available for all patients within Government hospitals. However, all treatment expenses are borne by the patients. Due to the quality of service available, this facility is being availed by

patients from low socio-economic status. Women from the affluent class prefer to undergo treatment in private hospitals and clinics where services are much better (Aziz et al 2014) Zaidi et.al (2012) conducted cross sectional study in Agha Khan University Hospital (AKUH) Karachi, Pakistan. Study indicated that the financial burden of cancer was substantial and mostly borne by the patients or the family. Most of the time, the monthly household average cost of the treatment far exceeded the monthly household income and a significant proportion of patient perceived the financial burden as overwhelming.

The financial aspect of the disease is particularly sensitive in countries like Pakistan where almost entire cost of the treatment is borne by the patient and the immediate family with little or no support from state or health insurance policies. Hence, the diagnosis of the cancer could be devastating news not only because of nature of the disease but also because of the continuous financial drain posed by the costs of the treatment.

Aziz et.al 2014 conducted qualitative study use semi structured interviews to explore the views of women in relation to breast cancer in regional cancer hospital in Lahore, Pakistan conclude that in Pakistan, seeking spiritual advice rather than medical advice appears to be unique to Pakistani Muslim women. There is also the dominant issue of maternal responsibility which appears to be an innate characteristic of Pakistani Muslim women and one that led to much worry, depressive reactions, emotional chaos and deep concern in women. Many women's initial thoughts were for their children rather than their own lives or the potential impact of their illness on relationships with their husbands. This innate cultural influence needs to be the focus for additional studies. In Pakistan, many women choose to surrender their careers to become housewives and mothers. Zaidi et.al (2012) conducted observational study in 2013-2014 at the Shaukat

Khanum Memorial Cancer Hospital and Research Center, Lahore and conclude that the female breast cancer patients had a lower mean age (48 years) at presentation compared to what has been reported in the advanced countries of the world, age at menarche was 13.2 years, age at first childbirth was 23.7 years, and the BMI was on the higher side. Family history of breast cancer was positive in less than 1/5th of the patients, majority of the females were parous and had breast-fed their children, and most had not used any OCPs/HRT. The difference in the pre- and postmenopausal status was not significant. Moreover, many women had ductal carcinoma, grade 3 tumor, stage II disease, and ER/PR+, HER2- cancers.

Naqvi et.al (2015) conducted descriptive cross-sectional study in Combined Military Hospital (CMH), Rawalpindi from September 2013 to August 2015 and conclude that the majority of patients presented in the later stages of disease with a moderate grade, more common lymph node metastasis and a size larger than 2 cm. Besides social and economic factors, the lack of awareness may also be responsible for fewer turnovers of patients to hospital in the early stages of this disease.

CHAPTER 3

DATA AND METHODOLOGY

3.1 Introduction

This section provides a detailed description of the analysis technique used for this study.

This section is also further divided into subsections. Section 3.1 deals with study design, Section 3.2 deals with sampling technique and Section 3.3 is about sample size of the study.

3.2 Sampling framework

Our target population is female breast cancer patients approaching the hospital for treatment.

The sampling in this research has utilized the convenient sampling technique, where the respondents are female breast cancer patients taking treatment of breast cancer in selected public and private hospitals of Islamabad Rawalpindi. The following hospitals from Islamabad and Rawalpindi were included for the study purpose:

Nuclear Medicine, Oncology & Radiotherapy Institute (n_1)

Surgical center Islamabad (n_2)

3.2.1 Unit of data collection 1

The unite of data collection for this study is female patients of breast cancer. Total of 189 respondents were selected from NORI hospital and 36 female patients were selected from surgical center Islamabad.

3.2.2 Unit of data collection 2

The second unite of data collection for this study is doctors of the breast cancer disease.

This study has included two interviews of doctors: Dr. Humaira and Dr. Saliha

The patients of Breast Cancer (BC) visit to Noori Hospital at G8 sector Islamabad from all over the country. This is the main center for the treatment of BC. The cost of illness technique is used to estimate the economic burden of breast cancer in female population. The respondents are taking breast cancer treatment at the concerned facility.

3.3 Sample size

The following formula is used for sample size calculation.

$$n = \left(\frac{Z_{\alpha} \sigma}{\frac{2}{e^2}} \right)$$

Where:

n = sample size

Z = standard normal deviation at required confidence level of 95%

σ = expected standard deviation of the outcome variable

E = desired margin of error

3.4 List of Variables

Table 1 provides the description of the variables. it includes the type of cost and the various categories of cost that were estimated in the study. It also describes the components of the cost incurred by women in seeking treatment for breast cancer.

Table 3.1: Description of study variables

Type of cost	Category of cost	Description
	Medical cost	Cost of consultation Cost of medication Laboratory/diagnostics Treatment
	Non- medical	Cost of travel Cost of food and drinks for patients
		Productivity loss to the patient Travel time Waiting time
		Fear Pain Emotional Suffering
	Service Satisfaction	Stage after treatment Surgery Surgeon Treatment
	Habits	Food intake Contraceptives Pills Physical Activity
Individual Variables		Age Marital Status Family size Menopause Genetic

3.5 Methodology

According to the main objectives Methodology is based on the two sections.

- i. Costing
- ii. Multiple linear regression models.

3.5.1 Costing:

According to first objective separately measure three types of cost (direct cost, indirect cost, intangible cost). Direct cost is sum of medical and non-medical cost. Medical cost involves cost of consultation medication, treatment and non-medical cost involve cost of food and travel.

$$\text{Direct cost} = \text{Medical cost} + \text{Non-medical cost} \quad DC = \sum_{i=1}^k P_i * Q_i \quad \text{Eq (3.1)}$$

Medical cost can be calculated by multiplying price and quantity of surgeries conducted during illness.

$$MC = P_1 * Q_1 + P_2 * Q_2 + P_3 * Q_3 \quad \text{Eq..... (3.2)}$$

Same we can calculate the non-medical cost by price multiply by quantity of each type of treatment service taken by patients

$$NMC = P_4 * Q_4 + P_5 * Q_5 \quad \text{Eq (3.3)}$$

And direct cost is the sum of both medical and non-medical cost

$$DC = MC + NMC = P_1 * Q_1 + P_2 * Q_2 + P_3 * Q_3 + P_4 * Q_4 + P_5 * Q_5 \quad \text{Eq (3.4)}$$

Medical cost	
P1= price of consultation per visit	Q1= No of visits
P2=Per unit cost of medication	Q2= No of units
P3=Price per test	Q3= No of tests
Non-medical cost	
P4= Cost of per travel	Q4= No of visits
P5= Cost of unit food	Q5= No of unit

Indirect cost calculates to measure productivity loss of patient and its attendant.

Indirect cost of patient	
P*=Per day wage	Q*=No of days absent from job
P*=Travel time	Q*= Cost per hour
P*=Waiting time	Q*=Cost per hour

Indirect cost of relative with same variables and same methodology as mentioned above. The indicators of Intangible cost are pain fear and emotional suffering and family management which is constructed by taking simple average. Graphical visualization is used to analyses the tendency of patients towards pain, fear and emotional suffering and family management.

3.5.2 Econometric Model

To meet second objective used multiple linear regression model. The multiple linear regressions are used to explain the relationship between one continuous dependent variable and two or more independent variables (continuous variable). There is a separate equation which determines the different factors which cause the different type of costs.

$$DC = \beta_0 + \beta_1NOV + \beta_2D2 + \beta_3D3 + \beta_4D4 + \beta_5TD + \beta_6Dpe + \beta_7Dg + \beta_8Age + \beta_9Dbf + \mu.....(3.5)$$

Where *NOV* Number of visits

D₂ Dummy of stage 2

D₃ Dummy of stage 3

D₄ Dummy of stage 4

TD Treatment Duration

Dpe Dummy of Physical exercise

Dg Dummy of Genetic abnormality

Dbf Dummy of breast feed

Equation (1) will be estimated using OLS (ordinary least square).

CHAPTER 4

RESULT AND DISCUSSION

4.1 Introduction

This chapter is divided into two main subsections. Section 4.1 is related to descriptive analysis in which demographic characteristics, health status of patients, sources of treatment, cost of treatment, intangible cost of treatment and satisfaction scale is presented. Section 4.8 is about the results econometric model in which different determinants of direct cost are analyzed.

4.2 Descriptive results

Histograms and descriptive statistics have been used to present the results of direct and indirect cost of the diseases.

4.2.2 Socio-demographic characteristics

The results in table 4.1 of the study show that, the respondents of the study are from different locations background in Pakistan. Specifically, from Punjab province, there are 65 percent of total respondents, women with Breast Cancer (BC), who were included for purpose of information source in this study. Only 18 percent of total women with BC disease were from Islamabad in total respondents of current study. Out of the total sample there are 11 percent respondents included from AJK and GB. Out of total respondent's 4 percent respondents are from KPK and only 1% respondents are from Sindh and 1 percent respondents are from Baluchistan.

11.6% of the women with BC disease in the study were below the age of 30 years. Out of total 21.8 percent respondents were of age between 30 to 40 years. The majority of the respondents were above 40 years of age, which are 65.8% in total. This is the main

issue that most the women are taken into trouble at the most beautiful time of her life. Result of this study significant with most of the other studies which conclude that over 80% of women diagnosed with the disease is aged over fifty years.

About 79.6% of the respondents are married, while Single women or not married girls in the study were 7.6% and 12.9% are widowed women in the selected sample of this study. This indicates that not only married women can be taken by this disease, but also unmarried girls can go through the same sufferings if they don't take care.

The education backgrounds showed, that 42.67% respondents were illiterate. 12.89% respondents were with primary education level and 16.89% respondents have middle level education. 17.78% respondents have studied only intermediate and 9.78% respondents have achieved higher education. But unfortunately, education doesn't have positive impact (awareness about self-examination) on women all over or as well as respondents of the study.

Table No 4.1 Demographic Characteristics of Respondents

	Category	Percentage
	Punjab	65%
	KPK	4%
	Sindh	1%
	Baluchistan	1%
	AJK, GB	11%
	Islamabad	18%
	less than 30	11.6
	30-40	21.8
	Above 40	65.8
	Married	79.6
	Single	7.6
	Widow	12.9
	Illiterate	42.67%
	Primary	12.89%
	Middle	16.89%
	Intermediate	17.78%
	Higher	9.78%

4.2.3 Demographic background of respondents

The results in table 4.2 show that there are patients, with maximum number of 9 kids, which makes it more challenging for the survival of milk feeding kids. There are some respondents, who are unmarried yet, un married respondents have no kid. However, the average number of kids across the BC patients is 3 kids per patient. The link between breast cancer and having children is complex in terms of management and care. These factors include income of the family education and family size. The family size is important in terms of support for the kids of patients and help during illness. The study results show that on average the respondent has 33435.5 rupees income on monthly bases the maximum monthly income of RS 150000.00 is reported by the respondents. The study estimates, minimum of only 11000 rupees, monthly income of BC patients.

Table 4.2 Demographic characteristics of Respondents

	Mean	Maximum	Minimum
No of kids	3	9	0
Age of the patient	44.4356	70.00	21.00
Family income	33435.50	150000.00	11500.00
Education	2.00 ³	5.00 ⁴	0.00
Family size			

4.3 Health status of patients

4.3.1 Stages of disease

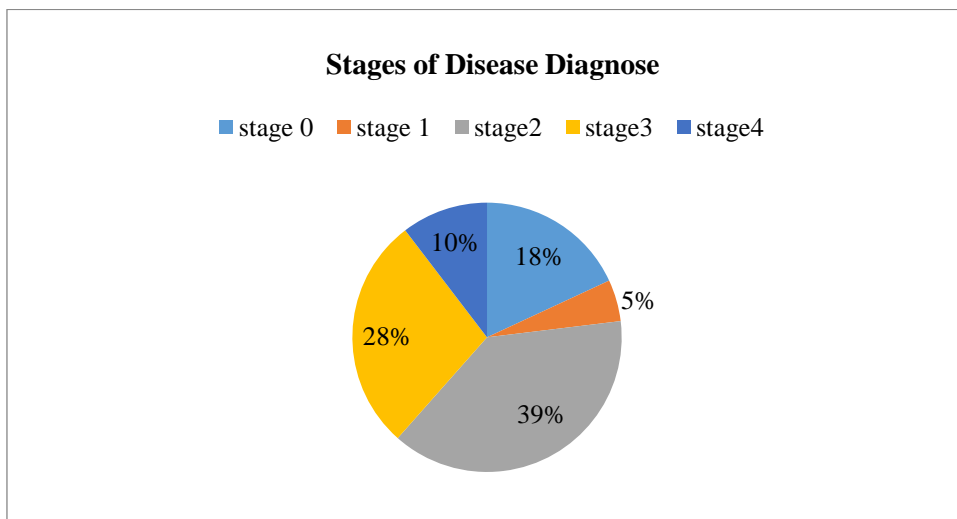
The patients are diagnosed with BC disease at the different stages. As shown in the figure 4.1 only 18.1 percent respondents were at “stage 0” which means that these 18.1 percent patients have minor lymph and are easily recoverable after minor surgery. Stage zero indicates that the person is diagnosed, and this stage is not dangerous as compared

³ 2 = primary education

⁴ 5 = Higher education

to the stage four. Only 5% respondents are at stage 1, which indicates these respondents have realized a bit late that they are diagnosed with Breast Cancer. The result shows that a major portion of respondents comprised of 38.5% respondents are at stage 2, these respondents are comparatively more intensive. At stage four most of the small health care unite do not even keep the patients, they directly refer it to better health care centers for surgery, where it depends upon the damages made by the issue to the patients, weather to conduct the surgery or it might not be treatable in some case with single surgery.

Figure No. 4.1 Stages of disease diagnose



4.3.2 Breast feed and Menopause

The results shown in table no 4.3 for this study show that, most of the respondents are married at age below 25, which comprise of 75 percent of the total sample size. Only 12 percent of the respondents are married ta age of 25-30 years. Only 3 percent of the study respondents are married ta age of above 30 years. The results show that 28.0 percent of the respondents do feed their kids. 68.9 percent of the respondents feed their kids and practice the breast-feeding activity, which reduces the risk for increasing breast cancer.

The studies have shown in past literature that breast feeding reduces the risk of BC. However, minor numbers of respondents with such cancer care activities are reported in our study. The results show that the reproductive system of 17.3 patient's women is not affected due to chemo-therapy. 82.7 percent respondents have lost their reproductive system after chemo-therapy.

Table 4.3 Breast feed and Menopause

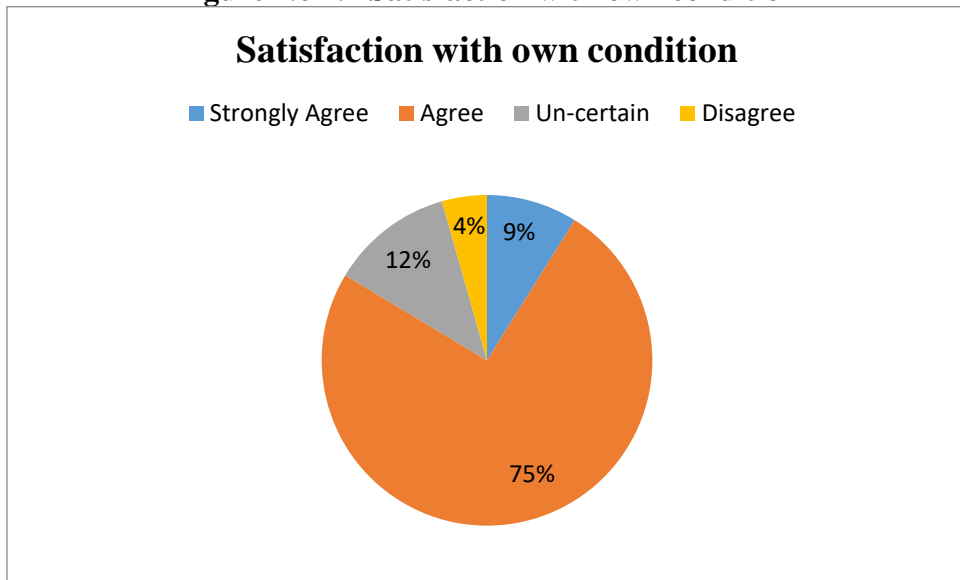
Status indicators	Category	Percentage
	Below 25	75%
	25-30	12%
	30 Above	3%
	No breast feed	28.0
	Yes	68.9
	No	17.3
	Yes	82.7

4.3.3 Satisfaction with own condition

The result in table 4.5 indicates that, 168 respondents argued that, their health condition is getting better day by day. Only 8.9 percent of total respondents are strongly agreed with the improvement in their condition. This indicates that their health is getting better, and the disease stage is declining towards zero stage from maximum stage.

The result shows that 12.0 percent of the respondents are uncertain of their health condition, whether it is improved or not. Only 4.4 percent of the respondents argued that they do not agree that their health condition has become better and improved due to the treatment.

Figure No 4.2 Satisfaction with own condition



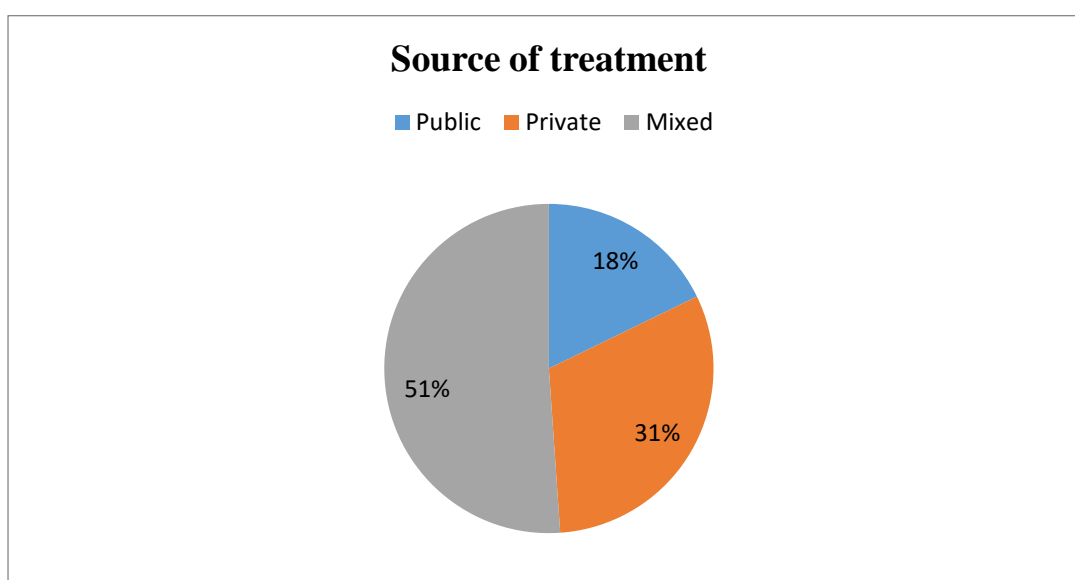
4.4 Treatment

4.4.1 Source of treatment

The results in table 4.6 indicate that, only 40 respondents out of 225 respondents visited only public health care facility. 70 respondents went to private health care centers and hospitals to access the health facility.

The results also show that, majority of the respondents went to both the facilities at different times for health care. The respondents, who used both facilities, are 51 percent of total selected sample of this study. This indicates that majority of the respondents has tried both the facilities for access better health care.

Figure No.3 Source of treatment



4.4.2 Age of disease and duration of Treatment

The results in table 4.4 show that, Minimum duration of treatment that patients have taken is only one month. One-month treatment duration is minimum time treatment recorded in our data. This is the shortest treatment, which was taken by the stage zero patients. On average the treatment duration is 11.2 months across respondents of this study, which means that, at least one-year treatment is taken on average by the respondents of the study. However, there are some respondents with 72 months of treatment duration for the same disease. Longest treatment of 6 years is taken by the patients of higher stages.

The study results show that, the disease is diagnosed at minimum age of 21 years, while on average the patients were of 44 years of age, when they got diagnosed with breast cancer . This disease is highly associated with age factor, as the studies of eminent researchers have shown that increasing age lead to higher risk factor for occurrence of this disease or the probability of this disease increases with increasing age of the person.

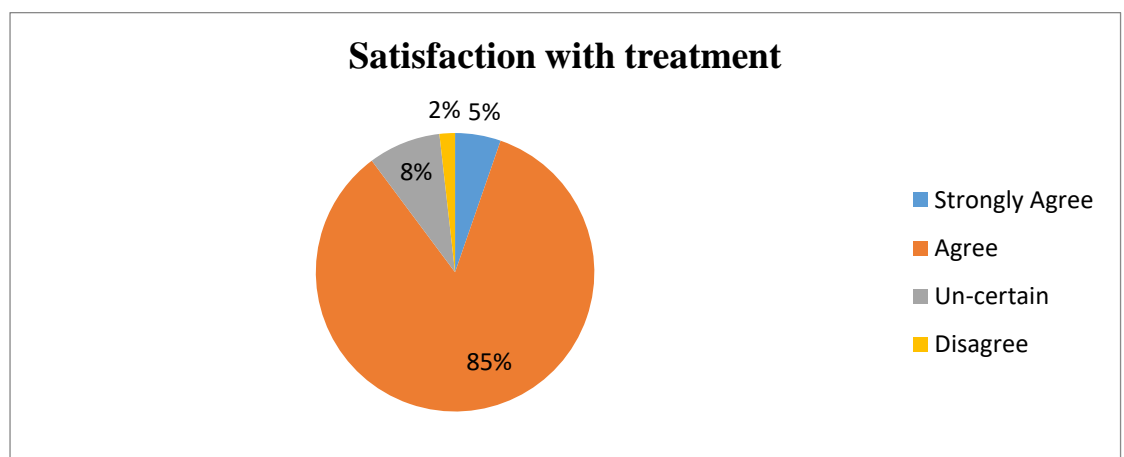
Table 4.4: Age of disease and duration of Treatment

TD-AG	N	Minimum	Maximum	Mean	Std. Deviation
Treatment duration (Months)	225	1.00	72.00	11.624	13.50190
Age of Disease Diagnosed	225	21.00	70.00	44.011	10.26582
Valid N (list wise) 225					

4.4.3 Satisfaction with Treatment

The result shown in table 4.8 indicates that majority of the patients are satisfied with the treatment of doctors and these patients argued that their health condition is getting better. Some of these patients argued that they do know what is happening to their health status with this treatment. Only 4 persons argued that they do not agree that their health is getting better but in fact they feel that their health is getting into worst condition with the treatment provided by hospital.

Figure No 4.4 Satisfaction with treatment



4.5 Cost of Cancer

4.5.1 Direct cost of treatment

The results are table 4.9 indicates the direct medical cost of cancer, where the consultation cost represents the doctor fee of private clinics for the person because the Noor i hospital has zero consultation fee for patients. It is totally free. The average cost of the consultation on per person is 3081 PKR, which depends upon the visits of the person to the private clinic. Otherwise the consultation fee is 2000 PKR per person on each visit. So calculating it for all the patients makes it 3081PKR on average. The maximum cost paid by patients for the consultation is 7200, which is also combined calculated cost because on per person one visit cost is 2000 PKR. Per person Lab investigation cost is 46171.36 PKR on average basis. This cost varies across respondents, where minimum cost of lab investigation is zero and maximum cost for patients on lab investigation cost is 200 thousand (2 Lacks). Higher lab cost means high number of tests conducted on patients or recommended by doctors. If the patients are aware of the fact that cancer has many stages, (0,4), at stages zero or One, if the person did self-examination every month, the cost on lab investigation can be easily reduced minimum amount per person.

As it is commonly understood that cancer has very high treatment cost, the study results show that per person treatment cost on average basis is above 3 lacks, which is 374124.44 PKR, while maximum treatment cost is 31,25000 PKR on per person basis. Per patient Average Medication cost is 7792.08 PKR in Noor i hospital Rawalpindi, despite of the fact that drugs are free in most of the cases in Noor i hospital Rawalpindi. The maximum cost for the medication is 40,000 PKR for the patients of Cancer at Noori hospital Rawalpindi. Non-medical cost is represented by the cost of travel and transport, which is direct cost paid by patients during the illness. The study found that 59593 PKR

is the transportation cost on average, which is calculated across all the respondents, whether they are coming from Bahawal Nagar or Mandi Bahaudin. The travel cost is the combine cost of all the visits of the person made during illness. Maximum travel cost for the cancer patients is 0.048 million PKR.

Table No. 4.5 Direct cost of treatment

Statistics	Mean	Maximum	Minimum
Direct medical cost			
Consultation	3081.67	7200	0
Lab investigation	46171.36	200,000	0
Treatment	374124.44	31,25000	0
Medication	7792.08	40,000	0
Non-medical cost			
Travel cost	59593.33	480,000	400

4.5.2 Laboratory Investigation Cost with respect to Stage of Disease and Age Patient

The results show that, the patients of breast cancer below 25 years of age are facing 14833.33 PKRs at zero stage of illness. The patients of breast cancer with in the age limit of thirty to forty years are facing higher cost of 18923.08 PKRs at zero stage of the illness across all the age groups. The expenses of patients with in the same age limit of 30-40 years are facing highest cost at zero stage of illness comparatively to the cost faced by other age groups at same stage of illness. The study results indicate that the average cost at zero stage of cancer is 15761.90 PKRs for the age group of above forty years.

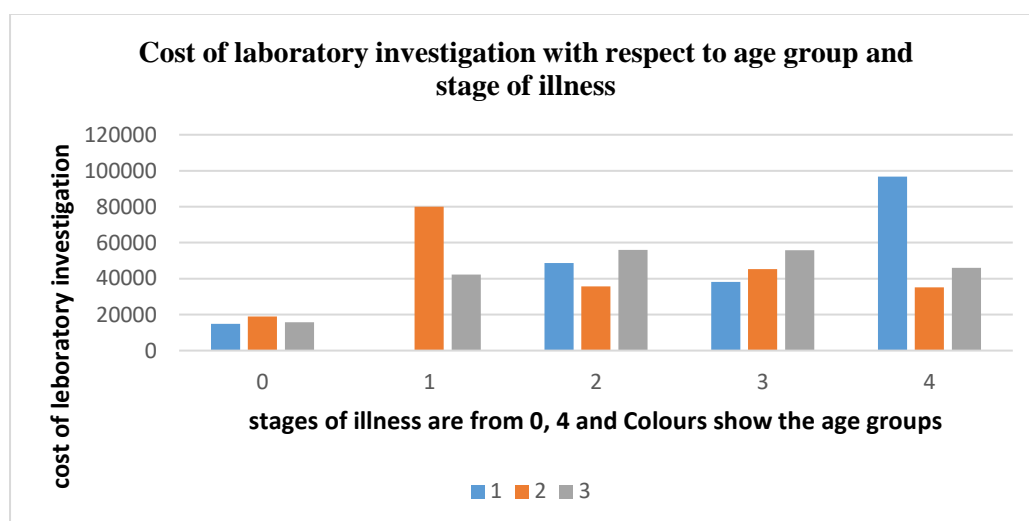
The lowest cost for the age group of below 25 years is zero at stage first⁵, while the highest cost for the same age group patients is 96666.67PKRs at fourth stage of illness, which is also the highest cost across all stages and all age groups patients. This is almost close to 0.10 million per patient at the age group of below 25 years. This group faces the highest cost among all the groups at stage first. This stage is the most expensive stage for the patients below 25 years of age, which can also reduce the productivity of person in long run if the illness stays for long time. The patients of breast cancer below age of 25 years are paying highest average expenses as compare to other groups. This group is most vulnerable group with respect to cost of illness. On one hand, the highest cost for patients of breast cancer with-in the age limit of 30-40 years is 80,000PKRs at first stage of illness at once and on the other hand, the same (30-40) years of patients are facing the lowest average cost at fourth stage of illness and also the lowest average cost across all the stages. This group is not highly vulnerable to the illness in terms of cost incurred for the illness. The patients above the age limit of 40 years are facing 15761.90 PKRs at zero stage, which is the lowest among all the groups in zero stage. The average cost across all the age groups of the breast cancer patients is 16650.00 PKRs at zero stage. However, grand average laboratory investigation cost across all stages for age the group is above 40 is the highest among all groups.

⁵ Because the patients of breast cancer below 25 years of age are supported by different organizations working the eradication of this disease. The collected data shows that the respondents below the age of 25 years were sponsored by Nori welfare society and Baitul mall. They support all the age groups for this disease but in our data below 25 years of patients at stage one was fully sponsored.

Table No. 4.6 Laboratory investigation average cost, stage of disease and age

After the analysis of whole picture, the study found that the age group below 25 years and above 40 years are more vulnerable in terms of laboratory investigation cost at different stages of disease. The cost of illness

Figure 4.5 Cost of laboratory investigation with respect to age group and stage of illness



Blue = 1 below 25 years age, (Orange = 2=25-40 years age) Grey=3=above 40 years age)

The figure shows that laboratory investigation cost of patients below 25 years of age is highest at fourth stage of illness, the cost is high because of multiple investigations required for treatment. The patients of 30-40 years age group face highest cost of laboratory investigation at first stage of illness. The study results show, that cost of illness for breast cancer patients sensitively varies across different age groups. At stage 3 the patients of all age groups face identical costs for laboratory investigation.

4.5.3 Cost of chemo therapy at different stages of breast cancer across different age groups

The study results indicate that the patients of stage zero and stage one, do not face any cost of Chemo Therapy, excluding the patients above age limits 40 years at stage one, where the patients of same age group spend PKRs 29875 at once for Chemo therapy. For the zero-stage patient's chemo therapy is not required that's why the cost is zero at zero stage.

The average cost of illness for across all the groups for stage one is 21727 PKRs at once for Chemo therapy. However, the patients, below the age of 40 years do not need chemo therapy and thus the cost is zero at even stage first. Because the patients below 40 years of age, recover soon without the chemo therapy. The highest cost at stage second is faced by the patients of above 40 years, which indicates that at first stage the rate of recovery for the patients above age limit of 40 years is very low and the cost of second stage is thus the highest among all.

Table no 4.7: average cost of chemo therapy at different stages of breast cancer across different age groups

Stage of illness	Less than 25 Years	25-40 Years	Above 40 Years
Stage 0	0.00	0.00	0.00
Stage 1	0.00	0.00	29875
Stage 2	10000	28666	100102
Stage 3	44571	65750	62642
Stage 4	37500	170000	55833

4.5.4 Surgery cost with respect to age group at different stage

The results show that highest surgery cost at stage first is faced by the patients of highest age group, which is above 40 years. The patients of lower age group are also facing significant cost for surgery at zero stage of illness.

The cost of surgery at first stage of breast cancer is zero for both the age groups of below 25 and between 25 to 40 years of age. Only the patients of above 40 years age group are facing 16666PKRs for surgery at stage one. Some patients do not need surgery because of minor illness and also the cost is connected to time period of illness. The patients below the age of 25 years are facing highest surgery cost at stage 2 and only 5000PKRs at stage 4. The grand total average cost of surgery for the patients of breast cancer, below the age of 25 years is 47115 PKRs only at once, which is second highest grand total cost for all the stages. The highest total grand cost surgery for all the stages is faced by the patients in the age group of 30-40 years

Table 4.8 Surgery cost with respect to age group at different stage

Stages of illness	≤25	25-40	≥40

0	76666.66667	68461.53846	86904.7619
1	0.00	0.00	16666.66667
2	96250	53933.33333	39079.36508
3	43750	40833.33333	43512.19512
4	5000	0.00	20909.09091

4.5.6 Radiotherapy cost with respect to age group at different stage

The study results indicate that the patients of stage zero and stage one, do not face any cost of radio Therapy, excluding the patients above age limits 40 years at stage one, where the patients of same age group spend PKRs 24000 at once for Radio therapy. The patients of same age group faced 253515.623PKRs at stage 2 ,444756PKRs for stage 3 and the highest cost paid for the same age group is 950000 at stage 4. For the zero-stage patient's radio therapy is not required. The patients lie between the age group of 25-40 years are facing 165000 cost at stage 2 ,270000PKRs at stage 3 and 1286666 at stage

4.9 Radiotherapy cost with respect to age group at different stage

Stages of illness	≤25	25-40	≥40
0	0	0	0
1	0	0	24000
2	0	165000	253515.625
3	0	270000	444756.0976
4	366666.6667	1286666.667	950000

4.5.5 Indirect cost

The indirect cost was calculated, through number of days missed by the working person multiplied wage rate and then we converted at to monthly cost. This also the opportunity

cost of the person. The study results show that, minimum cost was zero because there are few patients, who are not yet employed but on average per month opportunity cost is 2772.15 PKR and average monthly cost was 46000 PKR for employed patients.

4.6 Intangible Cost

Here Intangible cost is a combination of fear, physical pain, emotional suffering and family management. Moreover, fear is calculated through five indicators

4.6.1 My Future Is One of My Concern

The result at table 4.10 shows that most of the patients were extremely upset about their future due to cancer, because this disease is can destroy the future life. Few of the respondents were not worried about their future due to illness because these patients were at the very initial stages and hopeful for better health in future after the treatment.

Table no 4.10 Due to sickness my future is one of my concern

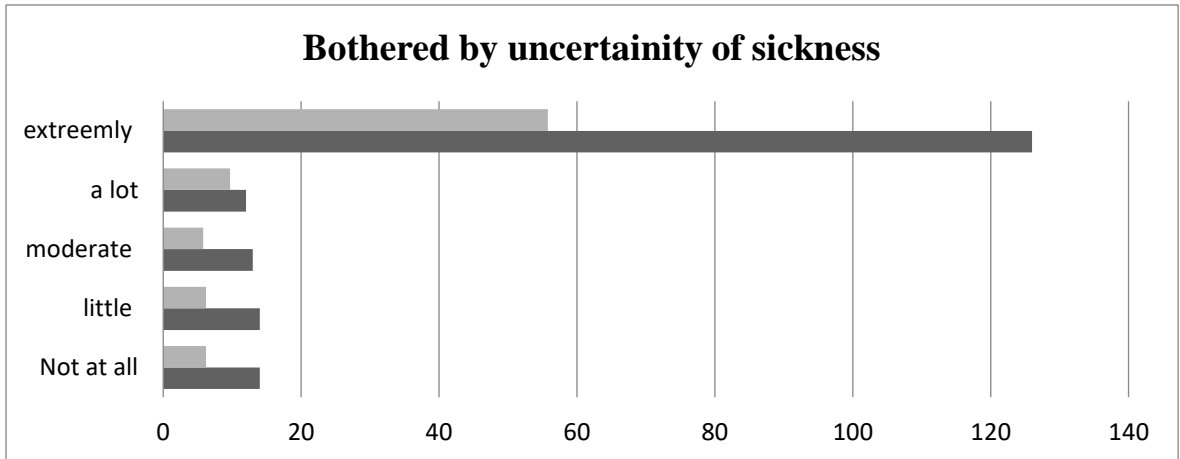
Scale it on	Frequency	Valid Percent	Cumulative Percent
Not At all	14	7.4	7.4
Little	12	6.3	13.8
Moderate	2	1.1	14.8
A lot	16	8.5	23.3
Extremely	145	76.7	100.0
Total	189	100.0	

4.6.2 Uncertainty of illness

The results at Figure 4.6 shows that 120 out of total patients are extremely bothered due to uncertainty of cancer disease, which is 55.8 percent represented by the top lines of figure 4.6 The results also reveal that 6.2 percent respondents argued that they are not bothered by this disease; the patients argued that one day we have to die so it is ok if

this is in my luck and 6.2 percent argued that they are bothered a little bit because they are disturbed due to the behavior

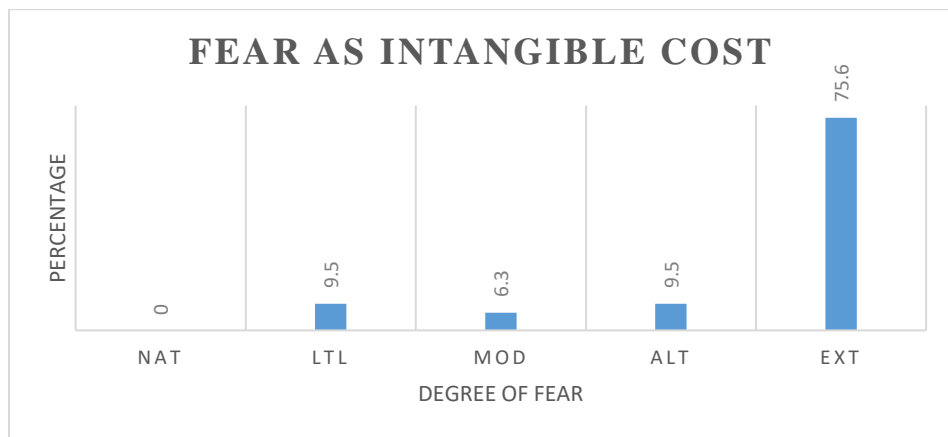
Figure 4.6 Bothered by uncertainty of sickness



4.6.3 Fear of cancer spearing, dying and Future

The figure no 4.7 shows that 75.6 % of the patients confessed that they feel extreme fear of spreading the cancer in their body and are afraid of dying. Only 9.5 percent patients were at normal condition, who were not afraid at all. On the other-hand 6.3 percent of patients were little bid afraid of these uncertainties. The results shown in figure 4.7 revealed that 9.5 percent patients expressed the feeling of fear for being in uncertain condition for the future and death due to this disease is lot. However maximum patients are extremely afraid of death and uncertainty, which indicates higher number of patients are facing intangible cost with higher intensity.

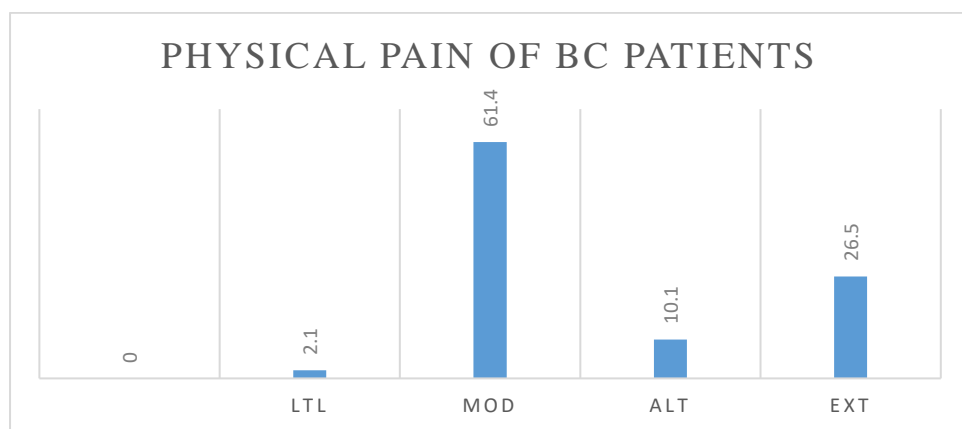
Figure no 4.7 Fear as intangible cost



4.6.4 BC patients suffering the Physical pain

The results in figure 4.8 indicate that most of the respondents go through the moderate pain. The moderate pain is defined as bearable pain. Very few argued that feel little bit pain. A significant percentage of respondents expressed, that victims are going through extreme pain. The indirect and intangible cost of disease is the bad feeling or suffering from pain in breast cancer, which is significantly evident from the collected data.

Figure 4.8 Physical Pain OF Breast Cancer Patients

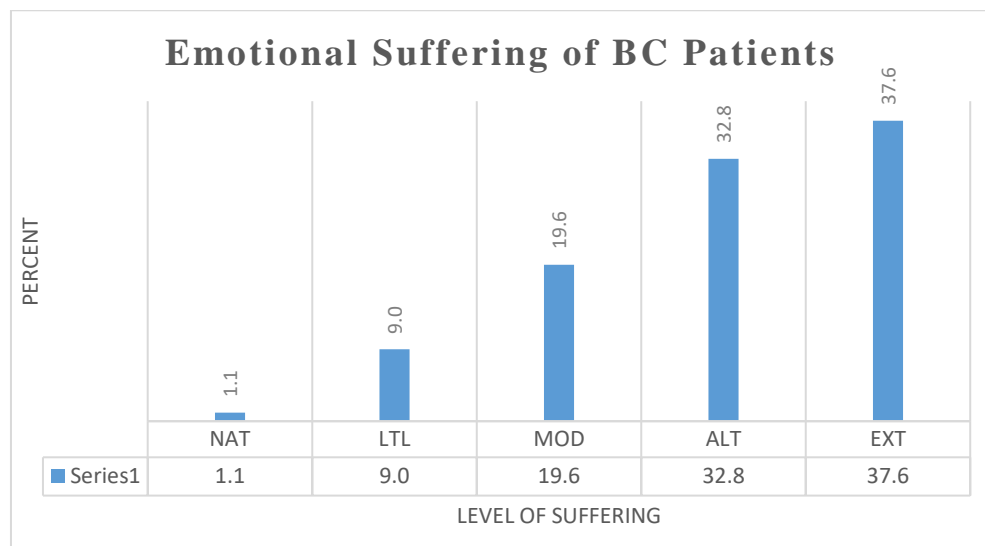


(NAT) = Not at all (LTL)= Little MOD = Moderate (ATL) = A lot (EXT) = Extreme

4.6.5 Emotional suffering of breast cancer patients

The results of the study shown in figure no Reveal the status of emotional suffering of breast cancer patients. Only 1.1 percent patients were not affected emotionally. 9 percent ladies argued that the disease has affected them emotionally but little bit. 19.6 percent patients have replied that the emotional suffering is moderate like other disease. 37.6 percent of the patients extremely suffered emotionally due to illness and the fear of many uncertainties. 32.8 percent suffering a lot due to the illness. This result indicate that this illness has serious emotional implications for the sociality and families suffering from breast cancers disease. This is the indirect cost faced by patients.

Figure no 4.9 Emotional suffering due to breast cancer



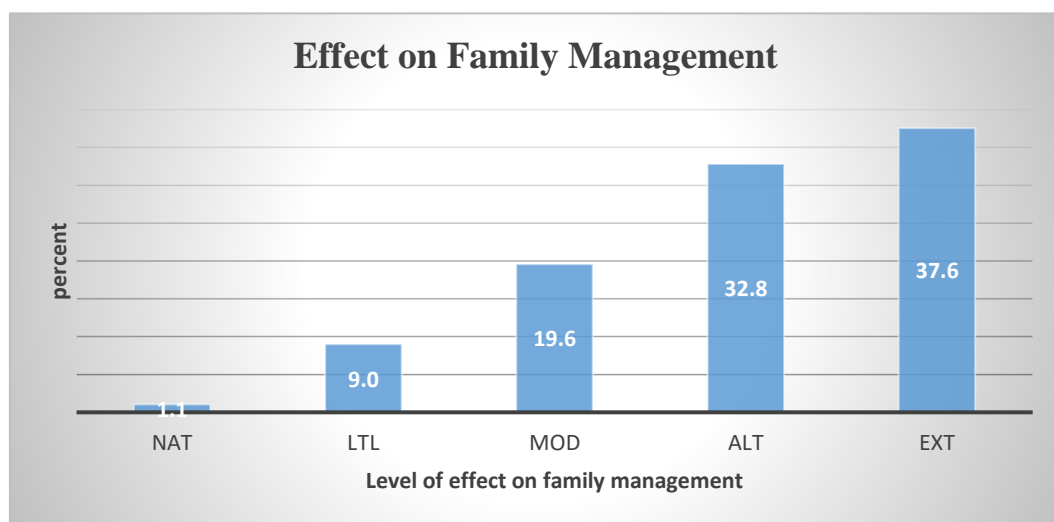
(NAT) = Not at all (LTL)= Little MOD = Moderate (ATL) = A lot (EXT) = Extreme

4.6.6 Effect on family management

The results shown in the figure no, show that more than 30 percent of the patient's family life management has extremely affected due to the illness. The logic behind, this disturbance is the hospital visits, which do not allow the patients to given proper time to kids. The problems of weakness in the body, weak immunity also stops the patient

from his/her social circle. Some patients face the surgery treatment stages and these patients are mostly isolated due to extreme illness conditions, which reduces their interactions with family and relatives. Around 30 % patients argued that their family life is affected a lot. Less than one percent of the patients responded that this disease hasn't affected their family lives. 19.6 percent patients have managed the family life and disease together and the affect is moderate like a normal disease.

Figure No:4.10 Effect on Family Management



(NAT) = Not at all (LTL)= Little MOD = Moderate (ATL) = A lot (EXT) = Extreme

4.7 Determinants of health cost for BC patients

The empirical results of the study show that age of the patients is positively associated with health cost, but it is statistically not significant for the patients of breast cancer. This can be also verified from descriptive statistics, where the results indicate at first stage for lower age group the cost is high while for the higher age group the cost is lower and for further higher stages of illness the cost for higher group is very volatile across all the age groups. So, there doesn't exist any relationship between age of the patient and health cost. This also means that the cost for lower age patients can be greater than the cost of illness for higher age patients. As a common logic if the patients

of the lower age are at higher stage of illness, they must be very critical, and cost of illness will get higher due to surgeries and other care. The relationship of age is not clearly correlated with patient's health cost in this type of illness because it can take over the patients of any age very soon to limits of life and death situation. The other important reason of this insignificant relationship is the age of illness. On one side some patients get diagnosed in very early 20s and on the other side age 70 is also not immune against Breast Cancer. Consistently insignificant in two models has allowed the author to drop the variable age from the third model. The sign of coefficient shows that Breast feeding is positively associated with health cost of breast cancer but statistically the association is not significant in three of the models. The reason for the insignificant relationship is that, this disease is not only associated with married or a woman with feeding kid, but the patients without kids are sometimes facing the highest cost comparatively. To understand the logic behind the insignificance of this association, the nature of this disease should be always in mind as the stages increase the illness gets more intense and the cost of illness for the treatment is pulled up, where it doesn't matter that the patient is married or not, feeding or not and young or old, the thing which matters is stage of illness and situation of patient. Breast feeding variable is also dropped after consistently insignificant association with health cost of illness.

The results showed that, increase in household monthly income across patients leads to increase in health cost of breast cancer. The rationale behind the positive and significant relationship between income and health cost is, that higher income families spend more money on their health comparatively. The lower percentage of income spent on health cost of a rich family is some time greater than the income of the poor person. Higher income people are expected to spend more on health and that's the common logic behind the association between income and health cost. The statistical relationship

between income and health cost is significant throughout four models of the study, which confirms the relationship exist between health cost and income. The treatment duration breast cancer increase the cost of breast cancer, which requires different treatments and therapies over the time, which are very costly. The results are statistically significant, which indicates that through the sample most of the patients with long duration of treatment have faced huge cost of illness. Treatment duration is highly significant throughout all the estimated models with every combination of variables. Genetic abnormality is also positively associated with health cost of breast cancer patients. The reason of consistently significant relationship between genetic abnormality and cost of illness might be the immunity problem of the patient, which doesn't resist against the illness like a normal person's body.

Spending on health of the patient will increase the health cost and healthy diet provision is one of important part of cost for breast cancer patients. The association is significant and positive in all the estimated models of the study. Physical exercise of the patients is not associated with health cost. It doesn't matter for the cost of a breast cancer patient treatment to carryon physical exercise or not. Even people with zero exercise have faced lower cost of health because of stage and illness short duration. The variable physical exercise is removed from the second 3rd and 4th model of the study. The results indicate that high number of visits have negative association with cost of illness because the follow up saves the patient from cost of surgery or chemo therapy, which are required at higher stages of breast cancer and high number of visits means more frequent checkup, which is safer and economical in this type of intense illness.

The study results showed that stages of breast cancer and health cost of breast cancer is positively associated, which indicates that higher stages will lead higher health cost for

better and critical treatment. This means, that the patients of breast cancer at higher stage of illness are facing greater cost of health treatment. The results are statistically significant with p value lower than 0.05, which allow us to accept alternative hypothesis that there is an association between stage of illness and Health cost of breast cancer.

Table No 4.10 Determinants of health cost for BC patients.

Variables	Model I	Model II	Model III	Model IV
Constant	-402336.959 (.048)	-397292.545 (.045)	-357870.365 (023)	-319662.209 (.031)
Age	1175.099 (.730)	1084.279 (.743)		
Brest Feed	50489.401 (.508)	50180.301 (.510)	54609.738 (.465)	
Monthly Income	3.016 (.051)	2.995 (.050)	3.014 (.048)	2.962 (.052)
Treatment Duration	35928.825 (0.000)	35987.012 (0.000)	36124.777 (0.000)	36157.988 (0.000)
Genetic Abnormality	255864.428 (.002)	257655.890 (.002)	258193.370 (.002)	258153.674 (.002)
Healthy Diet	170088.531 (.045)	170769.455 (043)	171089.432 (.043)	176343.229 (.036)
Physical Exercise	18113.873 (.907)			
Number of visit	-9068.347 (0.000)	-9115.524 (0.000)	-9155.526 (0.000)	-9325.525 (0.000)
Dummy for stage 1	291148.443 (.030)	292327.689 (.029)	297927.512 (024)	311362.980 (.017)
Dummy for stage 2	384335.441 (.054)	388056.976 (.048)	398166.132 (.039)	400920.975 (.038)
Dummy for stage 3	285769.847 (.036)	286480.982 (.035)	290052.790 (.032)	292603.613 (.030)
Dummy for stage 4	936865.768 (.000)	936991.077 (.000)	940670.403 (.000)	940158.010 (.000)
R²	.425	.425	.425	.423
P vales are in parenthesis				

Government cost of breast cancer

The basic cost or budget from the government of Pakistan, for the breast cancer is never reported in researches and annual reports. However, the government has upgraded three hospitals of Pakistan Atomic Energy Commission (PAEC) in the new fiscal year with the allocation of a huge money of Rs 2959.447 million, it has been learnt, that a major chunk of funds worth Rs. 1485.240 million was reserved for Upgradation of Atomic Energy Cancer Hospital-NORI (AECH-NORI) to facilitate patients of twin cities and its nearby areas for the new fiscal year (2018-19).

Moreover, Rs. 755.327 million and Rs. 718.880 million respectively have been allocated for two cancer hospitals of Institute of Nuclear Medicine, Oncology and Radiology (GINOR) and Gujranwala Institute of Nuclear Medicine and Radiology (GINUM). Confirming the allocation, an official of PAEC shared that the budgetary allocation for the cancer hospitals is a remarkable step of the incumbent government to allocate appropriate funds for facilitating patients of the deadly disease. “The latest equipment, provided to the Atomic Energy Cancer Hospital (AECH) NORI including PET Scan and Cyber Knife Technology through which the cancer tissues may be killed at the spot with precision. This technology has a significant on cost treatment from the patient’s perspective, as it reduces the probability of surgeries and further extensions of cancer cells in the body. The cost of breast cancer is estimated on basis of information provided by the government of Pakistan through ministry health. As the study has collected data from Nori surgical center, it will be logical enough to present the cost or annual budget of nori hospital in total and the cost of one patients can be estimated by dividing total budget on total number of patients served in a year. According to the budget allocated for the upgradation of nori hospital, which will serve 4000 patients in coming time. Per person cost of 746881 rupees of cost is

incurred by the government of Pakistan. This includes all types of costs. The recruitment cost of doctors and other staff. Building maintained and rent cost, equipment cost and service delivery overall cost.

4.8 Major findings

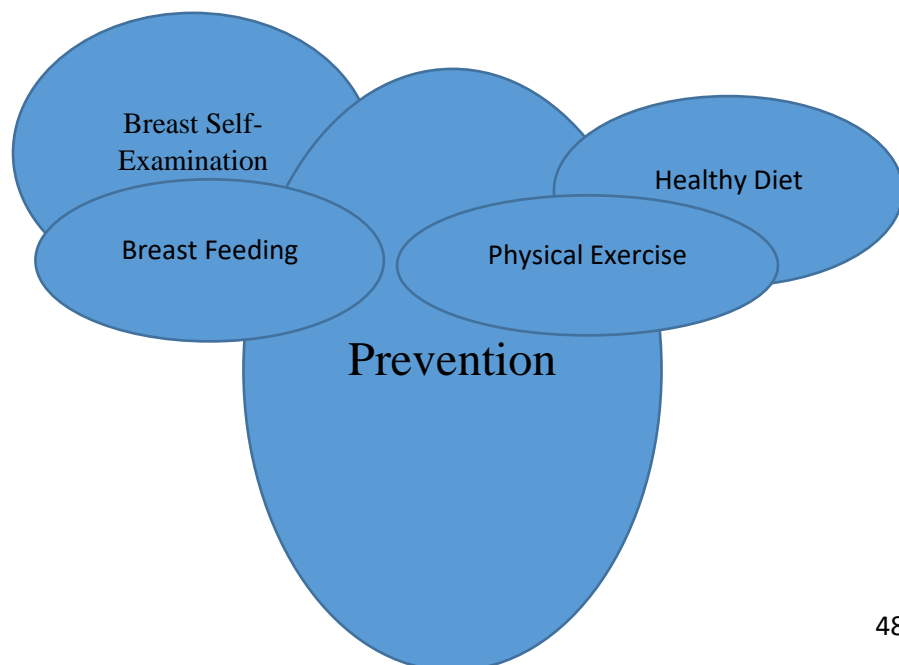
Fear and lack of knowledge caused women to hide the breast lump from their husbands and families. On disclosure of breast cancer is potentially life threatening but may be a reflection of the social stigma that is associated with a diagnosis of breast cancer. There is a social stigma of having a mastectomy in Pakistani culture. The breast cancer is viewed as a proscribed condition, which reduces the opportunities for unmarried women with breast cancer to later get married. In Pakistani society breast cancer is treated as a gender specific symbol of deprivation, which is not the case in rest of the world. Because of the awareness western societies do not face such kind of issues.

In Pakistan depression is viewed as a common psychological reaction to the illness. The level of depression varies from moderate to severe, and the severity is correlated with the stage of the disease at diagnosis. On realization of disease at first, Most of women argued that the initial thoughts, which depress them were of their children future without her rather than their own lives or the potential impact of the illness on their relationship with her husbands. Coping strategies also play important role in reducing the stress of patients temporarily but it is very dangerous for the health of patients. These types of cultural based treatments are very rarely effective. Most of the time, it increases the cost of health for patients. This study concluded that some of financial challenges women faced during treatment and care, like high cost of laboratory investigations, fees for treatment and costly travel expenses etc.

Funding the cost of treatment and care for breast cancer can stretch people's budget to breaking point. Many of the hidden cost of breast cancer are not tangible but important. A woman who is diagnosed with breast cancer at a younger age (before she has started menopause) may face additional financial pressure.

Having to travel long distance to and from treatment can also mean time away from family. This disruption can increase financial pressure also. While women with early stage cancer will most likely know at the start of their treatment how long they will be of their treatment (surgery, chemotherapy, radiotherapy) but women with last stages especially women with metastatic breast cancer don't have an "end point" to their treatment. Depending how their cancer responds to treatment, women with metastatic disease may have several "lines" of treatment, when one line of treatment stop working another treatment is tried.it is difficult to predict how long each line of treatment may be given. What each line of treatment will be and how much it cost will be. All of these can tighten the household budget. Paying for cancer treatment and its associated costs pushes them to the brink. They are forced to rely on government benefits, charity, borrow and sell off assets.

Concept of prevention policy for breast cancer patients



Explanation

Boosting the immune system by using exercise, taking healthy diet prevent and treat cancer. Other interventions that increase the immune system response such as reducing obesity, smoking etc.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The evidences of Breast cancer are more visible in Panjab and Islamabad as compared to other regions of Pakistan. This disease is more sensitive to the age of Patients. The study concluded that most of the patients realize Breast cancer in second stage of disease. Direct cost is the major cost faced by breast cancer patients. The lack of awareness and prevention measures lead to increase the economic cost of BC patients. The promotive measures in Pakistan are negligible and thus it adds up to the cost of BC for a common man.

The empirical results of the study indicate, that the duration of treatment is positively and significantly increasing the cost of breast cancer. Likewise, the stage of the illness is increasing the illness cost, higher stage patients are facing huge cost, which is also causing the intangible cost to patients. The study indicates that, most of the patients were Punjab region and out of total sample 65% patients of breast cancer are from Punjab, followed by capital territory of Pakistan with 18 % patients out of total sample of the study. This disease is more frequently found in the age group of above 40 years. The patients of this disease are mostly married in collected data sample for the study.

Most of the Breast cancer patients are at stage two, which are 39 percent followed by the 28 percent patients at stage three. This is a critically important issue that most of the patients are facing huge cost both economically and socially. The treatment is highly expensive for higher stage patients. Only 10 percent of patients are at stage 4, which is the most dangerous stage of this illness. The cost of treatment and care for breast cancer can stretch people's budget to breaking point. The study found that breast cancer patients incur huge direct cost in seeking treatment. Most of the respondents reported high intangible burdens owing to breast cancer disease patients indicating that majority of the study participants experience a lot of psychological problems due to their illness condition. The major source of this psychological burden is as a result of the stigmatization associated with breast cancer. In general, the direct cost of treatment, for breast cancer patients is a major challenge confronting breast cancer patient.

5.2 Recommendation

The awareness programs shall be started by government for prevention and treatment of cancer. This will reduce the treatment and lab investigation cost of the patients. Most of the expenses can be cut down due to prevention through screening.

Direct cost the major cost faced by breast cancer patients. There is demand for a rational policy on breast cancer, treatment with the intention of backing the direct cost components of breast cancer treatment. This could be done through effective advocacy and collaboration with interest group to raise the required resources for reducing the direct treatment cost.

The study recommends the awareness programs, which shall focus on prevention of disease with parallel focus on interaction with patients for reduction of psychological issues, which will help in reduction of intangible cost of breast cancers patients.

In addition, the establishment of cancer hospitals and increasing the number of beds in the existing cancer treatment Centers across the country is important.

The government budget should also include and focus on investment for diagnostic hospitals and BC treatment center.

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Appendix A

Direct treatment cost

Cost component	Total cost (GHS)	Mean (SD)	Median	Mode	Std. Deviation
Direct cost					
Direct medical cost					
Consultation	647150	3081.6667	.00	.00	7435.43884
Laboratory/Diagnos- tics	9581700	.9867	1.0000	1.00	.11495
Medicine	1574000	7792.08	.00	0	41235.959
Treatment	84178000	374124.444 4	85000	.00	6.69368
Sub total	94406850				
Direct non-medical					
Travel cost (In-out)	13408500	59593.3333	30000.000 0	.00	82615.3020 0
Food	0	0	0	0	0
Miscellaneous	0	0	0	0	0
Sub total	13408500				
Total direct cost	10781535 0				

Appendix: B

Questionnaire

TITLE: Household Economic Burden OF Breast Cancer Disease in Female Population: A Case Study of

Please kindly give me a little of your time so I can answer these questions with you. You are assured that the answers you give will be strictly confidential and would not be used against you.

Please tick () by the options provided as you deem fit.

Date: _____

Height: _____

Weight: _____

SECTION A: SOCIO-DEMOGRAPHIC INFORMATION

NO	Question
	Area of respondent
A1	Age in years
A2	Marital status [1] Married [3] Divorced [5] Separated [2] Single [4] widowed
A3	If married, then how much children do you have?
A4	Educational status [1] No education [3] Middle [5] Higher [2] Primary level [4] Intermediate [6] Madrassah [7] vocational centre
A5	Employment status
A6	Whether you are head of your family or not?
A7	How many numbers of household in your family?
A8	How many numbers of earners in your family?
A9	What is your family income?
A10	Are you still working in spite of your condition?
A11	If quit, then after how much time?
	What is your own understanding about disease?
	What is your source of information about the disease?
A12	When were you diagnosed of breast cancer?(age at disease presentation)
	From where you get treatment? [1] Public hospital [2] private hospital
	Who accompanies you during treatment?
A13	How long you have been on treatment?Years.....Months
A14	At which stage are you now after treatment? 1] agree [2] strongly agree [3] uncertainty [4] disagree [5] strongly disagree

	Are you now satisfied with your condition? 1] agree [2] strongly agree [3] uncertainty [4] disagree [5] strongly disagree
	Are you satisfied with your surgeon? [1] agree [2] strongly agree [3] uncertainty [4] disagree [5] strongly disagree
	Are you satisfied with your treatment? 1] agree [2] strongly agree [3] uncertainty [4] disagree [5] strongly disagree
A15	What is your source of first diagnosis? [1]Self examination [3]Ultrasound [5]Biopsy [2] Mammography [4]MRI [6] other
A16	At what stage of the disease were you diagnosed? [1] Stage 1 [2] Stage 2 [3] Stage 3 [4] Stage 4 [5] Stage 5
A17	Type of your disease [1] Invasive ductal carcinoma [2] Invasive lobular carcinoma [3] Other's (specify)
A18	Is it due to genetic abnormality?
A19	If yes then how many of other family members are diagnosed with it?
A20	Are you taking healthy diet?
	Are you taking any contraceptives pills during or after treatment?
	Do you have any physical activity?
A21	What is the source of financing for the cost of care? (tick as many) [1] Self [2] Pensions [3] Remittances [4] Relatives [5] Private insurance [6] Health card [7] taking loan on interest [8] loan from family or friend [9] taking away home expenditure [10] Children education expenditure [11] baitul mal [12] sadqat [13] Other's (specify)
A22	Have you or a household member had to sell a property to cater for your disease? [0] No [1] Yes
A23	If yes in 15, what item did you sell? (tick as many) [1] House [2] Household items [3] Land [4] Car [5] jewelery [6] cattle [7] Other's (specify)
A24	If you answered A15, how much did you derive in total?

SECTION B: DIRECT COST

Medical Cost

B25. How much you and your household do spends in a month on a treatment?

	Item/ Treatment Quantity	Cost (RS)
B25.1	Registration	
B25.2	Consultation	
B25.3	Laboratory investigations	
B25.4	Mastectomy	
B25.5	Histopathology	
B25.6	Chemotherapy	
B25.7	Radiotherapy	
B25.8	Other drugs	
B25.9	Radiological investigations	
B25.10	Other's (specify)	

Non-Medical

B26. How much do you and your household spend in a month on these items?

	Item	Cost (RS)
B26.1	Travel cost in and out	
B26.2	Food during treatment	
B26.3	Drink during treatment	
B26.4	Others (specify)	

SECTION C: INDIRECT COST

Patient Indirect cost

C27	How many days within the last month have you (patient) absented yourself from because of your disease)?	
C28	How many hours did you (patient) spend seeking treatment on Your last visit? (travelling in and out and waiting time	

Household member accompanying patient

C29	How many hours did you spend seeking treatment on your last Visit? (travelling in and out and waiting time)	
C30	How many days within the last month have you been absent from work because you have to bring your relative for treatment	
C31	How many hours in a day does a household member spend taking Care of the sick relative?	

SECTION D: INTANGIBLE COST	
Fear	
D32.1	I am bothered by the uncertainty of my sickness [1] Not at all [2]A little [3] Moderately [4] A lot [5] Extremely
D32.2	I think about my health now more than before I was diagnosed. [1] Not at all [2]A little [3] Moderately [4] A lot [5] Extremely
D32.3	Because of my sickness my future is one of my concerns to me. [1] Not at all [2]A little [3] Moderately [4] A lot [5] Extremely
D32.4	I am always worried about my cancer spreading [1] Not at all [2]A little [3] Moderately [4] A lot [5] Extremely
D32.5	Because of my disease I am always afraid of dying [1] Not at all [2]A little [3] Moderately [4] A lot [5] Extremely
Physical Pain	
D33.1	I always feel pain around the affected breast [1] Not at all [2]A little [3] Moderately [4] A lot [5] Extremely
D33.2	I feel pain when I lift the arm on the affected side. [1] Not at all [2]A little [3] Moderately [4] A lot [5] Extremely
D33.3	I feel general body pains and weakness [1] Not at all [2]A little [3] Moderately [4] A lot [5] Extremely
D34.4	
Emotional suffering	
D35.1	I feel I am a burden on to others who have to take Care of me [1] Not at all [2]A little [3] Moderately [4] A lot [5] Extremely
D35.2	I think about my friends knowing about my conditions [1] Not at all [2]A little [3] Moderately [4] A lot [5] Extremely
D35.3	I think about my sickness at night and cannot sleep [1] Not at all [2]A little [3] Moderately [4] A lot [5] Extremely
Family Management	
D35.4	I feel embarrassed to let people know of my condition [1] Not at all [2]A little [3] Moderately [4] A lot [5] Extremely
D35.5	I feel my children ignored just because of my sickness [1] Not at all [2]A little [3] Moderately [4] A lot [5] Extremely
D35.6	I feel my relation with spouse going to be worse [1] Not at all [2]A little [3] Moderately [4] A lot [5] Extremely
D35.7	I think my social circle now going to be limited just because of my condition [1] Not at all [2]A little [3] Moderately [4] A lot [5] Extremely