Thesis On

"Prescription Pattern Analysis of Women with Breast Cancer: A Single Center Experience in Bangladesh"

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The Department of Pharmacy,
Faculty of Allied Health Sciences,
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In the partial fulfillment of the requirements for the degree of Masters of Pharmacy

Submitted By

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APPROVAL

This thesis, on "Prescription pattern analysis of women with breast cancer: A single center experience in Bangladesh "submitted to the Department of Pharmacy, Faculty of Allied Health Sciences, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of Masters of Pharmacy and approved as to its style and contents.

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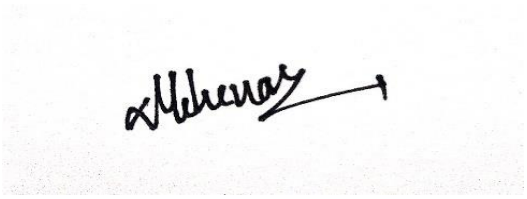
DECLARATION

I hereby attest that I am the single author of this thesis and that no part of it, nor the entire thesis, has been submitted to any other university or institution for a degree.

I certify that the project report titled " Prescription pattern analysis of women with breast cancer: A single center experience in Bangladesh " submitted to Daffodil International University's Department of Pharmacy is an original work completed by me under the supervision of Farjana Islam Aovi (Assistant professor, Department of pharmacy, Daffodil International University).

The facts and information included in the report are accurate to the best of my knowledge.



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I'd always want express my gratitude to Allah, the All-Powerful, for providing me with the ability to complete my project work and the opportunity to focus on this issue.

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I'd like to extend my heartfelt greetings to **Dr. Muniruddin Ahmed**, Professor and Head, Daffodil International University's Department of Pharmacy.

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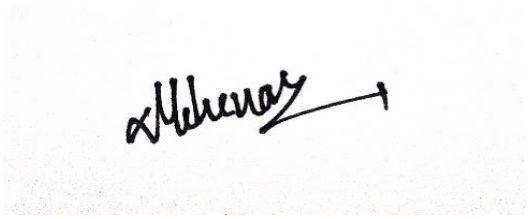
Finally, I'd want to convey my thanks to my parents and other family members for their unwavering support and encouragement in completing this project.



Author

DEDICATION

I dedicate this work to Almighty Allah first, and then to my family, my teachers and friends.

Abstract

There is a dearth of information on the analysis of drug use in breast cancer patients, despite the fact that breast cancer (BC) is an increasing public health concern for both developed and developing countries. This study on the use of anti-cancer medications by BC patients took place at the Labaid Cancer Hospital and Super Specialty Center in Dhaka, Bangladesh. Here, treatment orders, the treatment patterns for BC patients were assessed in a descriptive-observational study. The study enrolled 150 breast cancer patients in total who met the inclusion criteria. The bulk of the patients who were enrolled were female (100%) and in the age range of 36 to 49 (54%). As a risk factor for the onset of BC, the family history was shown to be insignificant. 60 percent of cases of BC were ductal infiltrating, 30 percent were ductal invasive, and 8 percent were metastatic. Estrogen and progesterone positive tumors affected 6% and 4% of these individuals, respectively, while HER2 positive tumors affected 8% of them. Cyclophosphamide (68%) and doxorubicin (60%) were the two most commonly given antineoplastic drugs. About 58% of patients underwent surgery, whereas 42% underwent radiation. Breast ultrasound, breast mammography, magnetic resonance imaging (MRI), immunohistochemistry (IHC), and biopsy are the most often prescribed diagnostic tests. Filgrastim (4%) and other supportive drugs, along with dexamethasone (22%), ondansetron (28%), palonosetron (4%), esomeprazole (44%) and pantoprazole (26%) were also used. According to this study, taxanes, anthracycline derivatives, and alkylating agents were the most common treatments given to BC patients. Additionally, to reduce toxicities brought on by chemotherapy, supportive care medications such as dexamethasone, ondansetron, and pantoprazole were given to the majority of patients in addition to filgrastim. To have a comprehensive understanding of the prescribing patterns of BC patients, further research of the same kind with a larger sample size is necessary.

Keywords: Breast cancer, Chemotherapy, Radiotherapy, Supportive care

Table of contents

List of Table

List of Figure

Chapter 1: Introduction

1. Introduction:

Cancer is a fatal disease where the control over the normal cell division is lost. Apoptosis, or programmed cell death, in healthy tissues, is replaced by uncontrolled development in cancer cell [1]. These malignant cells can spread to any other organ through blood flow or lymphatic flow and develop malignancy there; this phenomenon is known as metastasis [2]. Malignant cells are cells that grow uncontrollably, and the phenomenon that turns a normal cell into a malignant cell is known as "malignancy." Malignant cells may also infiltrate the tissue around them. The most prevalent malignancies worldwide are lung cancer, skin cancer, colorectal cancer, bladder cancer, and breast cancer. In the United States, 1,752,735 new cases of cancer were reported in 2019, while 599,589 people passed away from the disease. 439 new cases of cancer and 146 cancer-related deaths were reported for every 100,000 persons [3]. There are around 1.5 million cancer patients in Bangladesh, and 150,000 of them pass away each year, according to the most recent World Health Organization (WHO) data. Two lakh people are diagnosed with cancer each year, according to the report [4].

There are numerous factors that contribute to the morbidity and mortality of women, and that certain diseases are more prevalent in women than males. One of the top causes of death for women is believed to be breast cancer [5]. According to Women's Health Queensland Wide [6], it is "a development of malignant cells within the breast tissue." More specifically, breast cancer may develop as a result of oestrogen-influenced cells proliferating and encroaching on surrounding tissue, eventually spreading to other parts of the body [7]. In the United States, breast cancer is the second most prevalent cancer among women (some kinds of skin cancer are the most common). There were 264,121 new cases of female breast cancer recorded among women in 2019, the most recent year for which incidence data are available, and 42,280 women lost their lives to the disease. There were 130 newly diagnosed instances of female breast cancer and 19 deaths from this disease for every 100,000 women [8]. According to the WHO Cancer Country Profile 2020, Bangladesh has 150,781 total cancer cases and 108,137 total cancer deaths. Breast cancer accounts for 8.5% of all cancer cases and 6.3% of all cancer deaths [9]. Breast cancer is one of the most important health issues in our society due to its high incidence, complexity, and economic expenditures of treatment. A study showed that, over the past few years, there is a noticeable increase in the death rate of breast cancer [10]. Early diagnosis and more effective therapy are two ways to counter this rising trend in patient mortality. Higher cure rates will be guaranteed by widespread population-based screening programs that catch

the disease at an earlier stage. On the other hand, improved staging techniques, surgery, and radiotherapy will result in higher local control rates while reducing mutilation and the number of unfavorable effects associated with breast cancer treatment. Better systemic treatments will significantly enhance patient outcomes because the disease is seen as systemic from the very beginning. Better systemic treatments will significantly enhance patient outcomes because the disease is seen as systemic from the very beginning. Chemotherapy and targeted methods like hormonal manipulations and anti-Her-2/neu therapies are examples of systemic medicines employed as a support to local treatments in curative settings to date. Hormone therapy has unquestionably the best-established role in the adjuvant setting for the majority of patients and the best toxicity/efficacy profile of all of them. Local treatments, such as surgery and radiotherapy, play a very limited role when cancer becomes incurable, usually as a result of its metastatic spread, whereas systemic treatments have proven to be extremely effective at extending life, improving symptom control, and improving patients' quality of life. In this study, using information from a single center in Dhaka City, we will attempt to assess the relationships between several risk factors and breast cancer as well as prescribing practices in case of breast cancer patients.

Chapter 2: Literature Review

2.1. History of breast cancer

In 1600 BC, an Egyptian papyrus contained the very earliest description of breast cancer [11]. Since the illness was still mysterious at the time, the "battle" was quickly abandoned under the idea that there was no cure [12]. The terms carcinoma (also known as karkinoma), scirrhous (hard, Greek skirros), and cacoethes (malignant disease, Greek kakoethes) all have their roots in Hellenistic literature. Early theories on the origin of cancer include Hippocrates' hypothesis from around 400 B.C. that an imbalance of humerus (blood, phlegm, and yellow and black bile) causes sickness, as well as his well-known descriptions of the development of breast cancer. Galen came to the conclusion that breast cancer was a systemic disease in A.D. 200 and attributed it to the buildup of black bile in the blood [13]. These ancient doctors believed that the cessation of menstruation had some connection to cancer; in reality, it most likely had to do with the connection between cancer and advanced age. According to this hypothesis, Galen disapproved of the use of ligatures and encouraged free bleeding from surgical wounds to eliminate the black bile. He created the term "crab" for cancer to symbolize the dilated veins emanating from the tumor [14]. Since then, there have been several breast cancer discoveries and case reports, as well as an increase in our knowledge of the illness as a result of technological breakthroughs [11]. We now have a greater grasp of the risk factors for the disease, as well as more knowledge about the biological basis of the condition and the efficacy of available treatments.

2.2. Pathogenesis:

Breast cancers typically begin as ductal hyperproliferation and progress to noncancerous tumor or even metastatic carcinomas when they are repeatedly stimulated by numerous carcinogenic stimuli. The development and spread of breast cancer are significantly influenced by the tumor microenvironment, which includes stromal effects and macrophages. Rats' mammary glands might develop tumors when just the stroma, not the extracellular matrix or the epithelium, was exposed to carcinogens [15,16]. Macrophages have the ability to provide a mutagenic inflammatory milieu that can encourage angiogenesis and allow cancer cells to avoid immune rejection. The microenvironments associated with normal and tumors cells exhibit different DNA methylation patterns, indicating that changes to the epigenome in the tumor microenvironment can encourage the development of cancer. The cancer stem cell theory and the stochastic theory [17] are two speculative ideas for the origin and spread of breast cancer. According to the notion about cancer stem cells, all types of tumors are

descended from the same stem cells or transit-amplifying cells (progenitor cells). Different tumor characteristics will result from acquired genetic and epigenetic alterations in stem cells or progenitor cells. According to the stochastic theory, each tumor subtype originates from a particular type of cell (stem cell, progenitor cell, or differentiated cell). Any breast cell can gradually get random mutations that, when enough mutations have accumulated, will cause the cell to become a tumor cell. Both ideas have substantial facts backing them up, but neither can entirely account for the cause of human breast cancer. There are many genes that have been linked to breast cancer. Oncogene and anti-oncogene mutations and abnormal amplification play important roles in the development and spread of tumors. Breast cancer associated genes 1 and 2 (BRCA1 and BRCA2), Human epidermal growth factor receptor 2 (HER2), Epidermal Growth Factor Receptor (EGFR) also known as c-erbB-1 or Her1 in humans, c-Myc, Ras, etc. are some of the common genes associated with breast cancer [17].

2.3. Aetiology and risk factors of breast cancer:

2.3.1. **Hormones:** The significance of hormones and their connection to breast cancer have drawn criticism and discussion. Studies have linked estrogen exposure to breast cancer. In laboratory studies, estrogen exposure causes tumors to grow more quickly, and epidemiological research has demonstrated that long-term estrogen exposure increases the risk of breast cancer in women [18]. Minor risk factors include early menstruation at a young age, infertility, postpartum delivery, and delayed menopause. Because menstruation continues, it is believed that all of these variables lengthen the time that a woman is in contact with estrogen. This idea contends that each menstrual cycle provides breast cells with a fresh opportunity to mutation, increasing the likelihood of developing breast cancer. On the other hand, both premenopausal and postmenopausal women have a higher risk of breast cancer when endogenous sex hormone levels are high. In postmenopausal women, high levels of circulating testosterone have been associated with a higher risk of breast cancer [19].

2.3.2. **Age:** Age raises the likelihood of getting breast cancer. According to the Surveillance, Epidemiology and End Results (SEER) database, the likelihood of a woman in the United States acquiring breast cancer is 1 in 8 over her lifetime; this risk is 1 in 202 from birth to age 39, 1 in 26 from age 40 to age 59, and 1 in 28 from age 60 to age 69 [20].

2.3.3. **Family history:** If there is a family history of breast cancer, a woman is more likely to develop the disease. Women with a mother diagnosed with breast cancer before the age

of 50 had an adjusted relative risk of 1.69, whereas those with a mother diagnosed at or after the age of 50 had a related risk of 1.37, according to the Nurses' Health Study follow-up. In addition, patients with a history of a sister who had breast cancer had a higher relative risk of 1.66 if the diagnosis was made before age 50 and a related risk of 1.52 if the diagnosis was made after age 50[21] compared to patients without a family history.

2.3.4. **Breast Feeding:** According to available data, breastfeeding may help prevent the occurrence of breast cancer. In addition to lowering endogenous sex hormone levels, breastfeeding may postpone the return of regular ovulatory cycles. For each year that a child is breastfed, the reduction is reportedly 4.3% [22].

2.3.5. **Reproductive factors:** The risk of breast cancer can be increased by reproductive characteristics such early menarche, delayed menopause, late age at first pregnancy, and low parity. Breast cancer risk is increased by 3% for every year that menopause is postponed. The risk of breast cancer is reduced by 5% or 10%, respectively, with every 1-year delay in menarche or for every extra birth [17].

2.3.6. **Alcohol consumption:** At levels as low as 5.0 to 9.9 g per day, or 3 to 6 drinks per week, alcohol use has been linked to an elevated risk of breast cancer that is statistically significant (RR=1.15; 95%CI: 1.06-1.24; 333 cases/100000 person-years). After adjusting for cumulative alcohol use, heavy drinking was linked to a higher risk of breast cancer but not frequency of drinking. Early and late alcohol use in adulthood were independently linked to risk [23].

2.3.7. **Smoking:** Smoke-related mutagens have been found in non-lactating women's breast fluid, despite the fact that the link between smoking and breast cancer risk is still debatable. Additionally, women who smoke and drink have a higher risk of developing breast cancer. (RR=1.54) [24].

2.3.8. **Physical activity:** It has been demonstrated that regular physical activity lowers the risk of breast cancer in a dose-dependent way, with modest activity providing a 2% reduction in risk and intense activity conferring a 5% reduction in risk [25].

2.4. Epidemiology:

The WHO estimates that 107.8 million Disability-Adjusted Life Years (DALYs), of which 19.6 million DALYs are attributable to breast cancer, are caused by malignant neoplasms, which are the leading cause of disability for women globally [26]. In 2020, there was 2.26 million new cases of breast cancer, making it the most common cancer

among women worldwide [27]. Breast cancer will likely represent 29% of all new cancer cases in women in the United States [28]. Breast cancer is not only the most prevalent form, but it also kills more women from cancer than any other cancer globally. 684,996 people died from breast cancer worldwide [26]. Although developed regions had the greatest incidence rates, Asia and Africa together accounted for 63% of all deaths in 2020 [26]. In high-income nations, the majority of breast cancer patients survive; however, this is not the case for many women in low- and middle-income nations [29]. As a representative measure of 5-year survival rates, the mortality-to-incidence ratio (MIR) for breast cancer in 2020 was 0.30 globally [26].In countries with developed healthcare systems (Hong Kong, Singapore, Turkey), the 5-year survival rate is high compared to the less developed nations (Costa Rica, India, Philippines, Saudi Arabia, Thailand) [30].Over the past three decades, both the incidence and mortality rates of breast cancer have grown. Breast cancer incidence increased by more than doubling between 1990 and 2016 in 60 of 102 countries (including Afghanistan, the Philippines, Brazil, and Argentina), whereas fatalities increased by twofold in 43 of 102 countries (including Yemen, Paraguay, Libya, and Saudi Arabia) [30]. According to current estimates, there will be 2.7 million new cases diagnosed annually over the world by 2030, while there will be 0.87 million fatalities [30].

2.5. Types of breast cancer:

2.5.1. Histological types: Adenocarcinomas are by definition malignant tumors that originate from mammary epithelial cells. Pathologists have identified specific cytological and architectural features in breast adenocarcinomas that are typically associated with particular clinical manifestations and/or prognosis. These traits, which are referred to as "histological special types" 22, are present in up to 25% of all breast cancers. There are at least 17 different histological special types recognized in the most recent version of the WHO classification of breast cancers [31]. Invasive ductal carcinomas, not otherwise specified, are thought to account for 50–80% of breast cancer cases. The numerous breast cancer histological subtypes are listed in Table 1 [32].

2.5.2. Molecular subtypes: In the last ten years, the study of breast cancer has made substantial use of high-throughput, microarray-based gene-expression approaches to find signatures linked to prognosis and therapeutic response as well as molecular factors underlying histological grade or metastatic propensity. Additionally, based on a gene-expression profiling analysis of 38 primary invasive breast tumors, a molecular

categorization of breast cancer with four molecular subtypes was created (see table 01) [32].

Table 01: Histological and molecular subtypes of breast cancer [32]

Histological type	Molecular subtype
Invasive ductal carcinomas (no special type)	Basal-like
Carcinoma with osteoclast-like giant cells	HER2
Invasive lobular carcinomas	Normal breast-like
Pure tubular carcinoma	Luminal
Invasive cribriform carcinoma	Luminal A
Medullary carcinomas	Luminal B
Mucinous carcinoma	
Neuroendocrine tumors	
Invasive papillary carcinoma	
Invasive micropapillary carcinoma	
Apocrine carcinoma	
Metaplastic carcinoma	
Lipid-rich carcinoma	
Secretory carcinoma	
Oncolytic carcinoma	
Adenoid cystic carcinoma	
Acinic-cell carcinoma	
Glycogen-rich clear-cell carcinoma	
Sebaceous carcinoma	
Mixed types	
NST and invasive lobular carcinoma	
NST and special type	
Invasive lobular mixed	
Tubular carcinoma mixed	
Miscellaneous (metaplastic and adenoid cystic carcinoma)	

2.6. Diagnosis of breast cancer:

2.6.1. **Mammography:** Breast cancer detection still relies heavily on mammography [33]. Women who have breast illness symptoms such as a palpable tumor, a history of breast cancer within the past five years, or who have had an abnormal screening mammography may undergo diagnostic mammograms. Special views, including images with magnification or focal compression of a single area of the breast tissue, are part of diagnostic mammography. The breast imaging reporting and database system (BI-RADS) is the accepted procedure for reporting mammographic findings [34].

2.6.2. **MRI:** For some people, breast Magnetic Resonance Imaging (MRI) has emerged as a key element in the detection and management of breast cancer. Some current indications for breast MRI include reviewing individuals whose mammographic examination is limited by augmentation, figuring out the degree of disease at the time of initial breast cancer diagnosis, analyzing inconclusive findings on clinical examination, mammography, etc. Other applications for breast MRI include determining the presence of residual illness in patients with positive margins following lumpectomy and assessing the effectiveness of neoadjuvant chemotherapy with imaging before, during, and/or after treatment.

2.6.3. **Ultrasound:** By reflecting sound waves off the breast tissue, breast ultrasonography is a widely used and inexpensive screening technique that finds cancers. The most common method for figuring out the structure of a human breast is to use an ultrasonic transducer to monitor the acoustic waves reflected from the breast. Although breast ultrasonography improves cancer detection rates for those at high risk for the disease, it is generally less successful than mammography in detecting cysts and solid masses. Breast ultrasonography has been recommended in addition to mammography for those who have a high risk of getting breast cancer, pregnant women, and people who cannot receive mammography [35].

2.6.4. **Estrogen and progesterone receptor status:** For patients with breast cancer, the progesterone receptor (PR) and the estrogen receptor (ER) are the weakest prognostic variables, but they are the best predictors of response to endocrine therapy. On all invasive breast tumors, ER and PR assays ought to be run [36]. Immunohistochemistry (IHC) on paraffin sections is used to evaluate ER and PR.

2.6.5. **Biomarkers:** Table 3 lists a variety of markers that are used to find breast cancer [37]. Because there are so few cancer markers in DNA biomarkers, they are associated with poor early diagnosis but nevertheless offer significant information on the process of

tumor progression. Protein biomarkers, which can be categorized as prognostic and predictive indicators, are the main indicator of breast cancer. Prognostic protein markers offer the participants' overall information, whereas predictive protein markers offer information on a specific therapeutic intervention [37].

Table 2. Breast cancer biomarkers.

Biomarker	Technology Used for Discovery	Type
RS/DJ-1	Serum profiling	Serum protein
CA15-3		
CA27-29		
HER-2		
p53	Humoral response	Autoantibody
HSP60		
HSP90		
MUC1		
α-2-HS-Glycoprotein	Nipple aspirate fluid profiling	Ductal protein
Lipophilic B		
β-Globin		
Hemopexin		
Vitamin D-binding protein		

2.7. Treatment of breast cancer:

2.7.1. **Surgery:** The removal of breast malignant tissues can be accomplished through breast-conserving surgery (BCS) and mastectomy, which are the two main surgical techniques. BCS, also known as partial or segmental mastectomy, lumpectomy, wide local excision, or quadrantectomy, allows for the simultaneous removal of malignant tissue and preservation of healthy breast tissue. Oncoplastic techniques are frequently used in conjunction with BCS. A mastectomy, which involves completely removing both breasts, is frequently followed by quick breast reconstruction. Both axillary lymph node dissection and sentinel lymph node biopsy (SLNB) are used to remove the afflicted lymph nodes (ALND). Despite the fact that BCS appears to be much more

advantageous for patients, those who have undergone this procedure frequently display a propensity for a subsequent requirement for a total mastectomy [37].

2.7.2. **Chemotherapy:** Chemotherapy, which can be either neoadjuvant or adjuvant, is a systemic treatment for BC. The best option is chosen specifically for each patient based on the features of the breast tumor; chemotherapy may also be employed in cases of secondary breast cancer. Inflammatory breast cancers with locally progressed BC are treated with neoadjuvant chemotherapy. Carboplatin, cyclophosphamide, 5-fluorouracil/capecitabine, taxanes (paclitaxel, docetaxel), and anthracyclines (doxorubicin, epirubicin) are being used in combination with schemes 2-3 as part of treatment. The selection of the right medication is crucial. Even though chemotherapy is thought to be beneficial, it frequently causes a number of adverse effects, such as hair loss, nausea/vomiting, diarrhea, mouth sores, exhaustion, and an increased risk of infection. It can also suppress bone marrow, which can result in leucopenia and anemia [30].

2.7.3. **Radiotherapy:** After surgery and/or chemotherapy, radiotherapy is frequently used to treat BC locally. It is done to make sure that every last one of the malignant cells is eliminated, reducing the likelihood of a breast cancer recurrence. Additionally, radiation therapy is beneficial in cases of metastatic or incurable breast cancer [38]. The most popular radiation therapy procedures include breast radiotherapy (always used after BC), chest-wall radiotherapy (usually used after mastectomy), and "breast boost." The choice of radiation therapy depends on the type of prior surgery or the unique clinical circumstances [30].

2.7.4. **Hormonal Therapy:** Patients with the Luminal-molecular subtype of breast cancer may get hormonal therapy as either neoadjuvant or adjuvant treatment; it is successful in cases of metastasis or recurrence of the disease. Because ER expression is a typical occurrence in breast cancer patients, hormone therapy is frequently used as one of the prospective treatment methods. The goal of endocrine therapy is to reduce estrogen levels or stop estrogen from stimulating breast cancer cells [30].

2.7.5. **Biological Therapy:** Before surgery as neoadjuvant therapy or after surgery as adjuvant therapy, biological therapy (targeted therapy) can be administered at any stage of breast cancer therapy. Patients with HER2-positive breast cancer frequently get biological therapy; popular medications include trastuzumab, pertuzumab, trastuzumab deruxtecan, lapatinib, and neratinib [30].

Chapter 3: Objectives of the study

3. **Objectives**: The primary objectives of this study are:
    - To determine the association of breast cancer with different demographic factors like Age, Gender, Marital status, Areas of Residence, etc.
    - To assess the relationship of breast cancer with Family history, Breastfeeding history, Menstrual status, Hormonal receptor status (ER, PR, HER2), and involvement of the breast.
    - Identify the diagnostic tools that are commonly prescribed in the case of the breast cancer patient.
    - To identify the types of breast cancer that are commonly affecting the patients.
    - To assess the prescribing pattern of different anticancer therapies that are commonly prescribed along with supportive therapies in the case of breast cancer patients.

Chapter 4: Materials and Methods

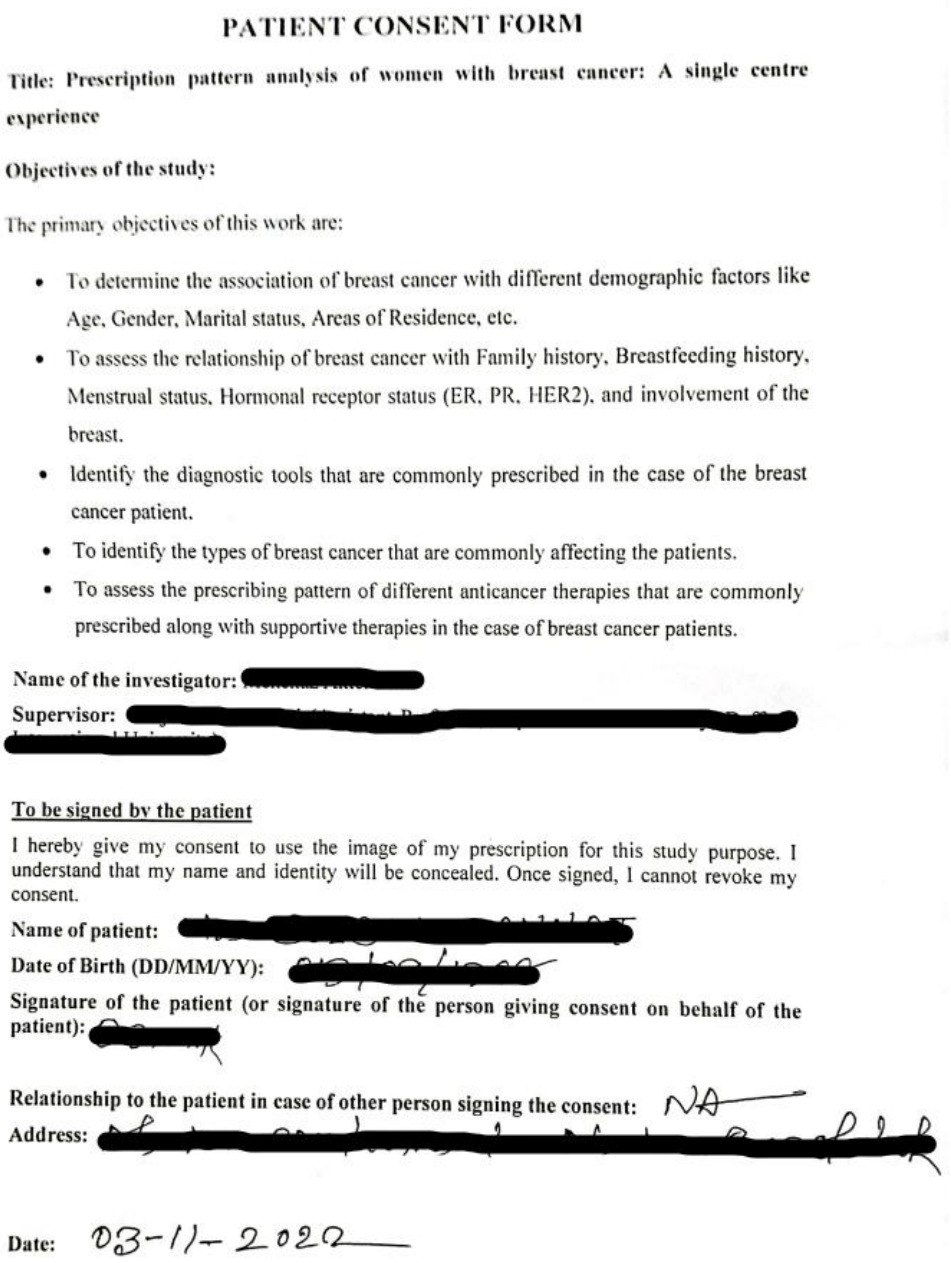
4.1. Study design and study site:

It was a descriptive observational study conducted at Labaid Cancer Hospital and Super Speciality Center, Dhaka, Bangladesh. This is an oncology specialty hospital that gets patients from all over Bangladesh.

4.2. Sampling and data collection: Out of the 168 prescriptions between the time January, 2022 to October, 2022, 150 were chosen. The remaining 18 prescriptions weren't included in the study since there wasn't enough information or the information wasn't what was wanted. Additionally, we didn't include any prescriptions that were written by doctors who didn't specialize in breast cancer. All newly diagnosed breast cancer patients who were older than 18 and had the disease were included in the study.

4.3. Study procedure: For patients who volunteered for the study and met the prerequisites, an appropriate informed consent form was created to get their consent. Following a voluntary agreement, the patient was informed about the study and their consent was gained. The study was discussed with the patients, who were illiterate, and the caretaker's consent was acquired. The hospital's outpatient clinics were where the data was collected. Each prescription contained the following information: name, age, gender, family history, height, weight, body surface area, address, clinical data (diagnosis, past medication history, co-morbidities, allergy status, tumor size, disease stage), and therapeutic data (drug name, dose, frequency, route, and duration of administration, concurrent medication(s), laboratory tests, and results). The demographic characteristics of breast cancer patients, the characteristics of the tumors, the most often prescribed diagnoses, the prescribed treatments, and the recommended supportive treatments were assessed using the prescription data.

4.4. Statistical analysis: Microsoft Excel and the Statistical Package for the Social Sciences (SPSS) were used to evaluate the demographic and clinical data acquired, utilizing descriptive statistics such as frequencies and percentages.



PATIENT CONSENT FORM

Title: Prescription pattern analysis of women with breast cancer: A single centre experience

Objectives of the study:

The primary objectives of this work are:

- To determine the association of breast cancer with different demographic factors like Age, Gender, Marital status, Areas of Residence, etc.
- To assess the relationship of breast cancer with Family history, Breastfeeding history, Menstrual status, Hormonal receptor status (ER, PR, HER2), and involvement of the breast.
- Identify the diagnostic tools that are commonly prescribed in the case of the breast cancer patient.
- To identify the types of breast cancer that are commonly affecting the patients.
- To assess the prescribing pattern of different anticancer therapies that are commonly prescribed along with supportive therapies in the case of breast cancer patients.

Name of the investigator: [redacted]

Supervisor: [redacted]

To be signed by the patient

I hereby give my consent to use the image of my prescription for this study purpose. I understand that my name and identity will be concealed. Once signed, I cannot revoke my consent.

Name of patient: [redacted]

Date of Birth (DD/MM/YY): [redacted]

Signature of the patient (or signature of the person giving consent on behalf of the patient): [redacted]

Relationship to the patient in case of other person signing the consent: NA

Address: [redacted]

Date: 03-11-2020

Figure 1: Patient signed consent form

CONSULTATION SUMMARY

UHID	: 10017583	Patient Name	[redacted]
Age/Sex	: Female/33 Yr 2 Mth 22 Days	Doctor name	[redacted]
Visit No	: Revisit	Visit Date	: 10/10/2022 11:15AM
Telephone	: [redacted]	Referred by	:
Address	: DHAKA CANTONMENT DHAKA DHAKA BANGLADESH		

CHIEF COMPLAINTS

Came for follow up with investigation reports (The patient is absent)

HISTORY

F/H : -Ve

Married for : 8 years

Num Of child : 01

ALC : 6 years 3 months.

M/H : Regular

H/O Lt breast lump 1.5 years back .

FNAC Lt breast : Suggestive of ductal carcinoma on 18.3.2021.

USG Lt breast : Malignant lesion (18.5 x 12.9 mm) at 12 o clock position in Lt breast with Lt axillary metastatic lymphadenopathy on 23.3.21.

***HPR (Tissue from Lt breast) : Invasive ductal carcinoma ,NOS, Gr-II on 28.3.21.

***IHC : ER : +Ve (7) , PR : +Ve (6) , HER-2 : -Ve on 31.3.21.

**S/H : Wide local excision of Lt breast mass & Lt axillary clearance was done on 20.4.21.

**HPR (Lt breast mass, Lt axillary tissue , Rt breast nodule) : Infiltrating ductal carcinoma (NST), Moderately differentiated ,Gr-II , pT2No(0/10) Mx , LVI : Detected, Mitotic figures : 2-5. ***HPF, , Desmoplasia : Moderate degree on 22.4.21.

H/O Chemotherapy : Received 4 Cycles Chemotherapy with Inj Endoxan + Inj Doxorubicin ,last cycle was on 27.7.21 at Shanti Oncology clinic.

H/O Radiotherapy : Site : Lt breast ,Lt SCF , T.D : 4320 cGy x 16 Fr from 17.8.21 to 6.9.21 at Delta hospital.

Site : Lt chest wall, T.D : 1000 cGy (electron boost) from 7.9.21 to 13.9.21.

Now on Tab Tamona (Since Aug 2021) .

Figure 2: Patient prescription

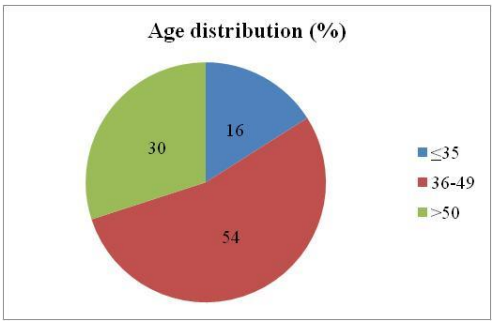
Chapter 5: Results

5. Results: For the study, 150 individuals with breast cancer (BC) who were being treated with anti-cancer medications were enrolled. Among them most of the patients (60%) were reported from Dhaka city. The age group 36-49 years was reported to have the highest prevalence of BC (n = 81, 54%), followed by >50 years (n = 45, 30%), and ≤35 years (n = 24, 16.0%). Only 51 (34%) of the 150 patients (n = 150,100%) followed throughout the trial were female and had a positive family history of BC. The majority of the patients (n=144, 96%) were married; and remaining were unmarried (n=3, 2%) and widow (n=3, 2%). When the patients' menstrual histories were examined, 76% (n=114) of the patients reported having regular menstruation while 24% (n=36) had irregular menstruation. Menopausal status was found to be relatively evenly distributed among the patients, with 87 and 63 of the 150 patients being in pre- and post-menopausal stages, respectively. Out of 150 patients, 147 (98%) have a history of breastfeeding. A total of 58 percent of the patients had the disease in their left breast, 42 percent in their right breast, and none had it in both breasts. According to the kind of breast cancer, 12 patients had metastatic illness, 48 patients had invasive carcinoma, and 90 patients had infiltrating carcinoma. The majority of the patients underwent testing to determine who had endocrine responsive malignancies. 150 patients were tested, and 9 had positive results for the estrogen receptor and 6 had positive results for the progesterone receptor. However, 63 patients had both positive results for the estrogen and progesterone receptors. 18 of the 150 patients who had HER2 testing also tested positive, whereas 39 showed triple negative results (**Table 3; Figure 3 (A)(B)(C)**).

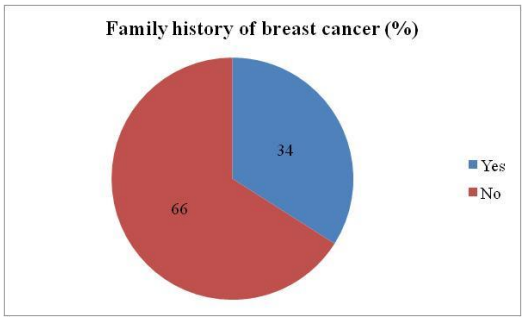
Table 3: Demographics, tumor characteristics and related information of breast cancer patients.

Demographic details	**Number of patients (n = 150) (%)**	**Demographic details**	**Number of patients (n = 150) (%)**
Gender		**Hormone receptor status**	
Male	0(0)	Estrogen positive	9(6)
Female	150(100)	Progesterone positive	6(4)
Age Groups		HER2 positive	18(12)
≤35	24(16)	Estrogen and progesterone positive	63(42)
36-49	81(54)	Estrogen and HER2 positive	12(8)
>50	45(30)	Triple positive	3(2)
Residence		Triple negative	39(26)
Dhaka	90(60)	**Ki67 Index**	
Outside Dhaka	60(40)	Positive	78(52)
Family History		Negative	54(36)

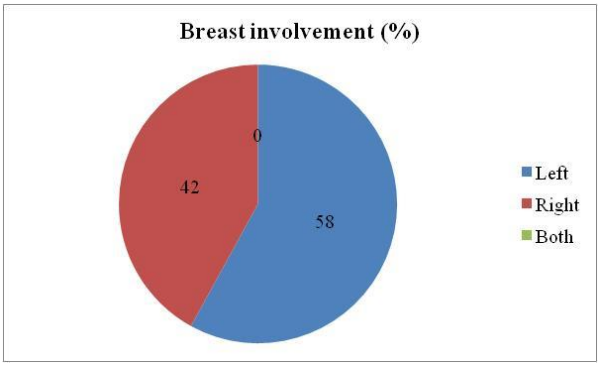
Yes	51(34)	Not detected	18(12)
No	99(66)	**Tumor characteristics**	
Marital Status		**Involvement of breast**	
Married	144(96)	Left	87(58)
Unmarried	3(2)	Right	63(42)
Separated	0(0)	Both	0(0)
Widow	3(2)	**Infiltrating**	
Menstrual abnormalities		Ductal	90(60)
Regular	114(76)	Lobular	0(0)
Irregular	36(24)	**Invasive**	
Menopause status		Ductal	45(30)
Pre-menopause	87(58)	Lobular	3(2)
Post-menopause	63(42)	Metastatic	12(8)
Breast Feeding History			
Yes	147(98)		
No	3(2)		



(A)



(B)



(C)

Figure 3: Demographic characteristics of breast cancer patients (A) Age distribution (B) Family history of breast cancer (c) Breast involvement

Breast ultrasound (n = 150, 100%), breast mammography (n = 135, 90%), magnetic resonance imaging (n = 150, 100%), immunohistochemistry (n = 150, 100%), and biopsy (n = 150, 100%) were the most frequently prescribed diagnostic tests in most of the cases case (**Table 4; Figure 4**).

Table 4: Commonly prescribed diagnostic tests.

Common diagnostic test	Total Number of patients (n=150) (%)
Breast ultrasound	150 (100)
Mammography of breast	135 (90)
Magnetic resonance imaging (MRI)	150 (100)
Immunohistochemistry (IHC)	150 (100)
Biopsy	150 (100)

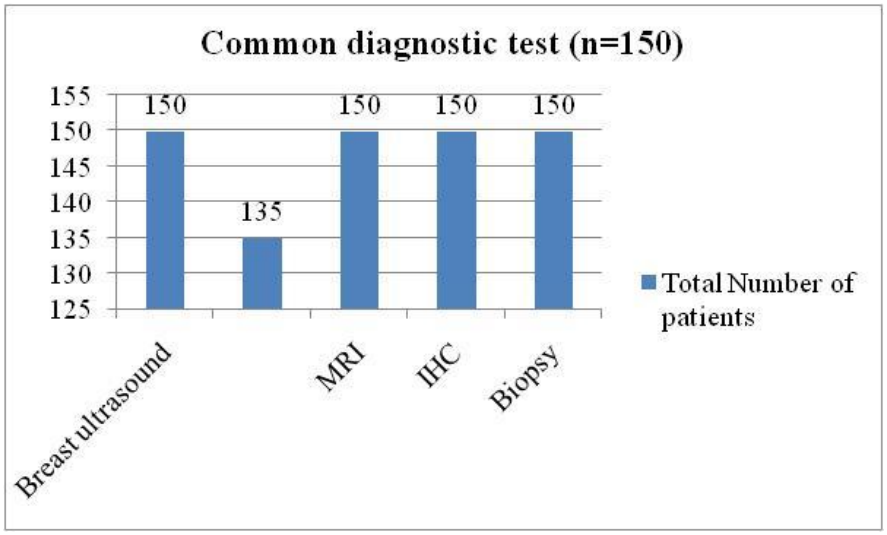


Figure 4: Commonly prescribed diagnostic tests in case of breast cancer patients

A total of 6 potential chemotherapeutic agents were used in 150 enrolled patients. Cyclophosphamide (68.0%), doxorubicin (60%) and paclitaxel (22%), and zoledronic (4.0%) were all utilized anticancer drugs, with cyclophosphamide being the most frequently administered. Table 3 lists the prescription trends for several supportive and anti-neoplastic medications. Granulocyte-colony stimulating factors (GCSF), multivitamins, minerals, anti-emetics, antiulcerants, and antidepressants are examples of supportive care medications. Nearly 87 (58%) of the breast cancer patients underwent surgery, while 63 of the 150 patients underwent radiotherapy. The most common forms of targeted therapy and endocrine therapy, respectively, were transtuzumab (6%) and tamoxifen (6%) (**Table 5**).

Table 5: Prescription pattern of anticancer and supportive care agents

Therapeutic classes of medication	Name of medicine	Number of patients prescribed (n=150)	Percentage (%)
Anti-neoplastic agents			
Alkylating agents	Cyclophosphamide	102	**68**
	Carboplatin	15	**10**
Taxanes	Paclitaxel	33	**22**
	Docetaxel	30	**20**
Anthracycline derivatives	Doxorubicin	90	**60**
Bisphosphonates.	Zoledronic	6	**4**
Endocrine therapy	Tamoxifen	9	**6**
Targeted therapy	Trastuzumab	9	**6**
Surgery		87	**58**
Radiotherapy		63	**42**
Supportive care agents			
Anti-ulcerant	Omeprazole	18	**12**
	Esomeprazole	66	**44**
	Rabeprazole	27	**18**
	Pantoprazole	39	**26**
Antiemetic	Palonosetron	6	**4**
	Ondansetron	42	**28**
	Dexamethasone	33	**22**
	Aprepitant	12	**8**
	Granisetron	30	**20**
Antidepressant	Diazepam	33	**22**
	Clonazepam	75	**50**
Laxative	Lactulose	45	**30**
	Sodium picosulfate	9	**6**
Progestine	Megestrol acetate	102	**68**
Multivitamine and minerals		150	**100**
Granulocyte-colony stimulating factors (GCSFs)	Filgrastim	6	**4**

Chapter 6: Discussion

6. Discussion:

Cancer cells develop as a result of aberrant proliferation in normal cells brought on by DNA mutation. Breast cancer is the most prevalent type of cancer that affects women the most [39]. The current study set out to evaluate the common types of breast carcinoma, the relationship between the risk factors for patients' BC development, including age, gender, family history, menstrual irregularity, and marital status. Two studies conducted on Indian women [40,41] found that the incidence of breast cancer has increased among women in the age range of 45 to 54 years, which is ten years sooner than in Western women. The majority of the study participants, we also observed in our study, were between the ages of 36 and 49. Only 5% of Indian patients had a low rate of a familial pattern of BC, according to cohort research by Brewer HR., et al. [42]; however, in our analysis, 51 (34%) patients had a positive family history of BC. The prognosis of this condition is heavily influenced by progesterone and estrogen. The development of this illness is influenced by disturbances in the body's hormone balance. In the majority of breast cancer cells, hormone receptors are abundantly expressed. In a small portion of cancer cells, HER2 receptors are also present. These receptors' characteristics determine the efficacy of hormone-targeted therapy. The term "triple negative tumor" is only applied to a small subset of breast tumors since these cancers lack receptor expression. The lack of a hormone-targeted therapy that can successfully treat triple negative tumors has a severe impact on the disease's prognosis [43]. According to Sandhu GS., et almeta-analysis, the prevalence of triple-negative BC was considerably greater in Indian women than in Western women [44]. Similar conclusions were drawn from our study, where we discovered that a significant percentage of patients (almost 26% of them) had triple-negative hormonal status. The prognosis of this illness is impacted by menopausal state. Studies show that postponing menopause increases the risk of breast cancer. Younger breast tumors also exhibit aggressive clinicopathologic characteristics. High sex hormone blood concentrations in postmenopausal women have been linked to an increased risk of breast cancer, according to studies [45]. In our study, 42% (63) of the patients were postmenopausal, while 58% (87) of the patients were premenopausal. A similar study on patients with breast cancer was also carried out in South India. A nationwide study found that 48% of the patients were premenopausal and 52% of the patients were menopausal [46]. Similar research was also done in Lahore, where it was found that 42.7% of women were premenopausal and 57.3% of women were postmenopausal [47]. Hormone status is a key tool for BC distinction and a crucial predictor of how well patients will respond to hormone therapy and survive in general [48]. Infiltrating ductal carcinoma

(IDC), which made up 60% of the study group, was the most prevalent kind of breast cancer observed in the current analysis. This was confirmed by several studies that indicated IDC accounted for 80% of all breast cancer cases and was the most common type of breast cancer [49].It is assumed that poor patient care may affect the course of the illness. The chemotherapeutic medications utilized in this study were listed. The most common drug used in the present study was cyclophosphamide (68%), followed by doxorubicin (60%), paclitaxel (22%), docetaxel (20%), carboplatin (10%), tamoxifen (6%), trastuzumab (6%), and zoledronic (4%). According to a study conducted in Nigeria's Tertiary Hospital, 38% of breast cancer patients received the treatment regimen of cyclophosphamide, methotrexate, and 5 fluorouracil [50], whereas a study conducted in Chandigarh, India, found that 41.58% of patients received the treatment regimen of fluorouracil+doxorubicin+cyclophosphamide, while 22.77% of patients received paclitaxel [51].In the study by Rajalakshmi et al., supportive care medications such dexamethasone (100%), palonosetron (100%), pantoprazole (25.4%), and ranitidine (18.4%) were frequently recommended to treat chemotherapy-related side effects [52]. In our study, we found that the following medications were frequently used: dexamethasone (22%), ondansetron (28%), palonosetron (4%), esomeprazole (44%) and pantoprazole (26%) along with filgrastim (4%) and other supportive medications like antidepressants and multivitamins to treat the side effects of chemotherapy.

The study has some limitations, including the fact that we did not evaluate the efficacy of prescription using WHO indicators and that we were unable to determine the precise sample size due to the lack of accurate BC prevalence data for Bangladesh.

Chapter 7: Conclusion

7. Conclusion:

The risk of breast cancer is alarming, particularly in developing countries like Bangladesh. The objective of the current study was to evaluate the pattern of breast carcinoma and the course of treatment offered to patients with breast cancer in a tertiary care hospital in Dhaka, Bangladesh. The study found that BC was much more common in patients who were older than 36 to 49 years old. Due to the lack of a family history in each enrolled patient, family history did not play a significant role in the development of BC. In comparison to ductal invasive and metastatic breast cancer, ductal infiltrating carcinoma of the breast was more common. Although the study found that triple-negative BC is very common, the main risk factors for BC development are estrogen, progesterone, and HER2 gene expression. Antineoplastic medications like doxorubicin, paclitaxel, docetaxel, and cyclophosphamide were widely used. Further research of this type including more sample size is necessary to assess the epidemiological profile of the condition, its risk factors, and the care given to these cancer patients. Increasing public awareness of breast cancer screening and treatment options may aid in reducing the disease's death rate.

Chapter 8: References

8. References:

1. Elmore, S. (2007). Apoptosis: a review of programmed cell death. Toxicologic pathology, 35(4), 495-516.

2. Seyfried, T. N., & Huysentruyt, L. C. (2013). On the origin of cancer metastasis. Critical Reviews™ in Oncogenesis, 18(1-2).

3. Centers for Disease Control and Prevention (CDC). Cancer Data and Statistics [Internet]. (2022, Oct 16). Available from: https://www.cdc.gov/cancer/dcpc/data/index.htm.

4. *State of cancer care in Bangladesh.* (2022, February 4). The Daily Star. https://www.thedailystar.net/supplements/world-cancer-day-2022/news/state-cancer-care-bangladesh-2953926

5. Baum, F. (2003). The new public health (No. Ed. 2). Oxford University Press.

6. Johnson, N. E. (2006). Young Women's Perceptions of Breast Cancer (Doctoral dissertation, La Trobe University).

7. John Wiley & Sons; 2002 Oct 1. Boaz NT. Evolving health: the origins of illness and how the modern world is making us sick.

8. Miller, J. W., King, J. B., Joseph, D. A., & Richardson, L. C. (2012). Centers for Disease Control and Prevention (CDC) Breast cancer screening among adult women—Behavioral risk factor surveillance system, United States, 2010. *MMWR Morb Mortal Wkly Rep*, *61*(suppl), 46-50.

9. World Health Organization (WHO). Cancer Bangladesh 2020 Country profile [Internet]. (2022, Oct 16). Available from: https://www.who.int/publications/m/item/cancer-bgd-2020.

10. Azamjah, N., Soltan-Zadeh, Y., &Zayeri, F. (2019). Global trend of breast cancer mortality rate: a 25-year study. *Asian Pacific journal of cancer prevention: APJCP*, *20*(7), 2015.

11. Silva, O. E., Zurrida, S., & Veronesi, U. (1999). Breast cancer: a guide for fellows. *Critical reviews in oncology/hematology*, *29*(1-2).

12. Olson JS. Dark ages. Bathsheba's breast: women, cancer & history. Johns Hopkins University Press, Baltimore & London. 2002:9-28.

13. De Moulin, D. (2012). *A short history of breast cancer*. Springer Science & Business Media.

14. EF, L. (1953). The surgical treatment of breast cancer: an historical and collective review. *Surgery*, *34*(5), 904-953.

15. Maffini, M. V., Soto, A. M., Calabro, J. M., Ucci, A. A., &Sonnenschein, C. (2004). The stroma as a crucial target in rat mammary gland carcinogenesis. *Journal of cell science*, *117*(8), 1495-1502.

16. Sonnenschein, C., & Soto, A. M. (2016). Carcinogenesis explained within the context of a theory of organisms. *Progress in biophysics and molecular biology*, *122*(1), 70-76.

17. Sun, Y. S., Zhao, Z., Yang, Z. N., Xu, F., Lu, H. J., Zhu, Z. Y., ... & Zhu, H. P. (2017). Risk factors and preventions of breast cancer. *International journal of biological sciences*, *13*(11), 1387..

18. Maya, F., Cabello, C. P., Frizzarin, R. M., Estela, J. M., Palomino, G. T., & Cerda, V. (2017). Magnetic solid-phase extraction using metal-organic frameworks (MOFs) and their derived carbons. *TrAC Trends in Analytical Chemistry*, *90*, 142-152.

19. Sieri, S., Krogh, V., Bolelli, G., Abagnato, C. A., Grioni, S., Pala, V., ... & Muti, P. (2009). Sex hormone levels, breast cancer risk, and cancer receptor status in postmenopausal women: the ORDET cohort. *Cancer Epidemiology Biomarkers & Prevention*, *18*(1), 169-176.

20. DeSantis, C., Ma, J., Bryan, L., & Jemal, A. (2014). Breast cancer statistics, 2013. *CA: a cancer journal for clinicians*, *64*(1), 52-62.

21. Beral, V., Bull, D., Doll, R., Peto, R., Reeves, G., van den Brandt, P. A., &Goldbohm, R. A. (2004). Collaborative group on hormonal factors in breast cancer: breast cancer and abortion: collaborative reanalysis of data from 53 epidemiological studies, including 83000 women with breast cancer from 16 countries. *Lancet*, *363*(9414), 1007-1016.

22. Beral, V., Bull, D., Doll, R., Peto, R., Reeves, G., van den Brandt, P. A., &Goldbohm, R. A. (2004). Collaborative group on hormonal factors in breast cancer: breast cancer and abortion: collaborative reanalysis of data from 53 epidemiological studies, including 83000 women with breast cancer from 16 countries. *Lancet*, *363*(9414), 1007-1016.

23. Chen, W. Y., Rosner, B., Hankinson, S. E., Colditz, G. A., & Willett, W. C. (2011). Moderate alcohol consumption during adult life, drinking patterns, and breast cancer risk. *Jama*, *306*(17), 1884-1890.

24. Knight, J. A., Fan, J., Malone, K. E., John, E. M., Lynch, C. F., Langballe, R., ... & WECARE Study Collaborative Group. (2017). Alcohol consumption and cigarette smoking in combination: A predictor of contralateral breast cancer risk in the WECARE study. *International journal of cancer*, *141*(5), 916-924.

25. Wu Y, Zhang D, Kang S. (2013 Feb), Physical activity and risk of breast cancer: a meta-analysis of prospective studies. Breast cancer research and treatment, 137(3):869-82.

26. Ferlay, J., Ervik, M., Lam, F., Colombet, M., Mery, L., Piñeros, M., ... & Bray, F. (2018). Global cancer Observatory: cancer today. Lyon, France: international agency for research on cancer.

27. DeSantis, C. E., Fedewa, S. A., Goding Sauer, A., Kramer, J. L., Smith, R. A., & Jemal, A. (2016). Breast cancer statistics, 2015: Convergence of incidence rates between black and white women. *CA: a cancer journal for clinicians*, *66*(1), 31-42.

28. Sharma, R. (2021). Global, regional, national burden of breast cancer in 185 countries: Evidence from GLOBOCAN 2018. *Breast Cancer Research and Treatment*, *187*(2), 557-567.

29. Ginsburg, O., Bray, F., Coleman, M. P., Vanderpuye, V., Eniu, A., Kotha, S. R., ... & Conteh, L. (2017). The global burden of women's cancers: a grand challenge in global health. *The Lancet*, *389*(10071), 847-860.

30. Łukasiewicz, S., Czeczelewski, M., Forma, A., Baj, J., Sitarz, R., &Stanisławek, A. (2021). Breast Cancer—Epidemiology, Risk Factors, Classification, Prognostic Markers, and Current Treatment Strategies—An Updated Review. *Cancers*, *13*(17), 4287.

31. Tavassoli, F. A. (2003). Pathology and genetics of tumours of the breast and female genital organs. *World Hhealth Organization Classification of Tumours*.

32. Weigelt, B., & Reis-Filho, J. S. (2009). Histological and molecular types of breast cancer: is there a unifying taxonomy?. *Nature reviews Clinical oncology*, *6*(12), 718-730.

33. Smetherman, D. H. (2013). Screening, imaging, and image-guided biopsy techniques for breast cancer. *Surgical Clinics*, *93*(2), 309-327.

34. Liberman, L., &Menell, J. H. (2002). Breast imaging reporting and data system (BI-RADS). *Radiologic Clinics*, *40*(3), 409-430.

35. Hooley, R. J., Scoutt, L. M., &Philpotts, L. E. (2013). Breast ultrasonography: state of the art. *Radiology*, *268*(3), 642-659.

36. Fitzgibbons, P. L., Page, D. L., Weaver, D., Thor, A. D., Allred, D. C., Clark, G. M., ... &Schnitt, S. J. (2000). Prognostic factors in breast cancer: College of American Pathologists consensus statement 1999. *Archives of pathology & laboratory medicine*, *124*(7), 966-978.

37. Morrow, M., White, J., Moughan, J., Owen, J., Pajack, T., Sylvester, J., ... & Winchester, D. (2001). Factors predicting the use of breast-conserving therapy in stage I and II breast carcinoma. *Journal of clinical oncology*, *19*(8), 2254-2262.

38. Yang TJ, Ho AY (2013 Apr). Radiation therapy in the management of breast cancer. Surgical Clinics. 2013 Apr 1;93(2):455-71.

39. Reddy, D. R., Kalyani, G., Pradeep, K., Asif, M. D., Kartheek, D., &Gangabhavani, M. (2017). The survey of cancer patients in the region of Guntur: Based on hospital registry. *Int J Pharm Pharm Sci*, *9*(2), 228-32.

40. Chopra, B., Kaur, V., Singh, K., Verma, M., Singh, S., & Singh, A. (2014). Age shift: Breast cancer is occurring in younger age groups-Is it true. *Clin Cancer Investig J*, *3*(6), 2278-0513.

41. Sandhu, D. S., Sandhu, S., Karwasra, R. K., &Marwah, S. (2010). Profile of breast cancer patients at a tertiary care hospital in north India. *Indian journal of cancer*, *47*(1), 16.

42. Brewer, H. R., Jones, M. E., Schoemaker, M. J., Ashworth, A., &Swerdlow, A. J. (2017). Family history and risk of breast cancer: an analysis accounting for family structure. *Breast cancer research and treatment*, *165*(1), 193-200.

43. Adhikari AN, Chakraborty DI, Indu RA, Bhattacharya SA, Ray MO, Mukherjee RA. (2018) Drug prescription pattern of breast cancer patients in a tertiary care hospital in west bengal: A cross-sectional and questionnaire-based study. Asian J Pharm Clin Res;11(3):398-401.

44. Sandhu, G. S., Erqou, S., Patterson, H., & Mathew, A. (2016). Prevalence of triple-negative breast cancer in India: systematic review and meta-analysis. *Journal of global oncology*, *2*(6), 412-421.

45. Endogenous Hormones and Breast Cancer Collaborative Group. (2002). Endogenous sex hormones and breast cancer in postmenopausal women: reanalysis of nine prospective studies. *Journal of the National Cancer Institute*, *94*(8), 606-616.

46. Surakasula, A., Nagarjunapu, G. C., &Raghavaiah, K. V. (2014). A comparative study of pre-and post-menopausal breast cancer: Risk factors, presentation, characteristics and management. *Journal of research in pharmacy practice*, *3*(1), 12.

47. Butt, Z., Haider, S. F., Arif, S., Khan, M. R., Ashfaq, U., Shahbaz, U., & Bukhari, M. H. (2012). Breast cancer risk factors: a comparison between pre-menopausal and post-menopausal women. *JPMA-Journal of the Pakistan Medical Association*, *62*(2), 120.

48. Desai, S. B., Moonim, M. T., Gill, A. K., Punia, R. S., Naresh, K. N., &Chinoy, R. F. (2000). Hormone receptor status of breast cancer in India: a study of 798 tumours. *The breast*, *9*(5), 267-270.

49. Kamath, R., Mahajan, K. S., Ashok, L., &Sanal, T. S. (2013). A study on risk factors of breast cancer among patients attending the tertiary care hospital, in udupi district. *Indian journal of community medicine: official publication of Indian Association of Preventive & Social Medicine*, *38*(2), 95.

50. Adisa, A. O., Arowolo, O. A., Akinkuolie, A. A., Titiloye, N. A., Alatise, O. I., Lawal, O. O., &Adesunkanmi, A. R. K. (2011). Metastatic breast cancer in a Nigerian tertiary hospital. *African health sciences*, *11*(2).

51. Saini, V. K., Sewal, R. K., Ahmad, Y., &Medhi, B. (2015). Prospective observational study of adverse drug reactions of anticancer drugs used in cancer treatment in a tertiary care hospital. *Indian Journal of Pharmaceutical Sciences*, *77*(6), 687.

52. Ramalakshmi, S., Ramesh, A., Sahini, K., Babu, K. S., Kousalya, K., & Saranya, P. (2013). A study on prescribing trends of supportive care drugs used in cancer chemotherapy in a tertiary care teaching hospital. *Indian Journal of Pharmacy Practice*, *6*(3).