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BREAST SIZE, BODY MASS INDEX, AND PHYSICAL ACTIVITY AS A RISK FACTOR OF BREAST CANCER IN SULAYMANIYAH CITY-IRAQI KURDISTAN REGION

A Dissertation

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Dedication

This study is dedicated to:

My dear Family

My dearest Mum & Dad

My Little brother (Aso)

My best friend (Narjis)

My dearest Colleagues

All of our Breast Cancer Patients

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- Finally, deepest thanks to all participants, I hope my project will be useful to reduce the number of breast cancer patients in my city.

Abstract

Background: Breast cancer, until today, is the most prevalent cancer diagnosed in females worldwide, and it affects 1 in 20 globally and as many as one women in 8 in developed countries. To our knowledge, there is no published data regarding the effects of breast size with body mass index, and physical activity a as risk factor of Breast Cancer among Iraqi Kurdish women.

Aim: The main aim of this study, this study aimed to determine the association between breast volume, Body Mass Index and physical activity concerning the possibility of developing Breast Cancer in this region.

Patients and Methods: A descriptive and analytical cross-sectional study was conducted on 400 women diagnosed with Breast Cancer at Hiwa Cancer Hospital in the Sulaymaniyah City - Iraqi Kurdistan. A questionnaire was adopted for collecting data by the researcher. The data gathering started from February 14th, 2021 to June 1st, 2022. Breast size, BMI and physical activity with some other risk factors were studied on women visiting the outpatient clinic. The data analysis was completed using Statistical Package for the Social Sciences program, version 21.

Results: Patient's mean ± SD age at early BC detection was 47.33 ± 9.9 years. Breast size; the majority (71%) of patients had a cup size D or larger, while only 13% of participants had a cup size A or smaller. In addition, most patients (61%) had ≥90 band size, and only 7.5% had ≤75 band size. Regarding BMI, majority participants were obese (63%) or overweight (29%). There was a significant relationship between high BMI and breast size with BC (P<0.001). Finally, more than half (58%) were physically inactive.

Conclusion: The results of this study indicated that large breast size, high body mass index and physical inactivity was significantly correlated to the incidence of Breast Cancer among Iraqi Kurdish women. Actions aimed at maintaining a healthy weight and enhancing physical activity with control of other modifiable risk factors seems to be essential to decrease the incidence of Breast Cancer. Further research needs to be conducted.

Keywords: Breast cancer, breast size, body mass index, physical activity, Kurdistan, Iraq.

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Abbreviations:	Meaning:
(BC)	Breast Cancer
(BCSM)	Breast Cancer-Specific Mortality
(CBC)	Complete Blood Count
(cm)	Centimeter
(CT)	Computed Tomography
(CUP)	Cancer of Unknown Primary
(DCIS)	Ductal Carcinoma in Situ
(DOH)	Directory of Health
(EBC)	Early Breast Cancer
(ER)	Estrogen Receptor
(FDG)	Staging fluorodeoxyglucose
(FNA)	Fine Needle Aspiration
(FNAC)	Fine Needle Aspiration Cytology
(HEPA)	Health Enhancing Physical Activity
(HER2)	Human epidermal growth factor receptor 2
(IDC)	Infiltrating Ductal Carcinoma
(ILC)	Infiltrating Lobular Carcinoma
(IPAQ-SV)	International Physical Activity Questionnaire-Short Version
(LCIS)	Lobular Carcinoma in situ
(M)	Metastasized
(ml)	Millilitres
(MRI)	Magnetic Resonance Imaging
(N)	Number
(NCCN)	(NCCN): National Comprehensive Cancer Network
(NSAIDs)	Non-Steroidal Anti-Inflammatory Drugs
(PA)	Physical Activity
(PET)	Positron Emission Tomography
(PR)	Progesterone Receptor
(SACT)	Systemic Anti-Cancer Therapy
(SLN)	Sentinel lymph node
(SLNB)	Sentinel lymph node biopsy
(T)	Tumor
(TPN)	Total Parenteral Nutrition
(USG)	Ultrasonograhpy

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CHAPTER ONE

INTRODUCTION

CHAPTER ONE

INTRODUCTION

1.1: Introduction

Cancer is a major public health problem worldwide and is the second leading cause of death in the United States (Siegel et al., 2020). Breast cancer (BC), until today, is the most prevalence cancer diagnosed in females globally and it is one of the most common form of malignancies among Iraqi women (AL-Safi et al., 2015; Al-Kafajy, 2020). It is one of the leading causes of mortality among women (Momenimovahed & Salehiniya, 2019; Ghazi et al., 2020) BC incidence continues to rise, although progress has been made over the last decades in regard to epidemiological and clinical research (Britt et al., 2020; Łukasiewicz et al., 2021).

In Kurdistan of Iraq, breast cancer is predominantly a disease of pre-menopausal women having multiple pregnancies. In young patients it was similar to the West and possibly higher than many Middle-Eastern countries, but unlike the West, the estimated rates declined markedly in the elderly (Majid et al., 2009). Recently, at Hiwa cancer hospital approximately more than four thousand breast cancer patients were registered in the system since 2007. The Directorate of Health records indentified 539 women diagnosed with breast cancer from 2006 to 2008 (Majid et al., 2009).

In the United States, 1,806,590 new cancer cases and 606,520 cancer deaths have occurred in 2020. Among them breast cancer estimated new cases in both genders are 279,100; 2,620 in male and 276,480 in female. Estimated death in both genders is 42,690; 520 in men and 42,170 in women (Siegel et al., 2020). In addition, more than 3.8 million women are living with history of invasive breast cancer. Approximately 268,600 were newly diagnosed in 2019 (Miller et al., 2019). In other parts of the world, it is rapidly becoming more common (Wang et al., 2020). Moreover; living with metastatic disease is accounted for

over 150,000 of breast cancer survivors. Approximately 64% of breast cancer survivors aged 65 years and older, while age younger than 50 years were around 7% (Miller et al., 2019). In the past 40 years, screening and treatment of breast cancer have improved significantly (Wang et al., 2020).

Breast size measurement has witnessed a revolution over the past few decades with majority of women knowing, buying and wearing their brassiere, commonly shortened to ‘‘bra’’, as per standard measurements of the breast Band and Busts (Chung et al., 2016). Breast size is commonly represented as a bra size, which is a combination of a number (e.g. 32, 34 and 36 inch or 10, 12 and 14 age) that represents the band size, and a letter (e.g. A, B and C) which represents cup size. Although the breast is a three-dimensional object, the size of the bra cup is typically determined from two simplistic anthropometric measurements; firstly, the under bust chest circumference and secondly, the over bust chest circumference by using tape measure (Coltman et al., 2017).

Correlations between breast cancer incidence and average breast size have been observed according to the level of population. For instance, Asian women have smaller breasts than Western women and had lower incidence of breast cancer. However, breast cancer risk but not, presumably, mammary gland size of Asian-American women appears to increase relatively rapidly, within the first generation migrating to the United States (Franceschi, 1997).

Body mass index throughout lifetime is associated with breast cancer risk, with adult BMI having opposite effects in premenopausal and postmenopausal women. A higher adult BMI is inversely associated with premenopausal breast cancer risk and positively associated with postmenopausal breast cancer risk (Harris et al., 2011).

Williams (2013) stated that prior studies suggest that physical activity reduce breast cancer risk by about 25 percent. This estimate is based primarily on studies that measure cumulative energy expended from all physical activities regardless of intensity. William undertook a study in (2013) and proved that breast cancer mortality decreased in association with both meeting the exercise recommendations and smaller breast volume.

1.2: IMPORTANCE OF THE STUDY

Breast cancer is the commonest female malignancy with one out of every eight women in the west being a victim of it. In the Middle East, it occurs in relatively young women and frequently presents as advanced disease (Majid et al., 2009). This is due to patients delay and not participate in the screening programme. Each year, 2.1 million of women are impacted by breast cancer worldwide (WHO, 2019). Recently, the incidence of breast cancer patients eighth time increased compared with the first year recorded in the electronic system (2007) at Hiwa Cancer Hospital (Majid et al., 2009).

Incidence of breast cancer is different among different countries due to their cultural and ethnic backgrounds. There are many risk factors affecting the occurrence of breast cancer. These may change according to the geographical location, age, family history, previous breast biopsy, and reproductive factors such as early menarche, late menopause, nulliparity, age at first birth after 30 years old and hormonal use. The other possible risk factors are high BMI, physical inactivity and dietary factors (Ghalib, 2019). Body mass index (BMI) is one of the important risk factor because it is potentially modifiable. Maintaining a healthy weight during adult life is particularly important for women who have a family history of breast cancer (Hopper et al., 2018).

Breast size has an effect on women's quality of life and well-being in various ways such as physically, socially and psychologically. Several studies on exercise & sport participation in female adolescent groups proved that large breasts to be a reason of physical strain and a major cause for not joining in physical activity. Also back problems are common among female who have large breasts (Lim et al., 2018). The other modifiable risk factor that increase breast cancer is physical inactivity especially after menopause and possibly in premenopausal women (Neilson, 2017).

Many studies have been conducted extensively on breast size as a risk factor of breast cancer but the results are inconclusive (Lim et al., 2018). It is a common sense that cancer is the function of the volume with bulkier breasts having more chance of harbouring a malignancy. We attempted to design this study to clarify that assumption & find out if heavier breasts, body mass index and physical activity are more prone to malignancy.

1.3: OBJECTIVE OF THE STUDY

The main aim of this study is to determine the correlation between breast size, body mass index and physical activity in relation to the possibility of developing breast cancer.

1.3.1: SPECIFIC OBJECTIVES

1. To identify socio-demographic characteristics of the women diagnosed with breast cancer.

2. To determine some obstetric characteristics among breast cancer women.

3. To assess clinical characteristics of breast cancer such as type stage.

4. To measure the non-cancerous breast size in unilateral mastectomy women as a control.

5. To find out the correlation between breast size and possibility of developing breast cancer.

6. To assess body mass index will also be correlated with the risk of developing breast cancer.

7. To assess physical activity and possibility of developing breast cancer.

8. To identify the other most common risk factors of breast cancer.

CHAPTER TWO

LITERATURE REVIEW

CHAPTER TWO

LITERATURE REVIEW

2.1: Literature Review

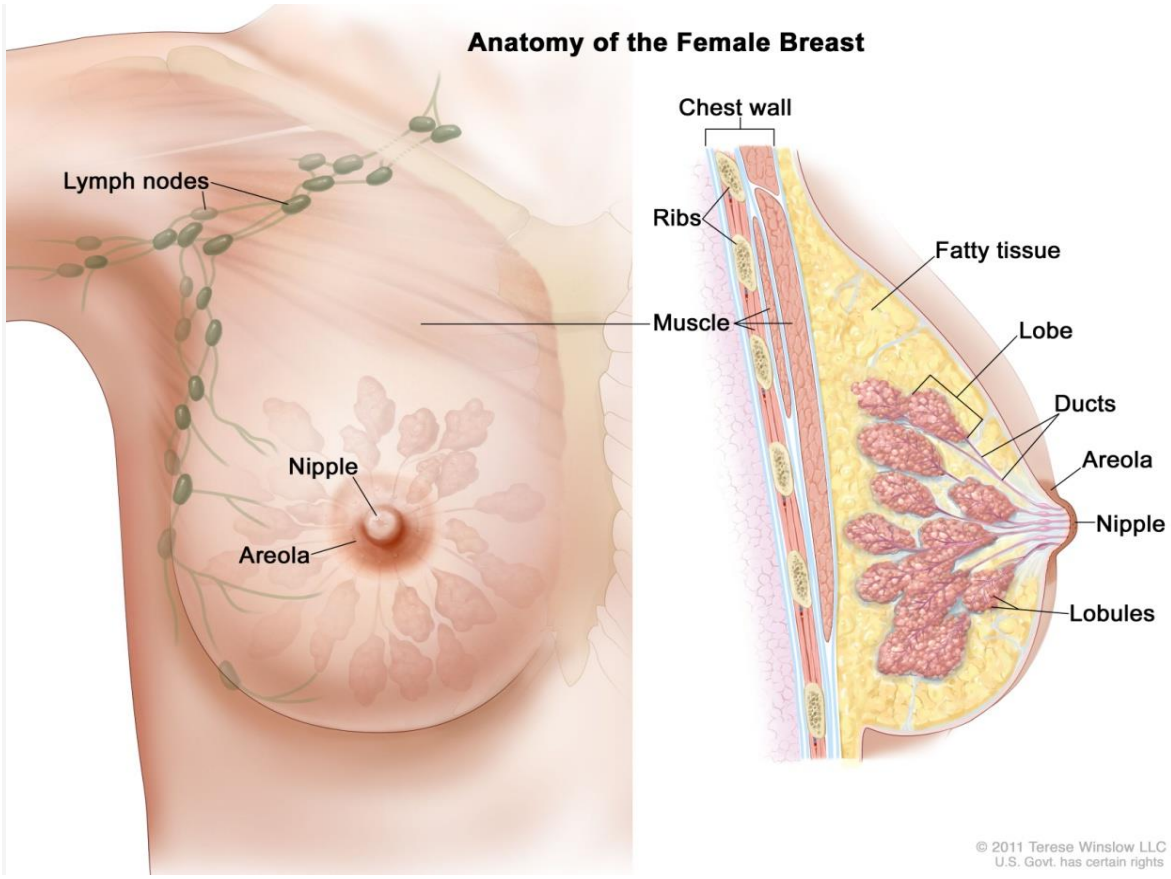
Breast Cancer affects one in 20 globally and as many as one woman in eight in developed countries (Britt et al., 2020). It is the most common cancer among women in the United States, which is about 30% or one in three of all new female cancer each year (ACS, 2023).

Breast cancer can be defined in several ways. American Cancer Society (2019) defined Breast cancer ‘‘is a type of cancer that starts in the breast’’; it can start in one or both breasts. More recently, Centers for Disease Control and Prevention (2021) defined as ‘‘a disease in which cells in the breast grow out of control’’.

Leonard stated that the women’s life cycle has several different stages. The visual changes from the figure that passes through puberty, hormonal changes, whether temporary as in the menstrual cycle and in pregnancy, or permanent as in menopause, react and gradually change the breast of the woman. Therefore, the breast does not remain stable throughout life, by it is behaviour, activity and nature, and all these factors contribute to the change of the breast mass. In this sense, the size chosen for the woman to wear, associated with the level of comfort, are critical to the success of a bra (Filipe et al., 2015). Research conducted by Coltman et al. (2017) proved that breast volume was not significantly affected by age; it was significant affected by Body Mass Index (BMI), with the breast volume of overweight and obese women being two-to-three times greater than women with normal BMI.

2.2: Anatomy of the Female Breast

The breast is made up of lobes and ducts. Each breast has 15 to 20 sections called lobes, which have many smaller sections called lobules. Lobules end in dozens of tiny bulbs that can make milk. The lobes, lobules, and bulbs are linked by thin tubes which is called ducts. Each breast also has blood vessels and lymph vessels. The lymph vessels carry an almost colorless, watery fluid called lymph. In addition, lymph vessels carry lymph between lymph nodes. The Lymph nodes are small bean-shaped structures that filter lymph and store white blood cells that help fight infection and disease. Group of lymph nodes are found near the breast in the axilla under the arm, above the collarbone, and in the chest (NCI, 2021).



(National Cancer Institute, 2021)

2.3: Risk Factors

There are many risk factors affecting the occurrence of breast cancer. These may differ according to the geographical locations including age, family history, previous breast biopsy, hormonal therapy, genetics and reproductive factors such as early menarche, late menopause, nulliparity, age at first childbirth after 30 years old. The other possible risk factors are high BMI, physical inactivity and dietary factors (Ghalib et al., 2019).

The chance of getting breast cancer, in 1940, the lifetime risk of a woman developing breast cancer was 5%. Now the risk is about 12%. In about half of the cases, the woman has no known risk factors (Web MD, 2021).

2.3.1. Age: is a strong correlation that can be observed with neoplastic tumors. Breast Cancer diagnosis is less common under the age of 45 years, however the incidence of breast cancer raise in postmenopausal period (Yahyaa, 2021). In a study was carried out by Ghalib et al. (2019) in Kurdistan region of Iraq, the age range of incidental breast cancer patients was 23-80 years with mean age 47±11.0. The frequency of 10-year age groups were calculated, the highest frequency was reported for the age group between 40 to 49 years. Although out of 338 patients 243 were premenopausal at the time of diagnosis, which accounts 71.9% of them, compared to controls 68.0%, but there was no significant association. In another study in undertook in the Western Himalayan state found that among all risk factors age of women above 50 years is the most important risk factors for BC (Thakur et al., 2017).

2.3.2. Reproductive factors: Late menopause, the age of menopause over 50 years is associated with an increased risk of breast cancer. The results of a case-

control study also confirmed the association between older age in menopause and the incidence of breast cancer (Momenimovahed & Salehiniya, 2019). In Sulaymanyiah Kurdistan region-Iraq, concerning the analysis of established risk factors of breast cancer, age at menarche 14 years and more has a protective effect with (P = 0.027) and 152 cases (45.0%) had menarche at ≤ 12 years compared to controls (16.6%) with (P = 0.000), age at menopause more than 51 years (Ghalib et al., 2019). In a study carried out by McCarthy et al., (2021) in USA, half of the patients (50.4%) were age 12 or 13 at menarche while postmenopausal women made up a majority of the study population (58.2%).

2.3.3. Age at first live birth: In a study was approved by the University of Pennsylvania Institutional review board, the majority of the study population were under the age of 30 at their first childbirth, with 5.9% being over the age of 30 at first birth and 21.3% being nulliparous (McCarthy et al., 2021). Conversely, in the Sulaymaniyah City Kurdistan region-Iraq, age at first child birth of 30 years or more has an effect on the incidence of breast cancer (Ghalib et al., 2019).

2.3.4. Hormonal therapy: In Kurdistan Region-Iraq, the correlation between hormonal use and breast cancer was not significant without evaluation of their usage duration (Ghalib et al., 2019). While in Azam et al. study in (2018) proved that the association between Hormonal replacement therapy and breast cancer seems to be stronger in women with dense breast.

2.3.5. Family history: Positive family history have causative effect on breast cancer (high OR) with significant P value among Kurdish population (Ghalib et al., 2019). On the other hand in the study undertook among USA population

proved that most participants (87.3) had no known family history of mammary gland carcinoma (McCarthy et al., 2021).

2.3.6. Marriage: There was a statistical significant association between marriage and breast cancer, about 86.4% of cases were married compared to controls 91.4% (P=0.037). The marriage was appeared to be a protective factor (P = 0.039) (Ghalib et al., 2019).

2.3.7. Numbers of children: The result in the USA study in (2021) undertook by McCarthy et al., explained that most women had 3 or fewer live births, with 8.1% having had 4 or more child births. While in the study carried out in Kurdistan Region- Iraq numbers of children ≥ 3 have protective effect of mammary gland carcinoma (Ghalib et al., 2019).

2.3.8. Breastfeeding: the association between breastfeeding and breast cancer risk is still conflicting. A meta-analysis undertook by Zhou et al. in (2015), the results suggested that breastfeeding was inversely associated with the risk of breast cancer. In addition, a review study carried out by Cabrera et al. in (2022) proved that 50% percent of the research included found that Breastfeeding does not reduce the risk of breast cancer, while the other 50% argue that it is a protective factor. However, with regards to quality, the case studies that concluded the breastfeeding is not associated with breast cancer have more evidential support.

2.3.9. Breast Density: Women with very dense breasts (>75% density in the breast) have a four to six times greater risk of breast cancer than women with little mammographic density (<5-10%) or fatty breasts (Azam et al., 2018).

Breast cancer is divided into subtypes based on the expression of estrogen receptor (ER), progesterone receptor (PR) and human epidermal growth factor receptor 2 (HER2). Subtypes have different biology and prognosis, with accumulating evidence of different risk factors. In McCarthy et al. (2021) study proved that breast density was associated with increased risk of all subtypes. In regarding to age, the Advani et al. findings in (2021) suggest that breast density is associated with increased risk of invasive breast cancer among women aged 65 years or older.

2.3.10. Diet: In relation to diet, some studies have shown that the importance of nutritional status in the incidence of mammary gland carcinoma (Ghalib et al., 2019; Duche et al., 2021). Ghalib et al. (2019) found that consumption of fast foods and Mediterranean foods weekly > 2 times have high same Odds Ratio, while taking stewed meat weekly 1 time and fish weekly ≥ 1time, fruit daily >1 time and vegetables daily ≥ 1 time, and black tea daily > 3 cups have preventative effect on breast cancer.

2.3.11. Handedness: Hsieh & Trichopoulos (1991) proved that Handedness might affect the lateral occurrence of breast cancer, although this tumor is in general more common in the left breast, possibly because this breast is usually slightly larger. Premenopausal women who do not wear bras had half the risk of breast cancer compared with bra users (P about 0.09), possibly because they are thinner and likely to have smaller breasts. Among bra users, larger cup size was associated with an increased risk of breast cancer (P about 0.026), although the association was found only among postmenopausal women and was accounted for, in part, by obesity. These data suggest that bra cup size and conceivably mammary gland size may be a risk factor for breast cancer.

2.3.12. Breast Size:

William (2013) proved that bra cup size was the strongest predictor of breast cancer mortality. He explained that Risk increase per cup size. It was 4.0-fold greater for C-cup, and 4.7-fold greater for D cup vs. A-cup when adjusted for BMI and other covariates. In a prospective study undertook by Kusano et al. in (2006), they proved that with a BMI below 25 kg/m^2, those with a bra cup size of ‘‘D or larger’’ had a significantly higher incidence of breast cancer than women who reported ‘‘A or smaller’’. There was no significant association among women with a BMI of 25 kg/m^2 or higher. Stratifying by BMI at age 18 at a cutoff point of 21 kg/m^2 gave similar results. They concluded that larger bra cup size at a young age is associated with a higher incidence of premenopausal breast cancer, though this association is limited to leaner women.

Breast size may be a barrier that women who are physically inactive during adulthood life. Scurr et al. (2016) undertook a survey to investigate the effect of breast on sport and exercise participation among school girls. 14-years old girls who achieving exercise guidelines for about 12% of the UK school girls were included in this study. The survey was developed to assess demographics, breast characteristics, breast-specific concerns in sports, breast knowledge, views on breast education, and sport participation. Chi-squared tests assessed associations between participation and breast size, sports bra use, and breast concerns. The number of participants was two thousand eighty-nine school girls aged from 11 to 18 years completed the survey. They found that 97 of participant’s breasts had begun developing and 96% reported wearing breast support. Forty-six percent of girls reported that their breast had some effect on their participation in compulsory sports and exercise, which was more prevalent in girls aged 13 and 14 years (51%) and in larger-breasted girls (63%). More than 50% reported never wearing a sports bra during sports. Breast concerns were high with 73% reporting $\geq$ 1 breast-specific concern in sports; with breast bounce being most

prevalent (38%). They concluded that most of the breast concerns raised in this survey could be addressed via education and 87% of girls wanted to know more about breasts. This study demonstrates a need for breast education for school girls, which may reduce the influence of the breast on sport and exercise participation. From the information, it can be deduced that large breast has an effect on the adult physical activity.

In a study carried out by Burnett et al. in (2015), proved that the breast was a barrier to physical activity participation for 17% of women. Also the most influential breast related barriers to activity were ‘‘I can’t find the right sports bra’’ and ‘‘I am embarrassed by excessive breast movement’’. Breast pain increased with vigorous activity and poor breast support. Breast health knowledge increased the use of a sports bra and levels of physical activity. They concluded that the breast was the fourth greatest barrier to physical activity, behind energy/motivation (first), time constrains (second), and health (third), despite its omission form previous physical activity literature. As 33% of women were not meeting physical activity guidelines, increasing breast health knowledge may reduce barriers to physical activity.

2.3.13. Body Mass Index:

Body mass index (BMI) is an important risk factor in breast cancer because it is potentially modifiable. The evidence proved that high BMI in young ages group appear to be a protective, however, it has the opposite association in later life (Hopper et al., 2018). They conducted a study the greater woman’s familial risk, the greater influence of BMI on her absolute postmenopausal breast cancer risk. Also women with a family history of breast cancer, given that age-adjusted BMI is correlated across adulthood (Hopper et al., 2018). It can be deduced that maintaining a healthy weight during adult life is particularly important for women who have a family history of breast cancer.

Body mass index (BMI, weight in kilograms divided by the square of height in meters) is a marker for general adiposity. BMI categorized into Underweight (BMI<18.5 kg/m^2), Normal range (18.5-24.9 kg/m^2), Overweight (25-30 kg/m^2), and Obese (BMI≥30 kg/m^2) as defined by WHO BMI classification (Karim et al., 2015).

Shawon et al. (2017) undertook a study to evaluate the associations between body size in early life and breast cancer risk. This study was based on two Swedish population-based case control studies, consisting of 6731 invasive BC cases and 28,705 age-matched cancer-free controls were included in this study. The data was collected in two different times; firstly, from January 2011 to March 2013; secondly, from January 2001to December 2008. Also for control randomly selected from each groups who have cancer-free. They used the criteria that self-reported body sizes at ages 7 and 18 years were collected by a validated nine-level pictogram that aggregated into three categories; small, medium and large size. Odds ratios and corresponding 95% confidence intervals were estimated from multivariable logistic regression models in case-control analysis adjust for study, age at menarche, age at diagnosis, number of children, family history of BC and hormone replacement therapy. Body size change between ages 7 and 18 years old were also examined in relation to breast cancer risk. They found that Medium or Large body size at age 7 and 18 years was associated with a statistically significant decreased BC risk compared to small size.

Adult body mass index (BMI) is inversely associated with premenopausal breast cancer risk, childhood and adolescent body size is inversely associated with breast cancer risk in pre- and postmenopausal women. Breast density is inversely related to body size and may play a role in the association of body size with breast cancer risk (Harris et al., 2011).

Shawon et al., (2017) said that there is a considerable amount of evidence suggesting that larger adult body size or high body mass index (BMI), increases the risk of breast cancer among postmenopausal women. Conversely decreases the risk among premenopausal women. The prevailing hypotheses for these associations include the correlation between estrogen levels and BMI and increased risk of an ovulation among women with higher BMI, respectively. There are also indications that weight change during adult life is of importance. Weight gain after menopause has been found to increase the risk of breast cancer among postmenopausal women, while weight loss after menopause has the opposite effect.

Selier et al. (2018) said that obesity is the result of a complex interplay of genetic, biological, environmental, psychosocial and cultural factors that influence appetite, satiety, and food storage in the form of body fat. In addition, socioeconomic factors and lower educational levels that generally promote the consumption of less expensive, high-caloric foods with low nutritional value and disparities in access to healthy food sources may account for the association between unhealthy nutritional habits and obesity. Obesity increases the risk of developing breast cancer in both pre- and postmenopausal women and negatively affects breast cancer recurrence and survival. Poor dietary habits characterized by the high intake of refined starches, sugar, both saturated and trans-saturated fats, as well as the low intake of omega-3 fatty acids, fiber and natural antioxidants, modulate inflammation and, thereby, appear to be linked to increased risk of breast cancer and mortality.

Body fatness and weight gain throughout the life course are largely determined by modifiable risk factors. such as excess energy intake like food and drink and to a lesser extent physical inactivity. Which are the main drivers of the obesity epidemic (Lauby-Secretan et al., 2016).

Body mass index is not only effect on the incidence of breast cancer but also it has increased risk for developing second primary cancers. In Feigelson et al., study (2021), found that For every 5 kg/m^2 increase in BMI, the risk of any second cancer diagnosis increased by 7% confidence intervals (CIs) 95% , 13% CI for obesity related cancers, 11% CI for a second breast cancer, and 15% CI for a second estrogen receptor-positive breast cancer. They concluded that statistically significant increased risk of second cancers associated with increasing BMI these findings have important public health implications given the prevalence of overweight and obesity in breast cancer survivors and underscore the need for effective prevention strategies. In a study carried out by McCarthy et al., (2021) in USA, proved that about 38.3% of participants had a BMI under 25 (considered underweight to normal), 24.9% from 25 to 29.9 (overweight), and 25% had a BMI over 30 (considered obese).

In multivariable models, for every 5 kg/m2 increase in BMI, the risk of any second cancer diagnosis increased by 7% (RR ¼ 1.07, 95% CI ¼ 1.01 to 1.14); 13% (RR ¼ 1.13, 95% CI ¼ 1.05 to 1.21) for obesity related cancers, 11% (RR ¼ 1.11, 95% CI ¼ 1.02 to 1.21) for a second breast cancer, and 15% (RR ¼ 1.15, 95% CI ¼ 1.04 to 1.27) for a second estrogen receptor-positive breast cancer (Feigelson et al., 2021).

2.3.14. Physical Activity:

Physical Activity has an effective role on the incidence of breast cancer. In a study carried out in Kurdistan region- Iraq regular exercise, had a protective effect (Ghalib et al., 2019). Nearly half of the 3.5 million female breast cancer survivors in the US are aged 65 years or older at diagnosis, yet little is known about associations of obesity and physical activity with breast cancer-specific mortality (BCSM) among older survivors. Maliniak et al. undertook a Cohort study in (2018) to examine association of pre-and post-diagnosis body mass

index (BMI) and moderate-vigorous physical activity (MET-hours/week) with mortality outcomes stratified by age at diagnosis (<65, ≥65 years). In this prospective cohort of approximately 5000 breast cancer survivors, high BMI at either pre-or post-diagnosis was associated with a higher risk of BCSM among women aged 65 years or older. Pre-and post-diagnosis physical activities were not associated with BCSM among older survivors. They concluded that, among both age groups BMI and physical activity, regardless of when assessed, were significantly associated with all-cause mortality.

Chan et al. (2019) undertook a study to assess the systematically review the complex associations between energy balance related factors and breast cancer risk. Relevant publications on adulthood physical activity, sedentary behavior, body mass index, waist and hip circumferences, waist-to-hip ratio, weight change, pre- and postmenopausal breast cancer risk identified in PubMed were included in the study. The data was collected up to 30 April 2017. Random-effects meta-analyses were conducted to summerize the relative risks across studies. One hundred and twenty-six observational cohort studies comprising over 22,900 premenopausal and 103,000 postmenopausal breast cancer cases were meta-analyzed.

They found that higher physical activity was inversely associated with both pre- and postmenopausal breast cancers whereas increased sitting time was positively associated with postmenopausal breast cancer. Although higher early adult BMI ages from 18 to 30 years was inversely associated with pre- and postmenopausal breast cancer, adult weight gain and greater body adiposity increased breast cancer risk in postmenopausal women, and the increased risk was evident for hormone receptor (HR+) but not hormone receptor (HR-) breast cancers, and among never but not current users of postmenopausal hormones. The evidence was less consistent in premenopausal women. There were no associations with adult weight gain, inverse associations with adult BMI, hip circumference, and

non-significant associations with waist circumference and waist-to-hip ratio that were reverted to positive associations on average in studies accounting for BMI. There is no significant associations were observed for hormonal- defined premenopausal breast cancers.

Doré et al. (2022) explained that physical activity is a safe, feasible, and effective strategy that could be targeted to prevent and reduce late-effect symptoms of pain, fatigue, and depression among breast cancer survivors. Duche et al., undertook a study in (2021) they explained the importance of physical exercise, breastfeeding, menopausal status, and nutritional status in the occurrence of breast cancer. They proved that actions aimed at increasing physical activity, breastfeeding habits and keeping a balanced diet will help to minimize the incidence of breast cancer.

Regarding the awareness about breast cancer among women; A cross-sectional study conducted by Ghazy et al. (2020) in Selangor Malaysia, to find out the level of awareness and belief about breast cancer among women in this city. The number of participants was 483 women aged between 18 and 65 years old. They concluded that there is a high level of poor belief and poor awareness among women in Selangor, Malaysia regarding breast cancer. Source of information such as the internet plays a major role in breast cancer prevention and the majority of them do not know the technique of breast self-examination. They concluded that more health promotion is needed to target general population through big campaign of awareness.

2.4: Types of breast Cancer: (Histopathologic classification)

Breast cancer types are classified into two groups based on benign disorders and malignant breast lesions. Waks and Winer (2019) said that the most common breast cancer histology is invasive ductal carcinoma (50%-75% of patients), followed by invasive lobular carcinoma (5%-15% of patients), with mixed ductal/ lobular carcinomas.

2.4.1: Benign Disorders and Diseases of the Breast

Benign breast changes are more common in women of child-bearing age, peaking between the ages of 30 and 50, whereas the incidence of breast cancer peaks during the postmenopause (Amano & Shimizu, 2018).

2.4.1.1. Fibrocystic Disease: Fibrocystic breast change (FBC) also termed ‘‘fibrocystic breast disease’’ is the most common benign type of breast disease (Chen et al., 2018; Malherbe & Fatima, 2019). It is diagnosed in millions of women worldwide (Malherbe & Fatima, 2019). FBC is most common among premenopausal women aged 20-50 years old and occurs in 90% of women during their life time (Chen et al., 2018). Certain hormonal factors underpin the function, evaluation and treatment of this disease. Benign breast disease is an umbrella term for various non-malignant lesions, such as tumors trauma, mastalgia, and nipple discharge (Malherbe & Fatima, 2019).

2.4.1.2. Fibroadenomas: are one of the most common benign tumors of the breast in the adolescent females accounting for about 2/3rd of all the breast lumps and more than half of all the biopsied breast lesions. They come into being due to overgrowth of glandular tissue under the influence of hormonal changes that the girls undergo at the time of puberty. Due to the wide prevalence

of fibroadenomas and the psychosocial morbidity associated with the finding of a breast mass, it is imperative for physicians treating adolescent patients to be thoroughly familiar and updated with this disease (Salati, 2021).

2.4.1.3. Ductal ectasia: is also termed as periductal mastitis. It is a benign breast disease of perimenopausal and postmenopausal women involving the ducts in the subareolar area. Clinical manifestations include unilateral or bilateral non-bloody nipple discharge, skin or nipple retraction and mass. It is initially painless but may progress to burning, itching, and pain around the nipple and swelling in the areolar region. Mammogram and biopsy may be required to exclude malignancy. Duct ectasia sometimes may not require treatment. Warm compresses and antibiotics can be used. Surgical excision of the abnormal duct may be done (Chandran & Jesudoss, 2020).

2.4.1.4. Mastitis: Inflammatory breast conditions that occur in association with lactation are referred to as puerperal mastitis. It generally occurs during the first 3 months after delivery. Nonpuerperal mastitis is a collective term applied to all form of mastitis occurring outside the lactation period, the most common of which are bacterial mastitis (59%), nonbacterial mastitis (25%), and special forms of nonpuerperal mastitis (14%). Symptoms of puerperal mastitis are accompanied by fever (> 38.4), aching limbs, a general sense of illness, pain and usually unilateral local redness, warmth and swelling of the breast (Satchs et al., 2019). Mastitis is treated with antibiotics analgesics and antipyretics. Adequate breast support, personal hygiene, rest and hydration should be encouraged (Chandran & Jesudoss, 2020).

2.4.1.5. Mondor's disease (MD): Is a rare disease that manifests with a palpable cord-like induration beneath the skin. In general, MD is a self-limited, benign thrombophlebitis that resolves in four to eight weeks without requiring any specific treatment (Amano & Shimizu, 2018).

2.4.1.6. Breast Cyst: Are fluid-filled sacs that are almost always benign. These are more common in premenopausal women aged 35-50 years. After menopause, cyst occurs less often and does not increase the risk of breast cancer (Chandran & Jesudoss, 2020). It may develop as a result of hormonal changes from monthly menstruation where excess estrogen in the body stimulates the breast tissue leading to formation of breast cysts. The clinical manifestations include palpable fluid-filled mass, movable round or oval lumps, soft texure like a grape or a water-filled balloon but sometimes firm and nipple discharge that may be clear, yellow, straw coloured or dark brown and breast pain or tenderness in the area of the breast lump (Mayo clinic, 2023).

In breast cyst, no treatment is required usually. Fine needle aspiration (FNA) can be done to remove the fluid. To avoid cysts naturally, women can be encouraged in many ways firstly, avoid chocolate, tea, coffee. Secondly, eat a healthy natural diet including calcium supplements. Thirdly, Massage breasts regularly and avoid wearing tight bra as a tight bra causes tightening of the muscles and hinders the lymphatic glands from draining of fluids, which leads to formation of cysts in the breasts. Finally; take primrose as it reduces the inflammation and relieves pain (Chandran & Jesudoss, 2020).

2.4.2: Malignant breast Lesions

2.4.2.1: Non-invasive Breast Cancer

Ductal Carcinoma in Situ (DCIS): It is characterized by the proliferation of malignant cells inside the milk ducts without invasion into the surrounding tissue. It is noninvasive form of cancer also called intraductal carcinoma. If DCIS left untreated, there is an increased likelihood that it will progress to invasive cancer. DCIS is frequently manifested on a mammogram with the appearance of calcifications, and it is considered breast cancer stage 0. Treatment is total or simple mastectomy with the cure rate of 98% to 99% (Suzanne et al., 2008; p.1712).

Lobular carcinoma in situ (LCIS): It is also called lobular neoplasia. The term, ‘‘in situ’’ refers to cancer that has not spread past the area where it initially developed. LCIS is a sharp increase in the number of cells within the milk glands (lobules) of the breast (Sharma et al., 2010).

2.4.2.2: Invasive Breast Cancer

Infiltrating Ductal Carcinoma (IDC): It is also known as invasive ductal carcinoma (Sharma et al., 2010)**.** The most common histologic type of breast cancer, accounts for 75% of all cases. The tumors arise from the duct system, invade the surrounding tissues and possibly other regions of the body. They often form a solid irregular mass in the breast (Suzanne et al., 2008, p.1712; Sharma et al., 2010).

Infiltrating Lobular Carcinoma (ILC): It is also known as invasive lobular carcinoma and it accounts for 5% to 10% of Ca breast. The tumors arise from the lobular epithelium (milk glands) but often spread to other regions of the body. They are often multicentric and can be bilateral (Suzanne et al., 2008, p1712; Sharma et al., 2010).

Medullary Carcinoma: It accounts for about 5% of breast cancer, and it tends to be diagnosed more often in women younger than 50 years. The tumors grow in a capsule inside a duct. They can become large and may be mistaken for a fibroadenoma. The prognosis is often favourable (Suzanne et al., 2008; p.1712).

Mucinous carcinoma: It accounts for about 3% of breast cancers and often presents in postmenopausal women 75 years and older. The prognosis is more favorable than in many other types (Suzanne et al., 2008; p.1712).

Tubular Ductal Carcinoma: It accounts for about 2% of breast cancers. Because axillary metastases are uncommon with this histology, prognosis is usually excellent (Suzanne et al., 2008; p.1712).

Inflammatory Carcinoma: It is a rare (1% to 2%) and aggressive type of breast cancer that has unique symptoms. The cancer is characterized by diffuse edema and browny erythema of the skin. This is due to malignant cells blocking the lymph node channels in the skin. The disease can spread to other parts of the body rapidly (Suzanne et al., 2008; p.1712, p.1713).

Paget disease: It accounts for 1% of diagnosed breast cancer cases. Symptoms typically include a scaly, erythematous, pruritic lesion of the nipple. Paget disease often represents ductal carcinoma in situ of the nipple but may have an invasive components. Mammography should be performed followed by a biopsy of the involved skin area (Suzanne et al., 2008; p.1713).

Phylloides tumors: Also spelled ‘‘phyllodes’’ can be either benign or malignant. It develops in the connective tissues of the breast and may be treated by surgical removal. Phylloides tumors are very rare; less than 10 women die of this type of breast cancer each year in the United States (Sharma et al., 2010).

2.5: Sign and Symptoms

In the modern era of widespread screening mammography, more than half of breast cancers in the United States are diagnosed on screening mammogram and approximately one-third are diagnosed as a palpable breast mass. Palpable axillary mass, nipple discharge, nipple inversion, breast asymmetry, breast skin erythema, and breast skin thickening (peau d'orange) are less common presentations of breast cancer (Waks & Winer, 2019). However, mammograms do not find every breast cancer. This means it is also important for women to know what their breasts normally look and feels like, so they will be aware of any change in their breasts (ACS, 2022).

The most common sign and symptoms in benign breast disease are breast pain (mastalgia) and tenderness with menstruation. Generally in malignant the lesions are; non tender, fixed rather than mobile, and hard with irregular borders. In advanced signs, skin dimpling, nipple retraction or skin ulceration (Suzanne et al., 2008; p.1715).

The most common symptom of breast cancer is a new lump or mass, although most breast lumps are not cancer. A painless, hard mass that has irregular edges is more likely to be cancer, but breast cancer can be also soft, round, tender, or even painful. Other possible symptoms of breast cancer include; swelling of all or part of a breast even if no lump is felt, skin dimpling sometimes looking like an orange peel. Breast or nipple pain, nipple retraction turning inward. Nipple or breast skin that is red, dry, flaking, or thickened, nipple discharge. Swollen lymph nodes under the arm or near the collarbone, sometimes this can be a sign of breast cancer spread even before the original tumor in the breast is large enough to be felt (ACS, 2022).

Many of these symptoms can be caused by benign (non-cancerous) breast conditions. Still, it is important to have any new breast mass, lump, or other change checked by an experienced health care professional so the cause can be

found and treated, if needed. Screening mammography can often help find breast cancer early, before any symptoms appear. Finding breast cancer early gives the women a better chance of successful treatment (Łukasiewicz et al., 2021).

2.6: Diagnosis

Early-stage cancer detection could reduce breast cancer death rates significantly in the long-term. The most critical point for best prognosis is to identify early-stage cancer cells. Investigators have studied many breast diagnostic approaches, including ultrasound, mammography, computerized tomography, magnetic resonance imaging, biopsy and positron emission tomography (PET). However, these techniques have some limitations such as being expensive, time consuming and not suitable for young women. In recent years, investigators have paid their attention in the development of biosensors to detect breast cancer using different biomarkers. Apart from biosensors and biomarkers, microwave imaging techniques have also been intensely studied as a promising diagnostic tool for rapid and cost-effective early-stage breast cancer detection (Wang, 2017).

In the United States, sixty-two percent of breast cancers are confined to the breast at diagnosis, while an additional 31% have spread to regional lymph nodes. Only 6% of breast cancers are metastatic at the time of diagnosis, defined as involvement of sites distant from the breast and it is regional lymph nodes (Waks & Winer, 2019).

In order to evaluate the diagnostic capabilities of various methods of breast cancer, it was expected that the use of non-invasive imaging techniques would be the earliest and the best technique of patient management such as mammography and ultrasonography (Akbari et al., 2019).

2.6.1: Mammography: is one of the most common non-invasive methods in breast evaluation that has high diagnostic value in both screening and detection of disease. The value of mammography widely varies in different studies (Akbari et al., 2019). Several meta-analyses of randomized controlled trials on mammography screening showed that a reported mortality reduction of approximately 20% in women invited to screening, and a much higher mortality reduction in women actually undergoing screening. Unfortunately, mammography fails to detect a significant amount of cancers before the symptomatic phase that consequently present as interval carcinomas between screening rounds. Particularly in women with a large relative fraction of fibroglandular tissue, i.e., with dense breasts, up to 50% of cancers are detected between screening rounds (Mann et al., 2019).

2.6.2: Ultrasonography: Another non-invasive technique used in breast evaluation, especially in dense breasts, is ultrasonography. Ultrasound is also valuable in evaluating the uncertain findings of mammography (Akbari et al., 2019). The use of ultrasound as a supplemental screening technique, usually on top of the combination of MRI and mammography, has been evaluated (Mann et al., 2019). Research suggests that the combination of ultrasound combined with x-ray mammography images might enhance breast cancer screening accuracy and allow early-stage tumor detection in women with dense breasts. While ultrasound may be helpful as an alternative to mammography, but when used alone, it will be affected by some limitations on breast cancer identification. Predominantly the ultrasound images are not able to identify small tumors that are smaller than five millimetres, about one-quarter inch, abnormalities or microcalcifications associated with proven kinds of breast cancers (Muhammad et al., 2020).

2.6.3: Magnetic Resonance Imaging: Magnetic resonance imaging (MRI) is an essential tool in breast imaging with multiple clinical indications, including preoperative staging, monitoring of neoadjuvant chemotherapy, screening of high risk patients, evaluation of breast implants, evaluation of patients with cancer of unknown primary (CUP), and differentiation between scar and recurrence (Leithner et al., 2018).

Breast magnetic resonance imaging (MRI) has been reported to be a highly sensitive imaging modality for breast cancer detection and characterization (Hu et al., 2020). Nowadays, Dynamic contrast-enhanced MRI is the most sensitive imaging technique for breast cancer diagnosis, and provides excellent morphological and functional information (Leithner et al., 2018). MRI of the breast is the most sensitive test for breast cancer detection and outperforms conventional imaging with mammography, digital breast tomosynthesis, or ultrasound. However, the long scan time and relatively high costs limit its widespread use. Hence, it is currently only routinely implemented in the screening of women at an increased risk of breast cancer (Leithner et al., 2019).

2.6.4: Fine Needle Aspiration (FNA) cytology or core biopsy: In breast cancer, axillary lymph node involvement directly impacts the patient survival and prognosis. Sentinel lymph node biopsy (SLNB) is a procedure of choice for axillary staging in early breast cancer. Currently, management options for axilla management are axillary lymph node dissection and sentinel node biopsy in node positive and node negative respectively (Singh et al., 2020). The advantages of SLN biopsies in avoiding the incidence of complete axillary lymph node dissection while providing correct staging information have been well-documented. Sentinel lymph node is defined as the first lymph node that receives lymphatic drainage from a tumor, and therefore, if they are present, is most likely to have micro-metastasized lymph nodes (Bhandari et al., 2018).

Singh et al. undertook a study in (2020) in a tertiary care center in India, to evaluate the accuracy of ultrasound-guided (USG) fine needle aspiration cytology (FNAC) of axillary lymph nodes in early breast cancer patients. They proved that the feasibility of USG and USG-FNAC in a high-volume center with good accuracy of around 70-80%.

2.6.5: Positron Emission Tomography (PET): Through the use of a tracer, provides black and white or color-coded images of the biologic activity of a particular area, rather than its structure, used in detection of cancer or its response to treatment (Suzanne et al., 2008; p.391).

Staging fluorodeoxyglucose (FDG) positron emission tomography/ computed tomography (PET/CT) is not generally recommended in early breast cancer (EBC) at diagnosis due to a low risk of distant metastasis and high incidence of false positives. As per Oncology National Comprehensive Cancer Network (NCCN) guidelines, PET/CT is generally not routinely recommended in Stage I, II, or operable Stage III Tumor and is considered only optional for the evaluation of symptomatic patients. This is despite the fact that multiple studies in the recent past suggesting that staging preoperative PET/CT might provide meaningful information and impact disease management in about 20%- 30% of patients with clinical Stage IIB onward (Chandra et al., 2020). Despite the success of F18-FDG PET/CT, the possibility of replacing CT with MRI has been extensively investigated. MRI has several advantages over CT such as lower radiation exposure to patients higher contrast resolution, and higher potential for function and molecular imaging (Lin et al., 2018).

2.7: Breast Cancer Staging

The stage of breast cancer is based on the size of the tumor and if it has spread to other areas. There are five stages of breast cancer, including 0 (zero) through 4, written as 0, l, ll, lll and IV. The higher the number, the more the cancer has spread. The cancer is staged when the patient is first diagnosed. If they have stage ll breast cancer and the cancer comes back and spreads to the bone, patient will still be stage ll breast cancer with metastasis to the bones (ACS, 2023). The goals of cancer staging are to determine the extent of disease, help implement a treatment plan and inform prognosis (Weiss et al., 2018).

The stage of breast cancer is also described by the ‘‘TNM’’ system:

T: Tumor size (in centimeters)

N: Number of near by lymph nodes with cancer.

M: Whether the cancer has **metastasized** or spread to other organs of the body (0 = no spread, 1 = it has spread).

Stage 0: The disease is only in the ducts and lobules of the breast. It has not spread to the surrounding tissue. It is also called noninvasive cancer (Tis, N0, M0).

Stage I: The disease is invasive. Cancer cells are now in normal breast tissue. There are 2 Types:

Stage IA: The tumor is up to 2 centimeters (cm). It has not spread to the lymph nodes (T1, N0, M0).

Stage IB: The Tumor is in the breast and is less than 2 cm. Or the tumor is in the lymph nodes of the breast and there is no tumor in the breast tissue.

Stage II: describes invasive breast cancer. There are 2 Types:

Stage IIA: A tumor may not be found in the breast, but cancer cells have spread to at least 1 to 3 lymph nodes. Or Stage IIA may show a 2 to 5 cm tumor in the breast with or without spread to the axillary lymph nodes.

Stage IIB: The tumor is 2 to 5 cm and the disease has spread to 1 to 3 axillary lymph nodes. Or the tumor is larger than 5 cm but has not spread to the axillary lymph nodes.

Stage III: Describes invasive breast cancer. There are 3 types:

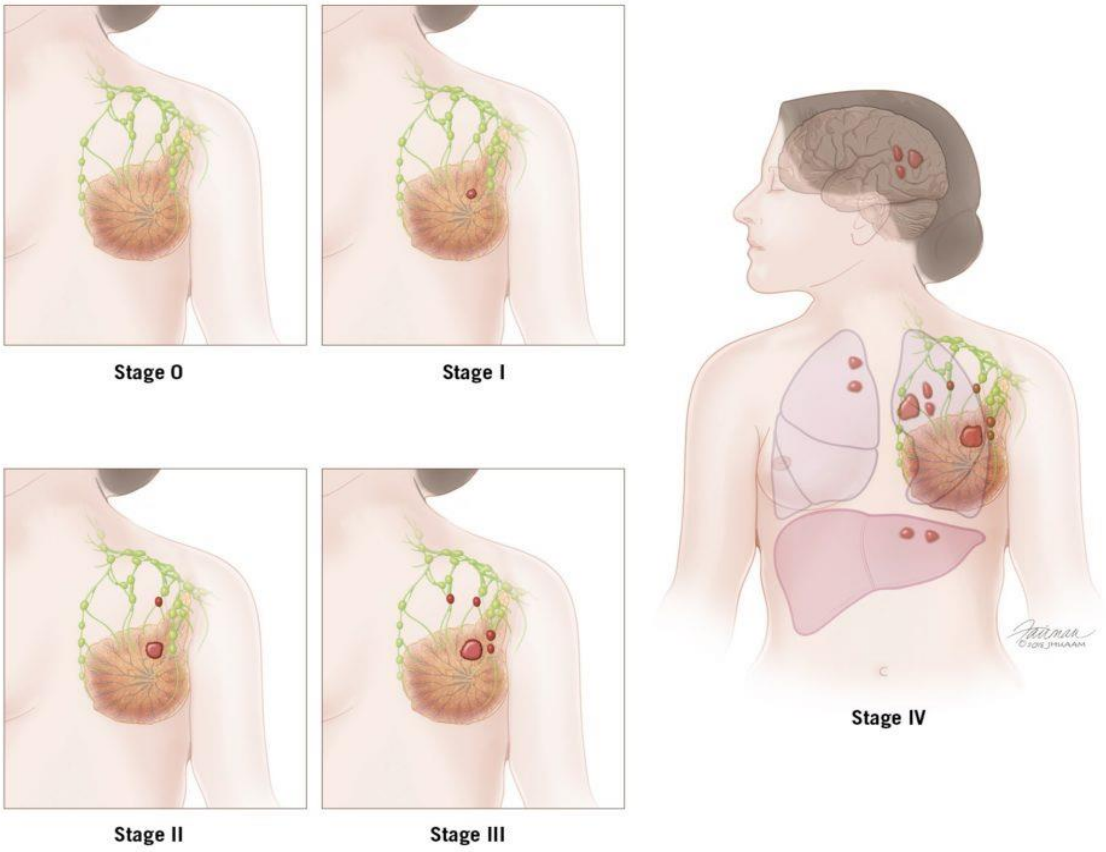
Stage IIIA: The tumor is in the breast and any size or no tumor is found in the breast but is in the lymph nodes. The disease has spread to more than 4 lymph nodes in the breast or axilla. It has not spread to other parts of the body.

Stage IIIB: The tumor may be any size and the disease has spread to the chest wall. It may cause swelling of the breast and may be in up to 9 lymph nodes. Inflammatory breast cancer is considered Stage IIIB.

Stage: IIIC: There may be no sign of cancer in the breast or a tumor may be any size and may have spread to the chest wall or breast skin. The disease has spread to 10 or more axillary lymph nodes, or nodes above or below the collarbone or breastbone.

Stage IV (metastatic): The tumor can be any size and the disease has spread to other organs and tissues, such as the bones, lungs, brain, liver, distant lymph nodes, or chest wall (any T, any N, M1) (ACS, 2023).

Breast cancer Staging:



(Johns Hopkins Pathology, 2023)

2.7.1: Breast Cancer Staging System

DEFINITIONS OF AJCC TNM: AJCC-TNM Staging System

The American Joint Committee on Cancer (AJCC) implemented the current TNM staging system for breast cancer (AJCC, 2018; p. 624-625).

Definition of Primary Tumor (T)-Clinical and Pathological

Primary Tumor	
T Category	**T Criteria**
TX	Primary tumor cannot be assessed
T0	No evidence of primary tumor
Tis (DCIS)*	Ductal carcinoma in situ
Tis (Paget)	Paget disease of the nipple Not associated with invasive carcinoma and/or carcinoma in situ (DCIS) in the underlying breast parenchyma. Carcinomas in the breast parenchyma associated with Paget disease are categorized based on the size and characteristics of the parenchymal disease, although the presence of Paget disease should still be noted.
T1	Tumor ≤ 20 mm in greatest dimension
T1mi	Tumor ≤ 1 mm in greatest dimension
T1a	Tumor > 1 mm but ≤ 5 mm in greatest dimension (round any measurement > 1.0- 1.9 mm to 2 mm)
T1b	Tumor > 5 mm but ≤ 10 mm in greatest dimension
T1c	Tumor > 10 mm but ≤ 20 mm in greatest dimension
T2	Tumor > 20 mm but ≤ 50 mm in greatest dimension
T3	Tumor > 50 mm in greatest dimension
T4	Tumor of any size with direct extension to the chest wall and/ or to the skin (ulceration or macroscopic nodules); invasion of the dermis alone does not qualify as T4
T4a	Extension to the chest wall; invasion or adherence to pectoralis muscle in the absence of invasion of chest wall structures does not qualify as T4
T4b	Ulceration and/ or ipsilateral macroscopic satellite nodules and/ or edema (including peau d'orange) of the skin that does not meet the criteria for inflammatory carcinoma
T4c	Both T4a and T4b are present
T4d	Inflammatory carcinoma (see section ''Rules for Classification'')

*Note: Lobular carcinoma in situ (LCIS) is a benign entity and is removed from TNM staging in the *AJCC Cancer Staging Manual, 8th Edition*

Definition of Regional Lymph Nodes- Clinical (CN):

cN Category	cN Criteria
cNX*	Regional lymph nodes cannot be assessed (e.g., previously removed)
cN0	No regional lymph node metastases (by imaging or clinical examination)
cN1	Metastases to movable ipsilateral Level l, ll axillary lymph node(s)
cN1mi**	Micrometastases (approximately 200 cells, larger than 0.2 mm, but none larger than 2.0 mm)
cN2	Metastases in ipsilateral Level, l, ll axillary lymph nodes that are clinically fixed or matted; *or* in ipsilateral internal mammary nodes in the absence of axillary lymph node metastases
cN2a	Metastases in ipsilateral Level l, ll axillary lymph nodes fixed to one another (matted)or to other structures
cN2b	Metastases only in ipsilateral internal mammary nodes in the absence of axillary lymph node metastases
cN3	Metastases in ipsilateral infraclavicular (Level lll axillary lymph node(s) with or without Level l, ll axillary lymph node involvement; *or* in ipsilateral internal mammary lymph nodes(s) with Level l, ll axillary lymph node metastases; *or* metastases in ipsilateral supraclavicular lymph node(s) with or without axillary or internal mammary lymph node involvement
cN3a	Metastases in ipsilateral infraclavicular lymph node(s)
cN3b	Metastases in ipsilateral internal mammary lymph node(s) and axillary lymph node(s)
cN3c	Metastases in ipsilateral supraclavicular lymph node(s)

Note: (sn) and (f) suffixes should be added to the N category to denote confirmation of metastasis by sentinel node biopsy or fine needle aspiration/ core needle biopsy respectively.

*The cNX category is used sparingly in cases where regional lymph nodes have previously been surgically removed or where there is no documentation of physical examination of the axilla.

**cN1mi is rarely used but may be appropriate in case where sentinel node biopsy is performed before tumor resection, most likely to occur in case treated with neoadjuvant therapy.

Definition of Regional Lymph Nodes-Pathological (PN)

pN Category	pN Criteria
pNX	Regional lymph nodes cannot be assessed (e.g., not removed for pathological study or previously removed)
pN0	No regional lymph node metastasis identified or ITCs only
pN0(i+)	ITCs only (malignant cell clusters no larger than 0.2 mm) in regional lymph node(s)
pN0(mol+)	Positive molecular findings by reverse transcriptase polymerase chain reaction (RT-PCR);no ITCs detected
pN1	Micrometastases; or metastases in 1-3 axillary lymph nodes; and/or clinically negative internal mammary nodes with micrometastases or macrometastases by sentinel lymph node biopsy
pN1mi	Micrometastases (approximately 200 cells, larger than 0.2 mm, but none larger than 2.0 mm)
pN1a	Metastases in 1-3 axillary lymph nodes, at least one metastasis larger than 2.0 mm
pN1b	Metastases in ipsilateral internal mammary sentinel nodes, excluding ITCs
PN1c	pN1a and pN1b combined
pN2	Metastases in 4-9 axillary lymph nodes; or positive ipsilateral internal mammary lymph nodes by imaging in the absence of axillary lymph node metastases
pN2a	Metastases in 4-9 axillary lymph nodes (at least one tumor deposit larger than 2.0 mm)
pN2b	Metastases in clinically detected internal mammary lymph nodes with or without microscopic confirmation; with pathologically negative axillary nodes
pN3	Metastases in 10 or more axillary lymph nodes; *or* in inftraclavicular (Level lll axillary) lymph nodes; *or* positive ipsilateral internal mammary lymph nodes by imaging in the presence of one or more positive Level l, ll axillary lymph nodes; *or* in more than three axillary lymph nodes and micrometastases or macrometastases by sentinel lymph node biopsy in clinically negative ipsilateral internal mammary lymph nodes; *or* in ipsilateral supraclavicular lymph nodes
pN3a	Metastases in 10 or more axillary lymph nodes (at least one tumor deposit larger than 2.0 mm); *or* metastases to the infraclavicular (Level lll axillary) lymphnodes
pN3b	pN1a or pN2a in the presence of cN2b (positive internal mammary nodes by imaging); *or* pN2a in the presence of pN1b
pN3c	Metastases in the ipsilateral supraclavicular lymphnodes

Note: (sn) and (f) suffixes should be added to the N category to denote confirmation of metastasis by sentinel node biopsy or FNA/ core needle biopsy respectively, with NO further resection of nodes.

Definition of Distant Metastasis (M)

M Category	M Criteria
M0	No clinical or radiographic evidence of distant metastases*
cM0(i+)	No clinical or radiographic evidence of distant metastases in the presence of tumor cells or deposits no larger than 0.2 mm detected microscopically or by molecular techniques in circulating blood, bone marrow, or other non regional nodal tissue in a patient without symptoms or signs of metastases
cM1	Distant metastases detected by clinical and radiographic means
pM1	Any histologically proven metastases in distant organs; or if in non-regional nodes, metastases greater than 0.2 mm

*Note that imaging studies are not required to assign the cM0 category (AJCC, 2018; p. 624-625).

2.8: The grade of breast cancer: is a prognostic factor and is representative of the ‘‘aggressive potential’’ of the tumor. In a broad generalization, ‘‘low grade’’ cancers tend to be less aggressive than ‘‘high grade’’ cancers. Determining the grade is thus very important, and clinicians use this information to help guide treatment options for patients (JHP, 2023).

The total score is used to determine the grade in the following way:

Grade I tumors have a total score of 3-5

Grade II tumors have a total score of 6-7

Grade III tumors have a total score of 8-9

2.9: Breast Cancer Survivorship

Shapiro (2018) defined breast cancer survivorship as ‘‘starts at the time of diagnosis and lasts throughout the lifespan’’. Breast cancer survival rates have improved over the last 3 decades, owing in part to both earlier detection and improved therapies. Early-stage breast cancer refers to patients diagnosed at stage 0 (DCIS or non-invasive), Stage I (invasive tumor < 2 cm) with negative axillary nodes), Stage II (invasive tumor size < 5 cm with positive nodes or tumor size > 5 cm with negative nodes), or stage IIIA (tumor over 5 cm with positive nodes). Five-years survival rates for local and regional (early-stage) breast cancer are 98.9% and 85.7%, respectively (Partin, 2022).

Krelikowske et al. (2020) said that, women diagnosed with advanced breast cancer have worse survival than women diagnosed with early stage disease. For that reason, breast cancer screening is important to reduce the number of women diagnosed with advanced breast cancer to decrease breast cancer mortality. The goal of screening mammography is to detect small malignant tumors before they grow large enough to cause symptoms. Effective screening should therefore lead to the detection of greater number of small tumors, followed by fewer large tumors over time (Welch et al., 2016). Shapiro (2018) concluded that advances in cancer screening and early detection, improvements in the therapeutics and supportive care all contribute to decreasing breast cancer mortality.

2.10: Treatment Modalities

2.10.1: Surgery

Most patients with breast cancer have surgery to remove the cancer from the breast. Surgical removal of the entire cancer remains the ideal and most frequently used treatment method. However, the specific surgical approach may vary for several reasons. Like diagnostic surgery. Surgery may be the primary method of treatment, or it may be prophylactic, or palliative or reconstructive (Suzanne et al., 2008; p. 391).

2.10.1.1: Types of Surgery

There are two main types of surgery used to treat breast cancer:

1. Lumpectomy: is a type of surgery to remove the breast lump or other abnormal tissue from the breast with some of the breast tissue around it. This may call it breast- conserving surgery, partial mastectomy, or excisional biopsy. Because lumpectomy leaves as much breast tissue as possible, it is known as breast-conserving surgery. It is typically followed by radiation to help prevent the cancer from returning to the breast (Web MD, 2022).

2. Mastectomy: is a way to treat breast cancer by surgically removing a breast and sometimes nearby tissues (Web MD, 2021). It is another name for breast removal surgery. Mastectomy need if someone have breast cancer or have a high risk of getting breast cancer (Cleveland Clinic, 2022).

Partial Mastectomy: is preferable for women with stage I or stage II breast cancer. It is a breast-conserving method in which the surgeon removes only the tumor and the tissue around it (Web MD, 2021).

Total mastectomy; it is also called simple mastectomy, the surgeon removes all breast tissue but leaves the pectoral muscles beneath. A total mastectomy can be unilateral or bilateral (Cleveland Clinic, 2022). It is done if the cancer has not spread beyond the breast, or if women who have a high risk of breast cancer, it is called prophylactic mastectomy. Studies show that women with a high risk of breast cancer may be as much as 90% less likely to get the disease after preventive mastectomy (Web MD, 2021).

Radical Mastectomy: is the complete removal of the breast. The surgeon also removes the overlying skin, the muscles beneath the breast, and the lymph nodes. However, they rarely do radical mastectomy today because it is not usually more effective than other types. It is recommended only when cancer has spread to the chest muscle (Web MD, 2022).

Modified radical mastectomy: MRM is a less traumatic and more common procedure, the entire breast including the skin, breast tissue, areola, and nipple is removed. The lining of the chest muscles with the lymph nodes under the arm is also removed, but the muscle itself is left in place (Web MD, 2022; Susan, 2022).

Skin-sparing Mastectomy: the surgeon removes breast tissue but spares most of the skin over the breast. It is used when breast reconstructing the breast (Cleveland Clinic, 2022). It may not be a good choice if the tumors are large or near the skin's surface (Web MD, 2022).

Nipple-sparing Mastectomy: the doctor removes all the breast tissue, including the ducts going all the way up to the nipple and areola. They save the skin of the nipple and areola and cut out tissues under and around them. If these areas are cancer-free, they can be saved. This method also calls for reconstruction right after the mastectomy (Web MD, 2022).

In the past decade, there have been marked trends toward higher proportions of breast conservation surgery (BCS) eligible patients undergoing mastectomy, breast reconstruction, and bilateral mastectomy. The greatest increases are seen in women with node-negative and in situ disease. Mastectomy rates do not yet exceed current American Cancer, also in Kurdistan decreased steadily. This is due to several subsequent studies confirmed equivalent outcomes regarding breast conservation surgery for management of early-stage breast cancer. This was endorsed by a National Institutes of Health Consensus Conference in 1990 has become a standard of excellence in breast cancer care (Moran et al., 2013; Kummerow et al., 2015).

2.10.1.2: Sentinel node biopsy; is the removal of the sentinel lymph nodes during surgery. The sentinel lymph node is the first lymph node the cancer is likely to spread to from the tumor. To locate the sentinel nodes, the surgeon before or during this procedure injects a radioactive substance called a tracer and/ or a blue dye into the breast. The surgeon locates the sentinel nodes by looking for the lymph nodes that have absorbed the tracer by using a special device called a gamma probe or the dye, which turns the lymph node blue. The radioactive tracer or blue dye usually identifies 1-5 nodes as the sentinel nodes. Then removes the sentinel nodes and a pathologist checks the nodes for cancer cells. If cancer is not found in the sentinel node (the sentinel node is negative), it is unlikely that other axillary lymph nodes have cancer. If the sentinel node does contain cancer cells (the sentinel node is positive), more nodes are sometimes removed with a procedure called axillary dissection (Susan, 2022).

2.10.2: Chemotherapy

It is the use of drugs to destroy cancer cells. This type of cancer treatment works by keeping cancer cells from growing, dividing, and making more cells. Chemotherapy is a systemic medication. This means it travels through the bloodstream and reaches all parts of the body. There are many different kinds of chemotherapy. In general, drugs used for chemotherapy are powerful chemicals that treat cancer by attacking cells during specific parts of the cell cycle. All cells go through the cell cycle, which is how new cells are made. Cancer cells go through this process faster than normal cells, so chemotherapy has more of an effect on these fast-growing cells. Because chemotherapy travels through the whole body, it can also damage healthy cells as they go through their normal cell cycle. This is why chemotherapy can cause side effects like hair loss and nausea (Cancer Net, 2022).

2.10.2.1: The Goals of Chemotherapy

The Goals of Chemotherapy depend on the type of cancer and how far it has spread. Chemotherapy can be given alone or as a part of a treatment plan that includes different treatments (Cancer Net, 2022).

2.10.2.2: Types of Chemotherapy

Some of the ways chemotherapy is used include: (Cancer Net, 2022)

Curative chemotherapy: it is used as the primary treatment: sometimes, the goal of chemotherapy treatment is to get rid of all the cancer and keep it from coming back.

Neoadjuvant chemotherapy: it can be given before surgery or radiation therapy to shrink tumors.

Adjuvant chemotherapy: it can be given after surgery or radiation therapy to destroy any remaining cancer cells.

Palliative chemotherapy: it is used to slow the progression of cancer and relieve symptoms. Even when the cancer is not curable, chemotherapy can partially shrink tumors and prevent tumor growth and spread for various lengths of time. In such settings, chemotherapy can extend survival, relieve cancer-related symptoms, and improve quality of life.

Chemotherapy can be used to treat many types of cancers. It can also be used to treat recurrent cancer and metastatic cancer. Recurrent cancer; is cancer that comes back after treatment. Metastatic cancer; is cancer that has spread to other parts of the body (Cancer Net, 2022).

2.10.3: Radiation Therapy

Radiation therapy is one of the most common treatments for cancer. It may be used alone or with other treatments, such as surgery, chemotherapy, hormones, or targeted therapy. If the treatment plan includes radiation therapy, knowing how it works and what to expect can often help patient to prepare for treatment and make informed decisions about their care (Cancer. org, 2019).

Radiation therapy uses high-energy particles or waves, such as x-rays, gamma rays, electron beams, or protons, to destroy or damage cancer cells. Human cells normally grow and divide to form new cells. However, cancer cells grow and divide faster than most normal cells. Radiation works by making small breaks in the DNA inside cells. These breaks keep cancer cells from growing and dividing then cause them to die. Nearby normal cells can also be affected by radiation, but most recover and go back to working the way they should. While chemotherapy and other treatments that are taken by mouth or injection usually expose the whole body to cancer-fighting drugs, radiation therapy is usually a local treatment. This means it is usually aimed at and affects only the part of the body needing treatment. In some radiation treatments use radioactive substances that are given in a vein or by mouth, which is called systemic radiation therapy.

Even though this type of radiation does travel throughout the body, the radioactive substance mostly collects in the area of the tumor, so there is still little effect on the rest of the body (Cancer. org, 2019).

2.10.3.1: Radiation for breast cancer: some women with breast cancer will need radiation, in addition to other treatments. Depending on the breast cancer's stage and other factors, radiation therapy can be used in several situations;

1. After breast-conserving surgery (BCS), to help lower the chance that the cancer will come back in the same breast or nearby lymph nodes.

2. After a mastectomy, especially if the cancer was larger than 5 cm, if cancer is found in many lymph nodes, or if certain surgical margins, such as the skin or muscle, have cancer cells.

3. If cancer has spread to other parts of the body, such as the bones, spinal cord, or brain (Cancer. org, 2019).

2.10.3.2: Types of Radiation

The main types of radiation therapy that can be used to treat breast cancer are; external beam radiation therapy and brachytherapy (Cancer. org, 2021).

External beam radiation therapy (EBRT); is the most common type of radiation therapy for women with breast cancer. A machine outside the body focuses the radiation on the area affected by the cancer. Which areas need radiation depends on whether patients had a mastectomy or breast-conserving surgery and if the cancer has reached nearby lymph nodes. If patient will need external beam radiation therapy after surgery, it is usually not started until the surgery site has healed, which often takes a month or longer. If the patient is getting chemotherapy as well, radiation treatments are usually delayed until chemotherapy is done. Some treatments after surgery, like hormone therapy or

HER2 targeted therapy, can be given at the same time as radiation (Cancer. org, 2021).

Brachytherapy; also known as internal radiation, is another way to deliver radiation therapy. Instead of aiming radiation beams from outside the body, a device containing radioactive seeds or pellets is placed into the breast tissue for a short time in the area where the cancer had been removed which is called tumor bed. For certain women who had breast-conserving surgery (BCS), brachytherapy can be used by itself instead of radiation to the whole breast as a form of accelerated partial breast irradiation. Tumor size, location, and other factors may limit who can get brachytherapy (Cancer. org, 2021).

2.10.4: Targeted therapy

An effective treatment can attack specific breast cancer cells without harming normal cells. Targeted methods are commonly used in combination with traditional chemotherapy. However, these drugs often less severe side effects than standard chemotherapy drugs (NBCF, 2023). It can be given in the vein (IV), as an injection under the skin, or as a pill (Cancer. org, 2023)**.**

2.10.4.1: Mechanism of action of targeted therapies

Targeted therapy in breast cancer, uses drugs that block the growth of breast cancer cells in specific ways. It may block the action of an abnormal protein such as HER2 that stimulates the growth of breast cancer cells. For example, Herceptin or lapatinib may be given to a woman whose lab tests show that her breast tumor has too much HER2 (NBCF, 2023). Some targeted therapy drugs such as monoclonal antibodies, work in more than one way to control cancer cells and may also be considered immunotherapy because they boost the immune system (Cancer. org, 2023).

Like Chemotherapy, these drugs enter the bloodstream and reach almost all areas of the body, which makes them useful against cancers that have spread to distant parts of the body. Targeted drugs sometimes work even when chemo drugs do not. Some targeted drugs can help other types of treatment work better (Cancer. org, 2023).

2.10.5: Hormonal Therapy:

Hormone therapy for breast cancer is a treatment for breast cancers that are sensitive to hormones. Some forms of hormone therapy work by blocking hormones from attaching to receptors on cancer cells. Others forms work by decreasing the body's production of hormones (Mayo clinic, 2023).

Estrogen and progesterone hormone are carried along in the bloodstream. When they encounter a breast cancer cell, they stick to proteins called hormone receptors on the cell's surface. This connection acts as an ''on switch'' and triggers the cancer cells to grow. The goal of hormone therapy is to prevent hormones from attaching to cancer cells, which deprives the cancer cells of fuel they need to grow. About 70% of all breast cancers depend on estrogen or progesterone for growth (RONDA, 2022).

Hormone therapy for breast cancer is only used to treat cancers that are hormone sensitive. Hormone-sensitive breast cancers are fueled by the natural hormones estrogen or progesterone. A breast cancer that is sensitive to estrogen is called estrogen receptor positive, also called ER positive. A breast cancer that is sensitive to progesterone is called progesterone receptor positive, also called PR positive. Many breast cancers are sensitive to both hormones (Mayo clinic, 2023).

2.8.5.1: Hormone therapy is given (BCN, 2021)

After surgery: Hormone therapy is usually started after surgery. It is given to reduce the risk of breast cancer coming back. It may also reduce the risk of a new breast cancer developing. Hormone therapy may be started during or after the radiotherapy. If patient having chemotherapy after surgery, it usually start after chemotherapy has finished. However, patient having Herceptin, hormone therapy may be given at the same time. It may be recommended after breast-conserving surgery for DCIS.

Before surgery: hormone therapy may be given before surgery to reduce the size of the cancer, or if surgery is delayed for some reason. It is given when surgery is not an option, for example if someone has a lung or heart condition.

If cancer has come back or spread: Hormone therapy can be used to treat breast cancer that has recurrence or that has spread to another part of the body. It is given either alone or with other treatments, depending on what treatments they had before.

2.10.5.2: Hormone therapy drugs

The most common hormone therapy drugs used to treat breast cancer are; Tamoxifen, Aromatase inhibitors (letrozole, anastrozole and exemestane), Goserelin (Zoladex), Leuprorelin (Prostap), Fulvestrant (Faslodex) (BCN, 2021).

Note: If patient prescribed tamoxifen or an aromatase inhibitor after surgery, she will usually take these for five years. However, some of them will be recommended to continue taking them for up to 10 years (BCN, 2021).

2.11: Methods for measuring breast volume (Appendix-K)

Breast volume should be measured in breast cancer because the tumor/ breast volume ratio is of significance with respect to breast-conserving surgery; it is necessary in order to establish the indication for breast-conserving surgery and to predict the tumor/ breast volume ratio. In addition, breast volume measurement used in all types of breast surgery such as reduction, augmentation, reconstructive, and oncoplastic surgery in order to obtain symmetry of both breasts (Kayar et al., 2011).

There are various methods have been used to measure breast volume; it include Anthropomorphic measurements, Biostereometric analysis, Archimedes-water displacement procedure, Casting techniques, Grossman-Rounder Device, radiological techniques such as measurements on Mammograms, Magnetic resonance imaging (MRI), Ultrasonography, Computer tomography (CT), 3D surface imaging, and Plastic cups (Kayar et al., 2011; Hansson et al., 2014).

2.11.1: Anthropomorphic measurements

Anatomic or anthropometric measurement, breast volume is measured using anatomic dimensions and a geometric volume formula. The most common formula is the one proposed by Qiao et al. (1997) as follows:

Breast volume= $\pi/3 \times MP^2 \times (MR + LR + IR - MP)$

Where MP= mammary projection, MR= medial breast radius, LR= lateral breast radius, and IR= Inferior breast radius. The measurements should be performed when the patient is in a sitting or standing with her arms at her sides (Kayar et al., 2011).

MR corresponds to the distance between the nipple and medial breast border, LR to the distance between the nipple and lateral breast border, IR to the

distance between the nipple and inframammary fold, and MP to the mammary projection (Kovacs et al., 2007).

2.11.2: Biostereometric analysis

This measurement technique use close-range stereophotogrammaertry to characterize the shape of the breast and is noncontact, noninvasive, accurate, and rapid with respect to the subject involvement time (Loughry et al., 1987).

2.11.3: Archimedes-water displacement procedure

The Archimedes method involves submersion of the breasts into a water-filled container to calculate the amount of displaced water. It was first defined by Bouman, and then a modified version was developed to avoid patient contact with water. In this new version, a half-elastic container, an appropriately sized plastic bag, and a plug to seal the bag are used for measurement while the patient is in a half-seated position. After placing the breast in the container, the difference between the container volume and the water that can be filled into the plastic bag reveals the breast volume. There are three containers with different capacities (800, 1300, and 1800 ml) according to breast size and the volume of the plastic bag is 1000 ml (Kayar et al., 2011).

2.11.4: Casting techniques

Synthetic gypsum (Policast II) was used to form a cast around the breast. A thin plastic film was used to protect the skin against a direct contact with the material. Breast volume was measured indirectly by filling the cast with water and measuring the volume of the displaced water (Anderson et al., 2013).

2.11.5: Grossman-Rounder Device

It is a graduated disc made of hard transparent polyvinyl chloride material, which can be formed into a cone-shaped device by means of a cut to the center along a radius line. Patients should be in sitting position with their arms at their sides, if the breasts are large or pendulous, the hands should be elevated to the neck during the measurement procedure. One-fifth of the area on the disc has markings. The graduated scale of the disc is aligned with the upper outer aspect of the breast and at the same time the lower end of the disc is placed according to the lower breast contour. Then, by pressing gently on the breast, the disc is converted into a cone by its cut edge covering the breast tissue. The breast should be supported from below and lifted gently into the cone. The cone should be filled completely. If the cone cannot cover the breast completely, then a larger size disc should be used. The volume can be read from the calibrations marked on the disc (Kayar et al., 2011).

The original three-disc set consisted of a 16 cm disc to measure volumes up to 150-200 ml, 18 cm disc to measure volumes up to 200-300 ml, and a 20 cm disc to measure volumes up to 300-425 ml. Two discs, 24 and 28 cm in diameter, were custom-prepared by us in order to measure larger volumes (500-700 ml and 700-1500 ml, respectively) (Kayar et al., 2011).

2.11.6: Radiological techniques

Radiological techniques such as measurements on Mammograms, Magnetic resonance imaging (MRI), Ultrasonography, Computer tomography (CT) Kovacs et al. undertook a study in (2007), using a 3D laser scanner, nuclear magnetic resonance imaging (MRI), thermoplastic castings, and anthropomorphic measurements. Mean volumes (cc) and mean measurement deviations were calculated, and regression analyses were performed. MRI showed the highest measurement precision, with a mean deviation (expressed as

a percentage of mean breast volume 0 of 1.56±0.52%). They concluded that the 3D scanner represents a simple and promising method.

2.11.7: Plastic cups

Breast volume measurement with plastic cups is an easily usable quick and cheap way to measure breast volume in everyday clinical practice. The plastic cups that have been used for measurement of breast volume were designed by the senior author (AR) and manufactured by Emballageform AB. The set comprises 14 cups with better-adjusted intervals from 125 millilitres (ml) to 2000 ml. Their method was based on 12 standard plastic cups for household use manufactured by Hammarplast AB (Hansson et al., 2014).

2.11.8: Measuring tape

This is a traditional method was used for measuring the volume of breast in a healthy woman. The band size and the bust size measured, the cup size was defined by subtracting the band size from the bust measurement (Cup size = Bust size – Band size). In this method each inch of difference is represent a cup size step. All the measurements were performed with the woman standing in a relaxed vertical position with empty lungs immediately after exhalation (Anderson et al., 2013).

Patients themselves often discuss breast size in terms of bra size. However, cup size labelling is not standardised; different brands of bras differ in their labelling of cup size for the same breast volume (Hansson et al., 2014). For that reason, direct breast volume measurement by using tape measure was the best option to find out the actual bra size. The breast size, the band and Bust sizes was measured by using tape measure (centimetre).

Band Size (Under Bust); was measured in centimetres across the patient's ribcage and around the back under arms, just below the breasts at the inframammary fold (Oncovia.com, 2018; McGhee et al., 2018).

Cup Size (Bust); measured the non-operated side by placing the measuring tape at the same level as patient's nipple in centimetres. Start from the sternum and stop at the middle of patient's back, multiply by two. Make sure that the measuring tape is horizontal and not too tight or loose. The participants assumed the same position and wore a non-padded high support bra (Oncovia.com, 2018; McGhee et al., 2018).

2.12: Nursing Care for Breast Cancer patients: (Curran, 2022)

Breast Cancer Nursing Care Plans Diagnosis and Interventions:

Nursing Care Plan 1

Nursing Diagnosis: Deficient Knowledge related to new diagnosis of breast cancer as evidenced by patient's verbalization of ''I want to know more about my new diagnosis and care''

Nursing Interventions:

- Assess the patient's readiness to learn, misconceptions, and block to learning e.g. denial of diagnosis or poor lifestyle habits, to address the patient's cognition and mental status towards the new diagnosis and to help the patient overcome blocks to learning.

- Explain what breast cancer is and its symptoms. Avoid using medical jargons and explain in layman's terms.

- Educate the patient about his/her breast cancer treatment plan. If patient is for systemic anti-cancer therapy (SACT) and/ or radiotherapy, explain the treatment protocol that will be administered, its purpose, risks, and possible side effects. If the patient is for surgery, explain the procedure to the patient.

- Inform the patient the details about the prescribed medications (e.g. drug class, use, benefits, side effects, and risks) for supportive care, such as pain medications, anti-emetics and bowel medications. Explain how to properly self-administer each of them. Ask the patient to repeat or demonstrate the self-administration details to you.

- Use open-ended questions to explore the patient's lifestyle choices and behaviors that can be linked to the development of breast cancer. Teach the

patient on how to modify these risk factors (e.g. smoking, excessive alcohol intake, obesity, unhealthy food choices, sedentary lifestyle, etc).

Nursing Care Plan 2

Nursing Diagnosis: Imbalanced Nutrition: Less than Body Requirements related to consequences of chemotherapy for breast cancer, as evidenced by abdominal cramping, stomach pain, diarrhea or constipation, bloating, weight loss, nausea and vomiting and loss of appetite.

Nursing Intervention:

- Explore the patient's daily nutritional intake and food habits (e.g. meal times, duration of each meal session, snaking, etc.)

- Create a daily weight chart and a food and fluid chart. Discuss with the patient the short term and long-term nutrition and weight goals.

- Help the patient to select appropriate dietary choices to increase dietary fiber, caloric intake and coffee intake.

-Refer the patient to the dietitian. To provide a more specialized care for the patient in terms of nutrition and diet in relation to newly diagnosed breast cancer.

-Symptom control: Administer the prescribed medications for abdominal cramping and pain, such as antispasmodics. Promote bowel emptying using laxatives as prescribed for constipation. On the other hand, provide advice on taking anti-diarrheal medication for diarrhea.

Nursing Care Plan 3

Nursing Diagnosis: Fatigue related to consequence of chemotherapy for breast cancer (e.g., immunosuppression and malnutrition) and/ or emotional distress

due to the diagnosis, as evidenced by overwhelming lack of energy, verbalization of tiredness, generalized weakness, and shortness of breath upon exertion.

Nursing Interventions:

- Ask the patient to rate fatigue level (mild, moderate, or severe fatigue). Assess the patient's activities of daily living, as well as actual and perceived limitations to physical activity. Ask for any form of exercise that he/she used to do or wants to try.

- For patients with grade 3 fatigue (severe fatigue), consider discussing having a treatment break with the oncology team. Having a treatment break may be needed to allow the patient to recuperate before receiving further doses

- Encourage progressive activity through self-care and exercise as tolerated. Explain the need to reduce sedentary activities such as watching television and using social media in long periods. Alternate periods of physical activity with rest and sleep.

-Teach deep breathing exercises and relaxation techniques. Provide adequate ventilation in the room. This is to allow the patient to relax while at rest.

-Refer the patient to physiotherapy/ occupational therapy team as required. This is to provide a more specialized care for the patient in terms of helping him/ her build confidence in increasing daily physical activity.

Nursing Care Plan 4

Nursing Diagnosis: Imbalanced Nutrition: Less Than Body Requirements related to fatigue, emotional distress, and poorly controlled pain due to chemotherapy secondary to breast cancer, as evidenced by expressions of inadequate food intake, loss of interest in food, inability to ingest food, reduced

subcutaneous fat, body weight 20 percent below optimum for height and frame, stomach cramps and constipation.

Nursing Interventions:

- Observe the patient's daily food consumption and advise them to keep a food diary as directed.

- Measure the patient's height, weight, and the thickness of triceps or other anthropometric measurements as appropriate. Find out how much weight has recently been lost. Weight the patient daily or as directed.

- Observe the patient for pallor, slow wound healing, and swollen parotid glands in the skin and mucosal membrane.

- Encourage the patient to have a calorie-dense, nutrient-rich diet while also getting enough fluids. Promote frequent or smaller meals spaced throughout the day and the use of supplements.

- Encourage the patient to eat with family and friends by creating a pleasant dining environment. This is leads to increases the joy of eating, which can increase proper food intake.

- Encourage the patient and carer/ significant other to share thoughts about the effects of chemotherapy on the patient's food intake.

- Adjust the patient's diet before and after chemotherapy treatment as needed. Give clear and cool liquids, offer light or bland foods, as well as candied ginger, dry crackers, toast, carbonated drinks. Consider fluid restriction during meals.

- Refrain the patient from eating overly fatty, sweet, or spicy foods. These foods can cause an episode of nausea and vomiting.

- Encourage the patient to do meditation, guided imagery, visualization, and light exercise before meals. This may delay the onset of nausea or lessen its intensiy and may allow the patient to increase oral intake.

-Determine which patient is experiencing anticipatory nausea and vomiting, and take the necessary action. Antiemetic medications typically do not relieve psychogenic nausea and vomiting that occurs prior to chemotherapy. On the day of treatment, a change in the patient's routine or the treatment environment may be beneficial.

- Administer antiemetics regularly, either before or after the administration of antineoplastic agents, depending on the situation.

- Monitor the antiemetic's effectiveness. All drugs have varied effects on various people.

- Subject the patient's gastric secretions and stool to lab tests as indicated by the physician.

- Review the patient's relevant laboratory studies including total lymphocyte count, serum transferring, and albumin or prealbumin. This is to determine the degree of malnutrition and metabolic imbalance, and it affects the choice of nutritional therapies.

- Refer the patient to the nutritional support team or dietitian. They give instructions for a unique diet to satisfy individual demands and lessen issues with protein, calorie, and vitamin deficits.

-Insert and maintain a central line for total parenteral nutrition (TPN) if necessary, or an NG or feeding tube for enteric feedings. These may be required to meet nutritional needs if there is severe malnutrition (loss of 25% to 30% of body weight in 2 months).

Nursing Care Plan 5

Nursing Diagnosis: Risk for Infection related to insufficient secondary defences, immunosuppresion, and chronic disease process secondary to breast cancer, as evidenced by damaged epidermal tissue, skin irritation on injection

site, shortness of breath, presence of mucus in the saliva, nasal drainage, fever of 100.5 F, sore throat and chills.

Nursing Interventions:

- Encourage the patient's visitors and other staff to wash their hands properly. Visitors who may be infected should be screened and limited. As specified, place the patient in reverse isolation.

- Reinforce good personal hygiene for the patient to reduce the risk of infection.

- Monitor the patient's temperature. Early detection of infectious processes enables timely initiation of the necessary therapy.

- Assess the patient for signs and symptoms of infection in various systems such as the skin, respiratory, and genitourinary on a regular basis.

- Encourage the patient to move frequently and to maintain sheets wrinkle-free and dry.

- Encourage the patient to have regular periods of relaxation and exercise; to reduce fatigue while promoting enough mobility to avoid complications from stasis such as pneumonia and thrombus formation.

- Emphasize the need for good oral hygiene to prevent stomatitis.

- Limit performing invasive procedures on the patient. If it is required, always follow aseptic technique.

- Check the patient's complete blood count (CBC), differential WBC and granulocyte counts, and platelets as needed.

- Obtain samples for cultures as needed. This is to determine the responsible organism and the best treatment.

- Ensure that dietary requirements are met. Skin deterioration and sluggish wound healing can be brought on by altered diet.

- Assess the patient's skin during radiation therapy. Every time a patient receives radiation, the area should be checked for redness, skin peeling or blistering, and other irritation.

- Educate the patient about the proper skin care after radiotherapy. Inform the patient about the potential effects of radiation on their skin integrity. Emphasize how important it is to stay away from lotions, deodorants, and other items that can cause irritation.

- Encourage the patient to adhere to limb restrictions. Following the excision or radiotherapy of the axillary lymph nodes, lymphedema is a problem. By avoiding blood pressure checks and lab draws in the affected arm, the complication can be reduced.

-Encourage the patient to wear loose clothing. During the months of treatments therapy, remind patients to dress comfortably and loosely to prevent having an impaired skin integrity which may cause pathogens to enter the body. Educate the patient to avoid wear clothing related friction, tightness, or constriction.

Nursing Care plan 6

Nursing Interventions: Anticipatory Grieving related to expected decline in physiological health and perceived risk of dying secondary to breast cancer, as evidenced by alterations in eating habits, changes in sleeping patterns, activity levels, and communication patterns, shortness of breath, acute panic, expressions of fear and crying.

Nursing Interventions:

-Prepare the patient for initial shock and disbelief following a cancer diagnosis and undergoing traumatic procedure such as a disfiguring surgery.

- Determine the patient's and significant other's current stage of grief, describe the process as necessary. Understanding the grief process helps patients deal with feelings and reactions more effectively and confirms that they are normal.

- Utilize active listening, acknowledgement, and other therapeutic communication techniques with the patient and create a welcoming, uncritical environment.

- Encourage the patient to have a verbal expression of ideas or worries, and welcome tears of sadness, rage, or rejection. Recognize that these feelings are normal.

- Monitor the patient for erratic behaviour, aggression, and other acting-out trials, limit incorrect actions and refocus the patient's thoughts. These are signs of inadequate coping and need for further therapies.

- Monitor the patient for possible debilitating depression. Directly probe the patient's mental condition. Numerous breast cancer patients are at a significant risk of suicide, according to studies. When just diagnosed and released from the hospital, they are particularly vulnerable.

Encourage the patient's caretakers and support person to remain with them as needed. Depending on the situation, either makes regular phone calls or frequent visits to provide physical contact.

- Provide information about dying and reinforce instruction about disease process and remedies. Be truthful and avoid inspiring false hope when offering emotional support to the patient. Factual information is beneficial to the patient and significant others.

- Review past events, changes in roles, and coping mechanisms. Talk about topics that patient is interested in.

- Identify and inform the patient about the positive aspects of the current condition.

- Discuss how the patient and significant others can make future plans together. Encourage both to set attainable goals. Participating in planning and problem-solving might give one a feeling of control over upcoming occurrences.

- If necessary, arrange for a visiting nurse, a home health provider, or a hospice program for the patient.

- Provide the patient with a warm and comforting environment. An environment that is chaotic or stimulating can make patient feel more anxious. When speaking with the patient, keep the voice soothing and encouraging.

- Encourage the patient to practice alternative relaxation techniques including guided imagery, talk therapy, deep breathing exercise, yoga, and meditation. Patient can find the one that suits them the best among various methods.

- Educate and help the patient in understanding the diagnosis. A lack of knowledge about the diagnosis may contribute to the grief of the patient.

Nursing Care Plan 7

Nursing diagnosis: Acute Pain related to tumor advancement causing inflammation and compression on nerves and bones, chemotherapy, radiation, and surgery. The pain evidenced by; verbalization of pain, body language or guarding behavoir, facial grimacing, changes in vital signs, Agitation or restlessness. (Wagner, 2023)

Acute Pain Assessment:

1. Assess pain appropriately; pain in breast cancer can be caused by tissue damage from the tumor or by the cancer treatments that used to fight the cancer. The nurse can assess pain by asking the patient their pain level on a 0-10 scale or using a nonverbal pain scale if the patient is unable to rate.

2. Assess pain with vital signs; elevated blood pressure, tachycardia and tachypnea are often seen along with complaints of pain. The nurse can assess if pain is controlled or not by assessing for changes in vital signs. Of course, pain is always subjective and the nurse will treat for pain based on the patient's report.

3. Examine the patient's cultural norms regarding pain expression; some cultures display pain openly, while others do not. The nurse can address this by assessing for pain often, using verbal and non verbal pain scales, and remaining understanding and nonjudgmental towards the patient's beliefs.

Nursing interventions:

1. Administer pain medication as prescribed. Patients being treated for breast cancer often require a combination of opioids and non steroidal anti inflammatory drugs (NSAIDs) along with antiemetics for nausea caused by chemotherapy to relieve pain and discomfort.

2. Evaluate the effectiveness of pain medication. After pain medications are administered, evaluate the effectiveness regularly. The dosage and type of medications may need to be adjusted by the physician if the patient's pain is not controlled.

3. Provide nonpharmacological pain management. Participating in activities such as distraction, massage, hot/cold compresses, and acupuncture may provide the patient with pain relief and relaxation.

4. Educate patients about side effects and treatment. Inform the patient about what to expect regarding side effects of chemotherapy, radiation, and other treatments, which are often uncomfortable. Educate and encourage patients to be honest about their pain and communicate regularly with their provider.

CHAPTER THREE

PATIENTS & METHODS

CHAPTER THREE

PATIENTS AND METHODS

This chapter deals with the design that is used in this study, administrative arrangements, ethical consideration, study setting, sample of the study, study instruments, the pilot study, the validity and reliability of the questionnaire, data collection methods, statistical analysis of the data, and limitations of the study.

3.1: Study design

A descriptive and analytical Cross-sectional design was conducted for (400) women who diagnosed with breast cancer to determine the ‘‘Breast Size, Body Mass Index, and Physical Activity as a Risk Factor of Breast Cancer in Sulaymaniyah City - Iraqi Kurdistan Region’’ The study was carried out during the period of 14th.February.2021 to 1st.June.2022.

3.2: Administrative arrangement

Research protocol of the study was reviewed and approved by the scientific committee of the College of Nursing/ University of Sulaimani. Accordingly, an official permission was proposed to the Sulaymaniyah General Directory of Health (DOH) to grant the permission (Appendix- F). Consequently, Sulaymaniyah DOH sent a request letter to Hiwa Cancer Hospital to gain facilitation and cooperation during data collection of this study (Appendix- G)

3.3: Ethical Consideration

The proposal of the current study was revised and accepted by the Scientific and Ethical Committees, College of Medicine, University of Sulaimani (No. 63/07/03/2021) (Appendix- E).

3.3.1: Patient Consent

Each woman has taken oral consent as a voluntary participant in this study. Information regarding the study, its plan, and its objectives has been explained to them thoroughly. Also, participants were informed about the confidentiality of the data, and they were free to withdrawal whenever they desired.

3.4: Study Setting

This study was carried out at Hiwa Cancer hospital is the sole tertiary care hospital in the Sulaymaniyah Governorate of Iraqi Kurdistan. It established since (2007) as a tertiary health institute that provide comprehensive medical service cancer and hematology patients. The vision is to provide best updated evidence based medical services that guarantee best outcome. Nowadays the hospital provide a broad spectrum of services that range from registration, medical supervision, pharmaceutical, diagnostic imaging, radiotherapy, bone marrow transplantation, histopathology, psychological, social and physical rehabilitation services. Hiwa Cancer Hospital consists of nearly 200 beds with more than 630 employees. Today the hospital is teaching certified by College of Medicine- University of Sulaimani.

3.5: The sample of the study

A non-probability, purposive-sample technique was used to recruit **(400)** female patients who diagnosed with breast cancer. Each woman visited to the outpatient clinic at Hiwa Cancer Hospital for follow up or newly diagnosed breast cancer was eligible to participate in this study. Participate rate was computed by the percentage of women who visited this department during follow up period with new case. Appointment depends on the Situation of patients, stage of breast cancer and stability the progression of disease. Some of them visited yearly or

each six months while others visited the specialist doctor each three months. This is for checking the health status of breast cancer survivor's women and ensures the breast cancer not recurrence. The sample was selected according to certain inclusion and exclusion criteria:

3.5.1: Inclusion criteria:

1. Female patients
2. Age from18 years and over
3. Completion of chemotherapy or new case
4. No history of other malignancies
5. No history of psychiatric disorder
6. Willingness to participate
7. Patient live in Sulaymaniyah Governorate

3.5.2: Exclusion criteria:

1. Palliative patients
2. Bilateral mastectomy
3. Chest deformity
4. Dead patients
5. Lactated mother
6. Undergoing Neo adjuvant and adjuvant chemotherapy
7. Physical disability; Deafness, paraplegia, hemiplegia

3.6: The study instrument

A constructed questionnaire form was used for data collection, which consisted of five parts to assess participant's characteristics, some risk factors of breast

cancer, Body mass index measurement, Breast Size measurement with breast features, and assess physical activity (Appendix-C).

3.6.1: Part One includes socio-demographic characteristics of patients (age, age of admission, blood group, gender, religion, marital status, residential area, economic status, level of education, occupation)

3.6.2: Part Two Some contributing factors which have relation with Breast Cancer (Menstrual history, Obstetric History, Hormonal replacement therapy, Clinical Presentation, Diagnosis, Type of breast cancer, Stage of cancer, Metastasis, Recurrence, Type of breast treatments, Previous breast disease, Type of previous breast treatments, History of other cancer, History of other disease, Family history of breast cancer, Family history of other cancers, Life style such as; Breast lactation, Smoking, Alcohol, Dietary pattern, and Radiation (X-Ray).

3.6.3: Part Three concerned about Body mass index (Weight and Height); Under weight, Healthy weight, Overweight, and Obese.

3.6.4: Part Four Breast Size and breast features; Previous Bra size Number, Recent Bra size Number, Measurement of Bra size = Bust size - Band size, Breast symmetry, Reconstructive surgery, Using Breast Prosthesis, and ask about breast self-examination.

3.6.5: Part Five International physical activity questionnaire (IPAQ-SV) was used to assess physical activity. It is a standard wide used instrument in many different cultures. The researcher asked the patients about weekly physical activity before diagnosis. This instrument consists of 7 questions; during the last 7 days, on how many days did you do vigorous physical activities like heavy lifting, digging, aerobics, or fast bicycling? How much time did you usually spend doing vigorous physical activities on one of those days? During the last 7 days, on how many days did you do moderate physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? How much time did you usually spend doing moderate physical activities on one of those days?

During the last 7 days, on how many days did you walk for at least 10 min at a time? How much time did you usually spend walking on one of those days? During the last 7 days, how much time did you spend sitting on a weekday?

3.7: Validity

The validity of the present study questionnaire was sent to 14 expertises with different careers such as (Oncology, Family Medicine and Nursing) in the collaboration with the research topic and expertise in the field (Appendix-D). These experts were asked to investigate the questionnaire for content clarity, relevancy and adequacy in order to achieve the present study objectives. Most of them only some changes should be done to few descriptive characteristics. Their comment and suggestions were taken in intention for correcting the questionnaire. Content validity of the questionnaire was taken based on their opinion and revision they had done.

3.8: Pilot study

A pilot study was conducted for (20) females breast cancer patients who visited the outpatient clinic at Hiwa Cancer Hospital. It was carried out from 18th January to 1st February-2021. Questions were designed as a six parts for pilot study. All patients who had diagnosed with breast cancer and visited for follow up only. The sample of pilot study was excluded from the present sample of this study.

3.8.1: The purpose of a pilot sample of the study

1. To determine the time needed for collecting the data; filling out questionnaire and breast measurement.

2. To enhance the reliability of the questionnaire.

3. To find out the problems and barriers facing the researcher during data collection.

4. To find the missed or not important questions those were essential for collecting the data.

The result of the pilot study proved that the items of the questionnaire were clear, understandable to the patients. The time required for answering the questionnaire in an interview with measurement of patients breast size range from 40 to 60 minutes for each case.

3.9: Reliability

Reliability is concerned with how consistently the measurement instrument measures the concept of interest. In other words, a measurement instrument is reliable if the same results are obtained every time the same items are measured. To measure the reliability of the questionnaire of this study, a test- retest statistical method was used. In a pilot study a (20) patients were requited (10) of them interviewed again two week after. The researcher re-administered the same process of gathering data to find out the correlation between tests and retest. Determination the reliability of the study instrument, post-test correlation coefficient of reliability ($r = 0.84$).

The questionnaire had an adequate level of consistency and equivalence measurability, after removed 14 questions regarding the risk factors of the occurrence of breast cancer. Also added some questions in sociodemographic data, obstetric history, pervious breast disease, family history of breast cancer, smoking, and dietary patterns, finally, added reconstructive surgery with using breast prosthesis for breast size and breast features.

3.10: Data collection methods

Data was collected based on structured questionnaire and short version of physical activity questionnaire was used as a standard tool; direct interview was made to data collection. Each interview was mainly last from 40 to 60 minutes. Any woman who visited to outpatient clinic at Hiwa Cancer Hospital had equal chance to be recruited to the study.

Patients & methods: Almost all patients with breast cancer are managed in this hospital by a specialized team of oncologists. We have the unique privilege of having access to all data related to patients managed at the center. Since women have a pair of breasts and usually one is affected by cancer, one is almost always at the privilege of using the non-cancerous breast as a control. This study will be mostly retrospective patients who visited for follow up, it will also be expanded prospectively to all new patients diagnosed and managed in the same center over the upcoming years of the data collection period.

3.10.1: Breast size measurement:

Breast size, the band and Bust sizes was measured by using tape measure (centimetre). As for the new cases the researcher physically measure the above parameters on each patient.

Direct measurements of each participant's band and bust were recorded following the United Kingdom and European Standard guidelines for mastectomy patients (Oncovia.com, 2018). The measurements were taken while each participant stood upright and breathing normally, using an anthropometric measuring tape (McGhee et al., 2018).

Band Size (Under Bust); was measured in centimetres across the patient's ribcage and around the back under arms, just below the breasts at the inframammary fold (Oncovia.com, 2018; McGhee et al., 2018).

Cup Size (Bust); measured the non-operated side by placing the measuring tape at the same level as patient's nipple in centimetres. Start from the sternum and stop at the middle of patient's back, multiply by two. Make sure that the measuring tape is horizontal and not too tight or loose. The participants assumed the same position and wore a non-padded high support bra (Oncovia.com, 2018; McGhee et al., 2018). Measurement of Breast:

Cup size = Bust size (measure the non operated side × 2)

Band Size = (measure the under bust)

The researcher measured the volume of healthy breast with tape measure. The breast was measured with the patient putted a non-padded bra in a standing position with her arms at her sides. The standard European bra sizes were used to measured bra size. The cups size, ranged from; AA, B, C, D, E, F, G, H, I, J, K. The band size ranged from; EU 65, 70, 75, 80, 85, 90, 95, 100, 105, 110, 115, 120 (Size guide. net, 2017; Oncovia. com, 2018) (Appendix-J; Appendix H).

The breast volume was calculated based on cup sizes which divided by Kusano et al. study in (2006) into the four categories ''A or smaller'', ''B'', ''C'', ''D or larger''. The author did not take into account the rib cage circumference. Ringberg et al. measure the rib cage circumference or band size in centimetre. They proved that the use of cup size alone without taking rib cage circumference into account is a poor surrogate for actual breast volumes, even when BMI is taken into consideration. This is because when the rib cage circumference was taken, the range in actual breast volumes considerably narrower (Ringberg et al., 2006).

Bra size was divided into six categories according to Fitting Guide- Lingerie & Swimwear; XS, S, M, L, XL, XXL (Amonea. com) (Appendix-I). These categories were depend on band size; large bra size was 90 centimeter or larger, medium bra size was band size 80 and 85 centimetre, small bra size was band size 75 centimetre or smaller.

3.10.2: Body Mass Index (BMI) Measurement

Regarding BMI, the specialized nurse measured patients' height (cm) and weight (kg) with the electronic instrument and recorded them in the electronic system. The researcher could access all data related to patients managed at the center. BMI in kg/m2 was considered underweight (<18.5), normal (18.5-24.9), overweight (25-30), and obese (≥30) as defined by WHO BMI classification (Karim et al., 2015).

3.10.3: Assessment of physical activity

A short version of the International physical activity questionnaire (IPAQ-SV) was used to assess physical activity prior to Breast Cancer diagnosis. The IPAQ-SV was designed to identify the frequency and duration of walking, moderate and vigorous physical activity at work and during recreational time, and sitting time prior diagnosis of breast cancer. Physical activity score was calculated as metabolic equivalent of task-minute per week (METs- min/week).

Total physical activity was estimated by adding together the minutes per week of vigorous physical activity, moderate physical activity, and walking. Based on the physical activity recommendations of the American College of Sports Medicine and the American Heart Association, respondents were classified into three groups. Individuals who reported less than 10 minutes (<600 MET-min/weeks) of total physical activity were categorized as ‘‘inactive’’. Those who reported engaging in total physical activity from 10 to 149 minutes/week (600 – 2999 MET-min/ weeks) were denoted as ‘‘minimally active’’, and those reporting 150 minutes/ week (3000 MET-min/ weeks) or more activities were coded as ‘‘health enhancing physical activity (HEPA)’’ (Haskell et al., 2007; Salvo et al., 2015).

3.11: Statistical analysis

Data entry performed via using an excel spreadsheet then the statistical analysis was performed by Statistical Package for the Social Sciences program, version 21 (IBM SPSS, Chicago, USA). The data presented in tabular forms showing the frequency and relative frequency distribution of different variables of the study participants. Chi-square tests and fisher exact test were used to compare the categorical data among different groups of patients (different variables). Quantitative continuous variables were described by mean and SD (Standard deviation). The statistical significance of difference in mean among groups (different BMI groups) was assessed using ANOVA test.

Different types of Bars charts and pie charts as well as line graph were used to describe some variables such as BMI, Bra size of the study diagrammatically. Body Mass Index presented in to four categories; Underweight, Normal weight, Overweight, and Obese as defined by WHO BMI classification. P values of $\leq$ 0.05 were used as a cut off point for significance of statistical tests between Bra size, BMI and breast cancer.

3.12: Limitation of the study

The COVID-19 was the most important barrier for present study; some of the patients were kept away themselves from face-to-face interview. In addition, they were worried about the tape measure that was used to measure the breast size, every time they asked the researcher about it (Are you sure this was clean?). To manage this issue the researcher used alcohol spray and tissue for cleaning the tape measure.

Some patients did not respond to participate in this study; most of them came from outside the Sulaymanyiah city. Their limited time was a big problem to do

ultrasound and MRI, and laboratory tests with histopathology tests. All of them they had chance to do these investigations through appointments. This was because too many follow up patients as well as new case daily were registered at Hiwa hospital. The time to interview for each patient was around one hour, for that reason some of them took permission in the middle of data collection and they want to go. This is because their family was waiting her in the outside of hospital.

Finally, most of the patients shy and they did not let the researcher to uncover her clothes for measuring the breast size, due to cultural and religious issue and one thirds of patients were illiterate. This is due to there was a not previous study about the measurement of breast size in the research area. As well as, no one in health care staff asked for measuring her breasts previously.

CHAPTER FOUR

RESULTS

CHAPTER FOUR

RESULTS OF THE STUDY

A total of four hundred female patients with breast cancer were included in this study to find out the ‘‘Breast size, body mass index, and physical activity as a risk factor of breast cancer in Sulaymaniyah City-Iraqi Kurdistan- Region’’

Table 4.1. Socio-demographic Characteristics of Studied Patients.

Socio-demographic characteristics		Frequency	Percent
Age	**Mean ± SD**	51.24 ± 10.15	
	28 - 44 Years	107	26.75%
	45 - 64 Years	243	**60.75%**
	65 - 84 Years	50	12.50%
Age on admission	**Mean ± SD**	47.33 ± 9.90	
	25 - 40 Years	111	27.75%
	41 - 60 Years	239	**59.75%**
	61 - 76 Years	50	12.50%
Marital status	**Single**	35	8.75%
	Married	315	**78.75%**
	Divorced	9	2.25%
	Widow	41	10.25%
Residential area	**Inside City**	153	38.25%
	Outer	247	**61.75%**
Economic status	**Income < Exp.**	157	39.25%
	Income = Exp.	243	**60.75%**
Level of education	**No formal Education:**	145	**36.25%**
	Primary:	119	29.75%
	Secondary:	58	14.50%
	Institute or University:	78	19.50%
Occupation	**Employed**	85	21.25%
	Retired	19	4.75%
	House wife	295	**73.75%**
	Others	1	0.25%
Total		**400**	**100.00%**

Table 4.1. Shows that the average age was 51.24±10.15, with a range of 28-84 years. At the time of interview more than half (60.75%) of participants were between 45-64 years. Ages on admission in (59.75%) of patients were between 41-60 years. All patients were of Kurdish nationality, Sulaymaniyah residents, and all of them were Muslims. More than two thirds (78.75%) of patients were married. Two thirds of the participants (61.75%) were living the in outer city. The financial status for most (60.75%) of them were equal to expenditure. Regarding the level of education (36.25%) were no formal education, (29.75%) were primary school, (14.5%) were secondary school, and (19.5%) were Institute or University graduate. Finally, more than seventy percent were housewives.

Table 4.2. Distribution of Sample According to Gynecological History.

Gynecological history		Frequency	Percent
Age of menarche	**11 - 12 Years**	99	24.75%
	13 - 14 Years	214	**53.50%**
	15 - 18 Years	87	21.75%
Regularity period	**Regular**	354	**88.50%**
	Irregular	46	11.50%
Menopause	**Yes**	145	36.25%
	No	255	**63.75%**
Gravida	**None**	61	15.25%
	One – Two	54	13.50%
	Three - Four	111	27.75%
	Five and more	174	**43.50%**
Parity	**None**	66	16.50%
	One – Two	84	21.00%
	Three - Four	141	**35.25%**
	Five and more	109	27.25%
First child after 30 years	**Yes**	62	15.50%
	No	338	**84.50%**
Contraceptive pill	**Yes**	182	45.50%
	No	218	**54.50%**
Hormonal replacement	**Yes**	119	29.75%
therapy	**No**	281	**70.25%**
Total		**400**	**100.00%**

Table 4.2. Indicates that more than half (53.5%) of participants had menarche between 13-14 years. More than (88.5%) had regular cycles, and (63.75%) of

patinets did not reach menopause. Nearly half (43.5%) of participants had five and more gravida while parity was almost one-thirds (35.25%) of studied patients, and most (84.5%) of them had no first child after 30 years. More than half (54.5%) of particpants did not use contraceptive pills. Regarding hormonal repalcement therapy (70.25%) had not used it.

Table 4.3. Blood Group and Rh of Studied Patients

Blood group	Frequency	Percent
A +ve	90	22.50%
A –ve	11	2.75%
B +ve	44	11.00%
B –ve	4	1.00%
O +ve	121	30.25%
O –ve	6	1.50%
AB +ve	12	3.00%
AB –ve	5	1.25%
None	107	26.75%
Total	**400**	**100.00%**

Table 4.3. The blood groups among studied patients were distributed as followings; (30.25%) of Patients O+ve, (22.5%) of patients A+ve, (11%) of patients B+ve, (2.75%) of patinets A-ve and (3%) of patinets AB+ve, (1.5%) of patients O-ve, Finally only (1.25%) of patients AB-ve with (1%) of patinets B-ve. While (26.75%) of patients had no known blood group also not recorded in the electronic systm at Hiwa Cancer Hospital.

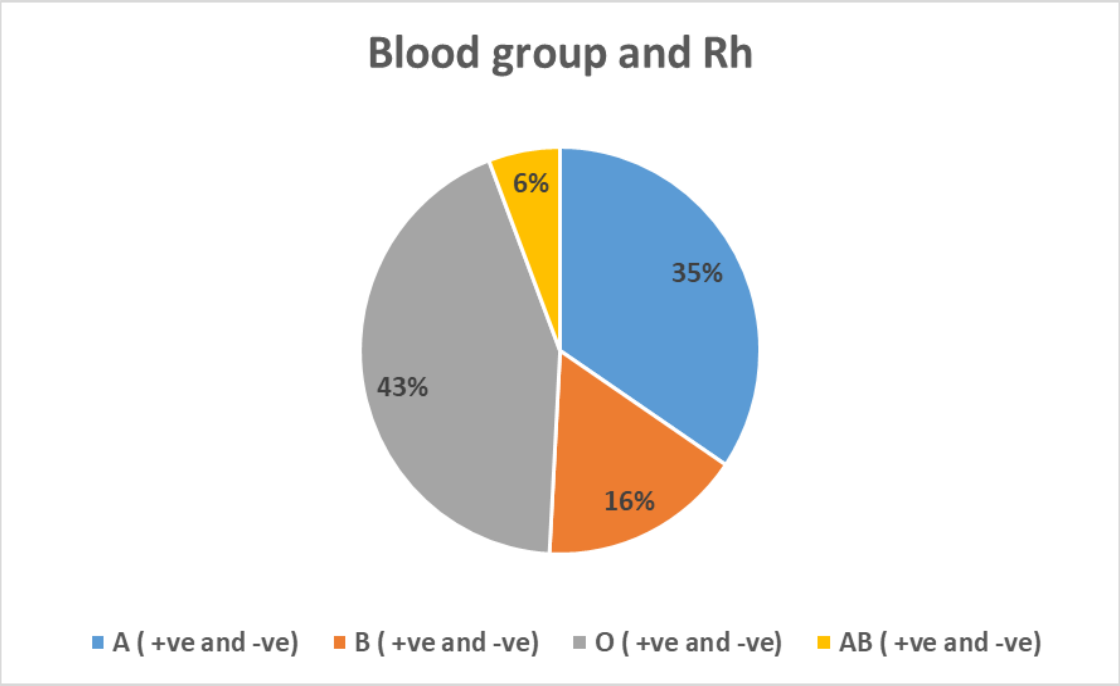


Figure 4.1. Blood Group and Rh of Studied Patients

The blood groups among studied patients were distributed as followings; (43%) of patients O+ve and O–ve, (35%) of patients A+ve and A-ve, (16%) of B+ve and B-ve, (6%) of patients AB+ve and AB –ve respectively

Table 4.4. Distribution of Sample According to Clinical Presentation.

Clinical findings		Frequency	Percent
Mass	**Yes**	383	**95.75%**
	No	17	4.25%
Nipple	**Yes**	35	**8.75%**
Discharge	**No**	365	91.25%
Lump pain	**Yes**	66	**16.50%**
	No	334	83.50%
Inflammation	**Yes**	46	**11.50%**
	No	354	88.50%
Itching	**Yes**	48	**12.00%**
	No	352	88.00%
Other	**Yes**	119	**29.75%**
	No	281	70.25%
Color of nipple	**None**	362	**90.50%**
Discharge	**Bloody Nipple discharge**	17	4.25%
	Bloody & infection	8	2.00%
	Yellowish color	10	2.50%
	Yellowish & infection	3	0.75%
Mass detected	**Herself**	337	**84.25%**
By	**Doctor**	63	15.75%
Affected side	**Left breast**	203	**50.75%**
	Right breast	197	49.25%
Total		**400**	**100.00%**

Table 4.4. Illustrates that the clinical findings of studied patients at diagnosis; majority (95.75%) of patients had mass, While only (8.75%) of participants had nipple discharge, (83.5%) had no lump pain and only few (16.5%) of them had lump pain. Only (11.5%) of patients presented with inflammation of breast, also (12%) patients presented with itching, nearly one-thirds (29.75%) had other clinical findings. Regarding the colour of nipple discharge, the majority (90.5%) of them had no nipple discharge, (4.3%) had bloody discharge, (2%) had bloody with infection, (2.5%) had yellowish color, and (0.75%) yellowish with infection. More than eighty percent of participants had mass detected by herself and only few (15.75%) of them mass detected by doctor. More than half (50.75%) of patients had diagnosis of breast cancer in left side.

Table 4.5. Distribution of Sample According to Features of Breast Cancer.

Features of breast cancer		Frequency	Percent
Type of Breast Cancer	Invasive Ductal Ca.	304	76.0%
	Invasive Lobular Ca.	31	7.75%
	Medullary Ca.	16	4.00%
	Mucinous Ca.	5	1.25%
	Paget disease	10	2.50%
	Papillary Carcinoma	2	0.50%
	Malignant neoplasm/ unspecified	8	2.00%
	Ductal Carcinoma in situ	18	4.50%
	Phylloides tumor	3	0.75%
	Adenocarcinoma	3	0.75%
Stage of Breast cancer	T1N0M0	84	21.00%
	T2N0M0	108	27.00%
	T2N1M0	202	50.50%
	T3N2M1	6	1.50%
Metastasis to other organs	Yes	12	3.00%
	No	388	97.00%
Recurrence	Yes	14	3.50%
	No	386	96.50%
Type of Surgery	Not done surgery	19	4.70%
	Lumpectomy	138	34.50%
	Radical Mastectomy	211	52.75%
	Partial Mastectomy	32	8.00%
Total		400	100.00%

Table 4.5. Demonstrates that the features of breast cancer, more than two third (76%) had invasive ductal carcinoma, while few (0.5%) of the patients had papillary carcinoma. The stage of cancer more than half (50.5%) of participants was diagnosed in stage III, more than one-fourth (27%) of patients in stage ll, one–fifth (21%) of patients in stage l, and only few (1.5%) of them in stage lV. The majority (97%) of participants had no metastasis to other organs also (96.5%) had no recurrence of breast cancer. Regarding the type of surgery, more than half (52.75%) of patients was done radical mastectomy, lumpectomy was done for (34.5%) patients, partial mastectomy was done for (8%) participants, and only few (4.7) of them did not undergone surgery.

Table 4.6. Distribution of Sample According to Breast Features.

Breast Features		Frequency	Percent
Breast symmetry	**Right Large**	42	10.50%
	Left Large	21	5.25%
	Same size	337	**84.25%**
Doing BSE	**Yes**	160	40.00%
	No	240	**60.00%**
Breast Prosthesis	**Yes**	24	6.00%
	No	376	**94.00%**
Reconstructive Surgery	**Yes**	2	0.50%
	No	398	**99.50%**
Total		**400**	**100.00%**

Table 4.6. Demonstrates that breast features; majority (84.25) of the participants had same breast size. Nearly two-third (60%) of the patients did not do Breast

Self Exam. Most (94%) of the participants had not considers breast prothesis. Regarding reconstructive surgery (99.5%) of the cases did not do.

Table 4.7. Distribution of Sample According to Non-surgical Management.

Non-surgical Management		Frequency	Percent
Radiation	**None**	146	36.50%
	4 - 10 Sessions	21	5.25%
	11 - 20 sessions	187	**46.75%**
	21 - 35 sessions	46	11.50%
Total		**400**	**100.00%**
Chemotherapy	**None**	106	26.50%
	1 - 10 Sessions	285	**71.25%**
	> 10 sessions	9	2.25%
Total		**400**	**100.00%**
Biology	**None**	330	**82.50%**
	1 - 10 Sessions	18	4.50%
	> 10 sessions	52	13.00%
Total		**400**	**100.00%**

Table 4.7. Shows the non-surgical management, radiotherapy (11-20) sessions was used for nearly half (46.75%) of patients, more than two-third (71.25%) of patients had received (1-10) sessions of chemotherapy, and biology or hormonal therapy did not use for more than eighty percents of participants.

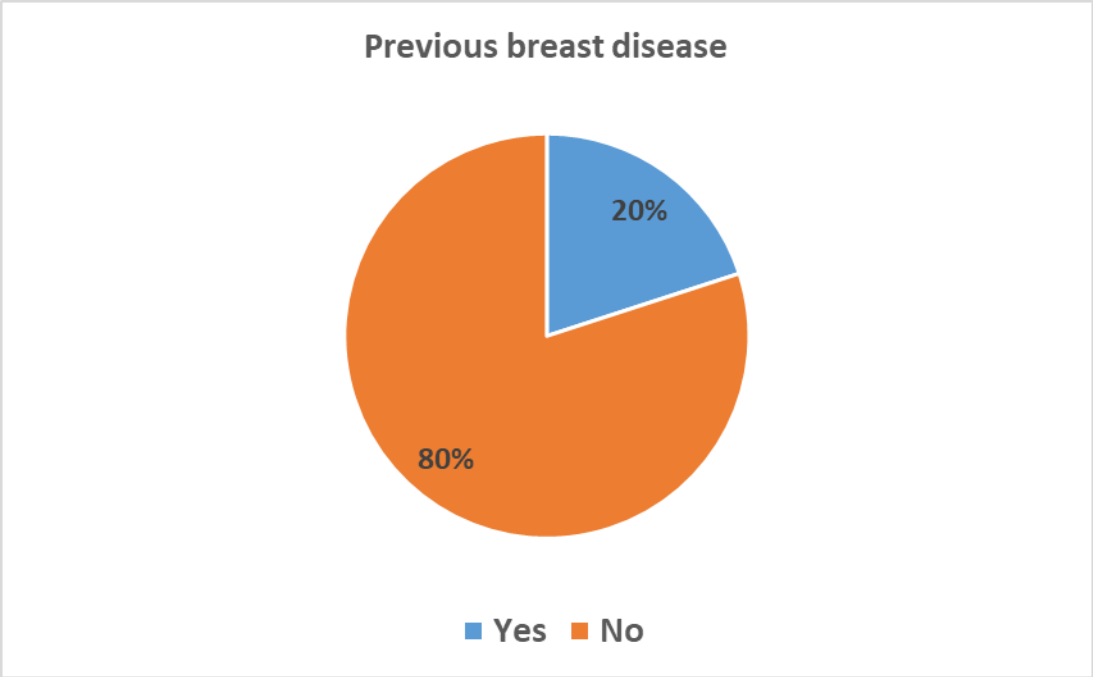


Figure 4.2. Previous breast disease

Pie chart illustrates that the majority (80%) of participants had no previous breast disease.

Table 4.8. Distribution of Sample According to Family History of Breast Cancer with Family History of Other Cancers.

Family history		Frequency	Percent
Family history of breast cancer	**Yes**	110	27.50%
	No	290	**72.50%**
Family history of other cancers	**Yes**	162	40.50%
	No	238	**59.50%**
Total		**400**	**100.00%**

Table 4.8. Indicates that family history of breast cancer was negative among nearly two-third (72.5%) of patients and positive among (27.5) patients. Also family history of other cancer was negative among more than half (59.5%) of patients and positive among more than fourty percents of patients.

Table 4.9. Distribution of Sample According to Breast Lactation.

Lactation		Frequency	Percent
Previous Breast	**None**	73	18.25%
Lactation	**By left breast**	10	2.50%
	By right breast	15	3.75%
	By both breasts	302	**75.50%**
Duration of	**None**	73	18.25%
Lactation	**One year**	74	18.50%
	Two years	48	12.00%
	Three years	56	14.00%
	Four years	149	**37.25%**
	None	73	18.25%
Number of	**One - two children**	103	25.75%
Children lactated	**Three - four children**	124	**31.00%**
	More than four children	100	25.00%
Total		400	100.00%

Table 4.9. Demonstrates that the history of breast-feeding was positive among (75.5%) of participants were lactated by both breasts. The duration of lactation (37.25%) of patients were lactated for four years. Regarding the number of child lactated (31%) of patients, three to four children were lactated.

Table 4.10. Distribution of Sample According to Smoking and alcohol consumption.

Smoking and alcohol		Frequency	Percent
Smoking	**Yes**	43	10.75%
	No	357	**89.25%**
Number of cigarettes per	**None**	357	89.25%
Day	**1 - 10 cigarettes**	31	**7.75%**
	> 10 cigarettes	12	3.00%
Smoking duration	**None**	357	89.25%
	1 - 5 years	25	**6.25%**
	> 5 years	18	4.50%
Family members smoking	**None**	197	49.25%
(Passive)	**Yes**	203	**50.75%**
Alcohol consumption	**None**	399	99.75%
	Yes	1	**0.25 %**
Total		400	100.00%

Table 4.10. Shows that smoking among breast cancer patients was negative, the majority (89.25%) of participants had no smoking. Among smoker patients (7.75%) had 1 to 10 cigarettes per day and only (3%) had more than 10 cigarettes per day. The duration of smoking was (6.25%) of patients for 1 to 5 years and (4.5%) of patients had smoking for more than 5 years. Regarding passive smoker or family member smoking had more than half (50.75%) of patients. Finally, only 0.25% of participants had alcohol consumption respectively.

Table 4.11. Distribution of Sample According to Dietary Habits.

Dietary Habits	Daily	Weekly	Monthly	Never
Sweet	198 **(49.5%)**	35 (8.75%)	2 (0.5%)	165 (41.25%)
Fat	181 **(45.2%)**	39 (9.75%)	0 (0%)	180 (45%)
Fruit	323 **(80.7%)**	67 (16.75%)	0 (0%)	10(2.5%)
Vegetables	304 **(76.0%)**	80 (20.0%)	6 (1.5%)	10 (2.5%)
Fish	0 (0%)	52 (13.0%)	263 **(65.75%)**	85 (21.25%)
Red meat and poultry	32 (8.0%)	339 **(84.75%)**	28 (7.0%)	1 (0.25%)
Milk & milk products	355 **(88.8%)**	27 (6.8%)	2 (0.5%)	16 (4.0%)
Fast food	18 (4.5%)	317 **(79.25%)**	56 (14.0%)	9 (2.25%)

Table 4.11. Indicates that the effect of dietary habits among breast cancer patients. Nearly half (49.0%) of patients like sweets daily, and (45.2%) of them ate fatty meals daily. More than 80 percents of patients ate fruits and more than two-third ate vegetables daily. Conversely, most (65.8%) of the participants ate fish monthly, and more than eighty percents ate red meat and poultry weekly. Most (88.8%) of the patients drunk milk and milk products daily. Regarding fast food more than two-third (79.3%) of the participants ate fast food weekly.

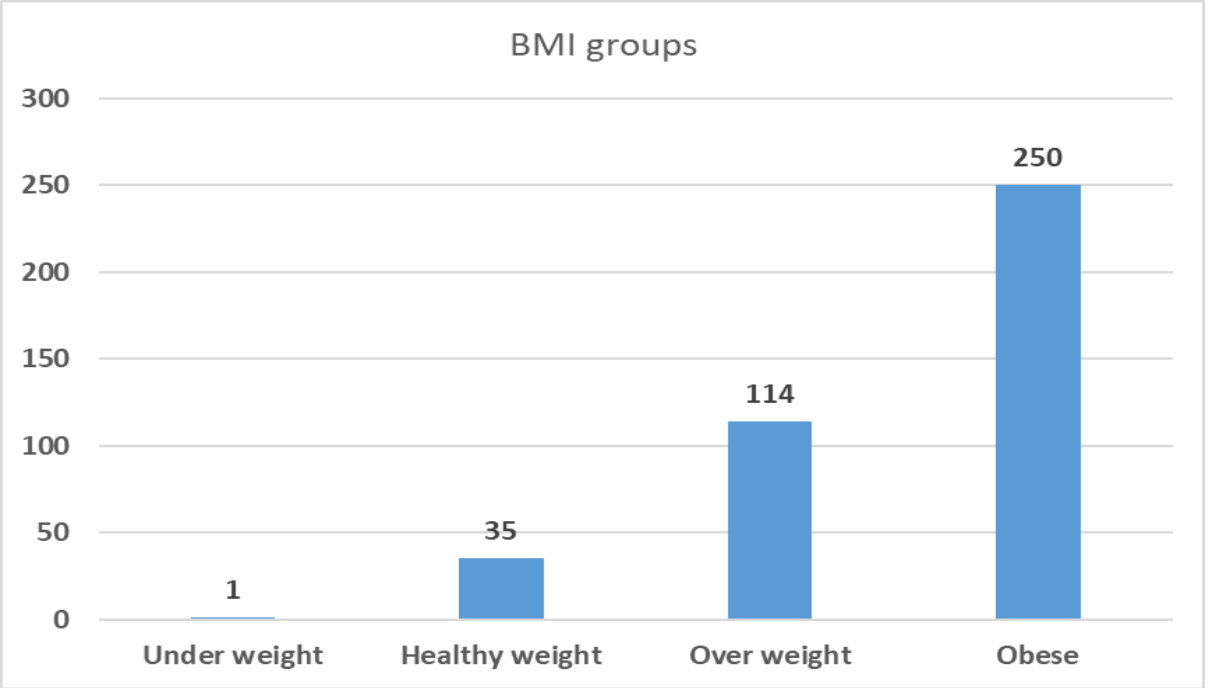


Figure 4.3. Body Mass Index Distribution Among Patients

Body Mass Index (BMI) groups with type of breast cancer; majority (250) of patients were obese and (114) of patients were overweight, only few of them (35) of patients were healthy weight, and only one (1) of the patient was underweight.

Table 4.12. Association Between Types of Breast Cancer with Body Mass Index (BMI).

Type of Breast Cancer	BMI groups				Total	P value
	Under weight	Healthy weight	Overweight	Obese		
Invasive Ductal Ca.	1	32	83	188	304	0.99*
Invasive Lobular Ca.	0	1	11	19	31	
Medullary Ca.	0	1	5	10	16	
Mucinous Ca.	0	0	1	4	5	
Paget disease	0	0	3	7	10	
Papillary Carcinoma	0	0	1	1	2	
Malignant neoplasm/ unspecified	0	0	1	7	8	
Ductal Carcinoma in situ	0	1	7	10	18	
Phylloides tumor	0	0	2	1	3	
Adenocarcinoma	0	0	0	3	3	
Total	1 (0.2%)	35 (8.75%)	114(28.5%)	250 (62.5%)	400 (100%)	

Table 4.12. Body Mass Index groups with type of breast cancer; the majority (62.5%) of patients were obese, (28.5%) of patients were overweight, (8.75%) of patients were healthy weight, and only (0.2%) of the patient was underweight. The P value* (0.99) was not significant for BMI groups with types of breast cancer.

* Fisher exact test

Table 4.13. Distribution of Sample According to Type of Breast Cancer and it is Relation to the Body Mass Index

Type of Breast Cancer	BMI			P-value
	Number	Mean	Standard Deviation	
Invasive Ductal Ca.	304	30.99	5.64	**0.77***
Invasive Lobular Ca.	31	32.05	6.18	
Medullary Ca.	16	29.88	4.42	
Mucinous Ca.	5	32.22	5.25	
Paget disease	10	31.18	8.95	
Papillary Carcinoma	2	30.29	4.63	
Malignant neoplasm/ unspecified	8	33.64	4.40	
Ductal Carcinoma in situ	18	30.32	4.63	
Phylloides tumor	3	28.44	1.16	
Adenocarcinoma	3	34.65	6.81	
Total	**400**	**31.08**	**5.64**	

Table 4.13. Illustrates that the Body Mass Index groups with different types of breast cancer, the mean was (31.08) and standard deviation was (5.64). The P value* (0.77) was not significant for BMI groups with type of breast cancer.

***Performed by T- test

Table 4.14 Distribution of Sample According to Invasive and non -Invasive Types of Breast Cancer.

Cancer type	Number	Mean	Standard Deviation	P value
Invasive types of Cancers	377	31.12	5.72	0.39*
Non-invasive types of Cancers	23	30.07	4.25	
Total	400	31.06	5.64	

Table 4.14. Illustrates that the invasive and non-invasive types of breast cancer. The mean was (31.12) and standard deviation was (5.72) for invasive, the mean was (30.07) and standard deviation was (4.25) for Non-invasive type. The P value* was (0.39) was not significant for BMI groups with type of breast cancer.

*****Performed by T- test

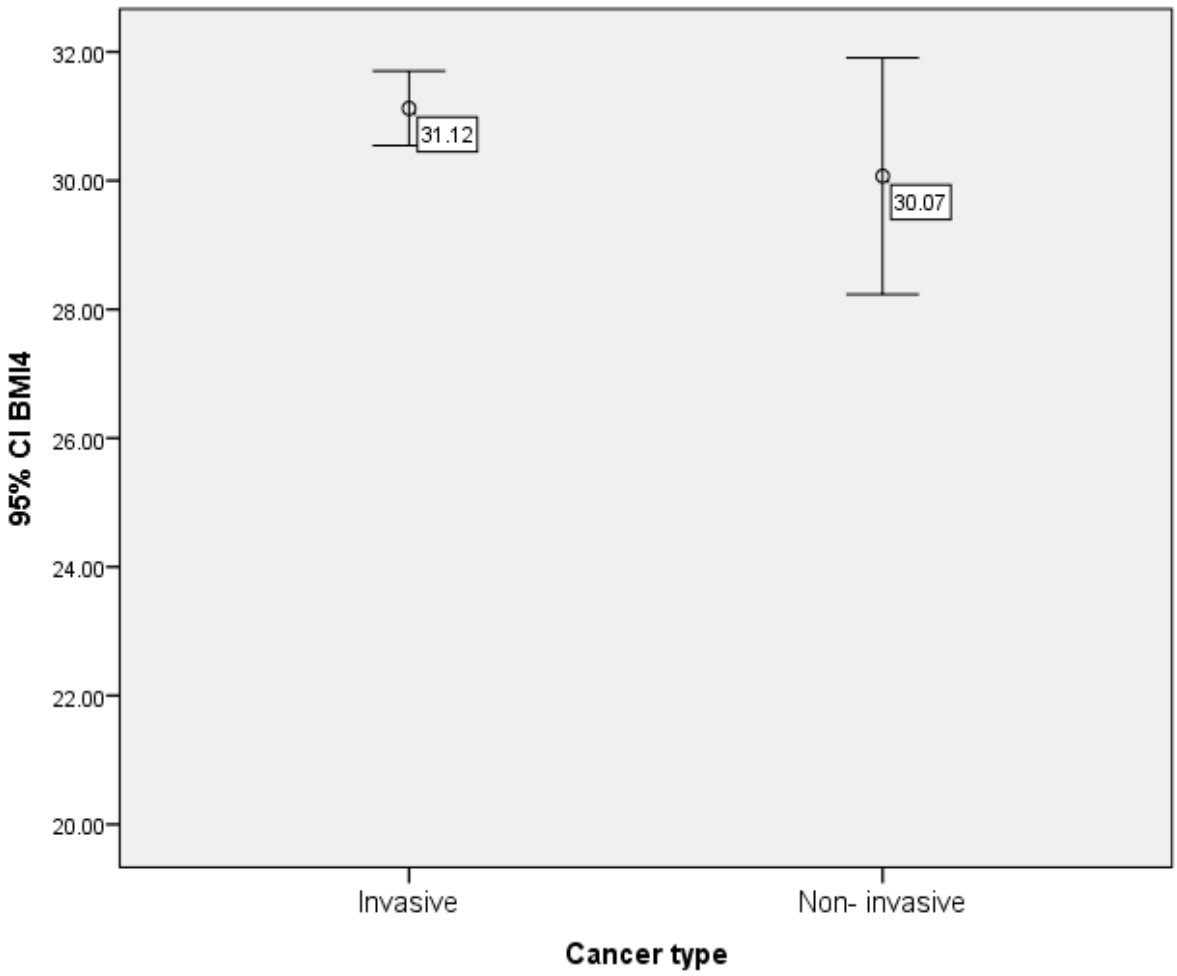


Figure 4.4. Breast Cancer Invasive and Non Invasive type

Shows the invasive and non-invasive type of breast cancer, the confident intervals was significant for non-invasive type of breast cancer, which was about from (28 to 32), the mean of confident intervals was (30.7).

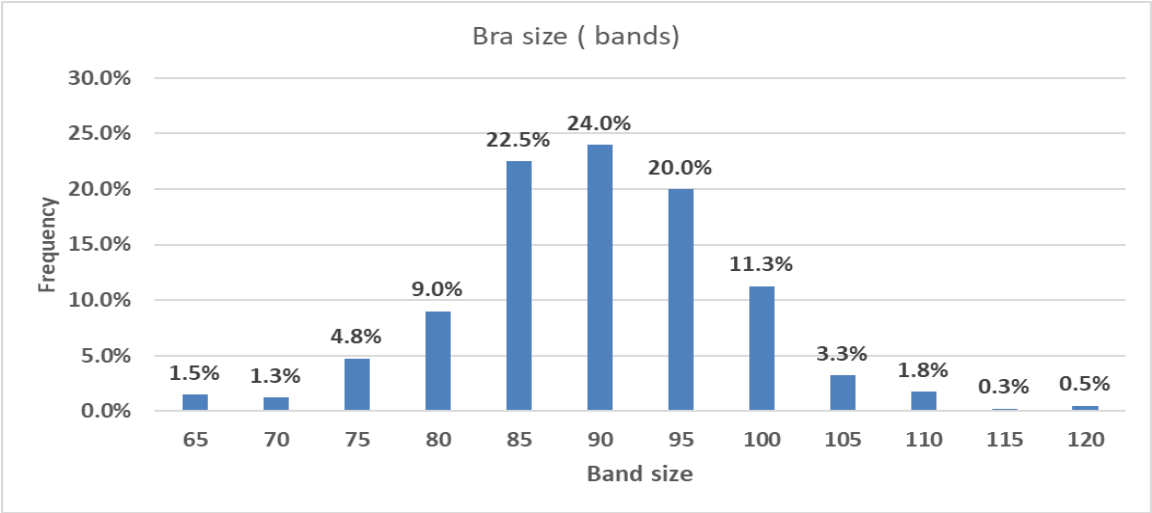


Figure 4.5. Band Size Based on Under Bust Measurements (cm)

The band size of patients based on under bust measurements in centimeter; most of the participants (24%, 20%, 11.3 %) the band size was (≥ 90 cm). It means the majority of patients had large band size respectively.

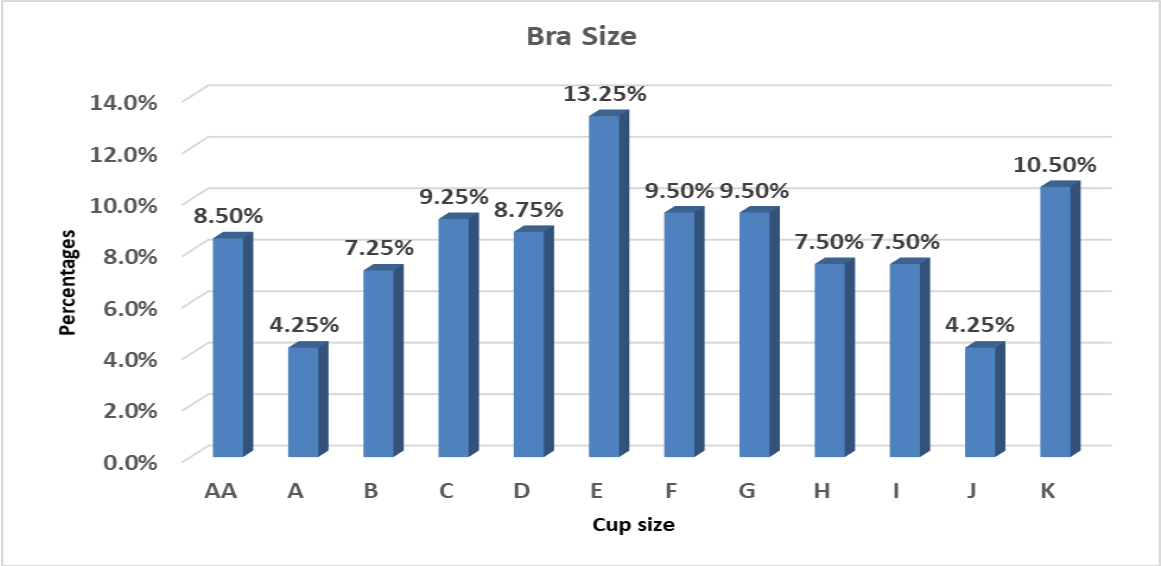


Figure 4.6. Cup Size Based on Bust Measurements (cm)

Cup size of patients based on bust measurements in centimeter; Most (8.75%, 13.25%, 9.50%, 9.50%, 7.50%, 7.50%, 4.25%, 10.50%) patients had large cup size D or larger, while (9.25%, 7.25%) patients had medium cup size C and B and only (4.25%, 8.50%) of participants had cup size A or smaller.

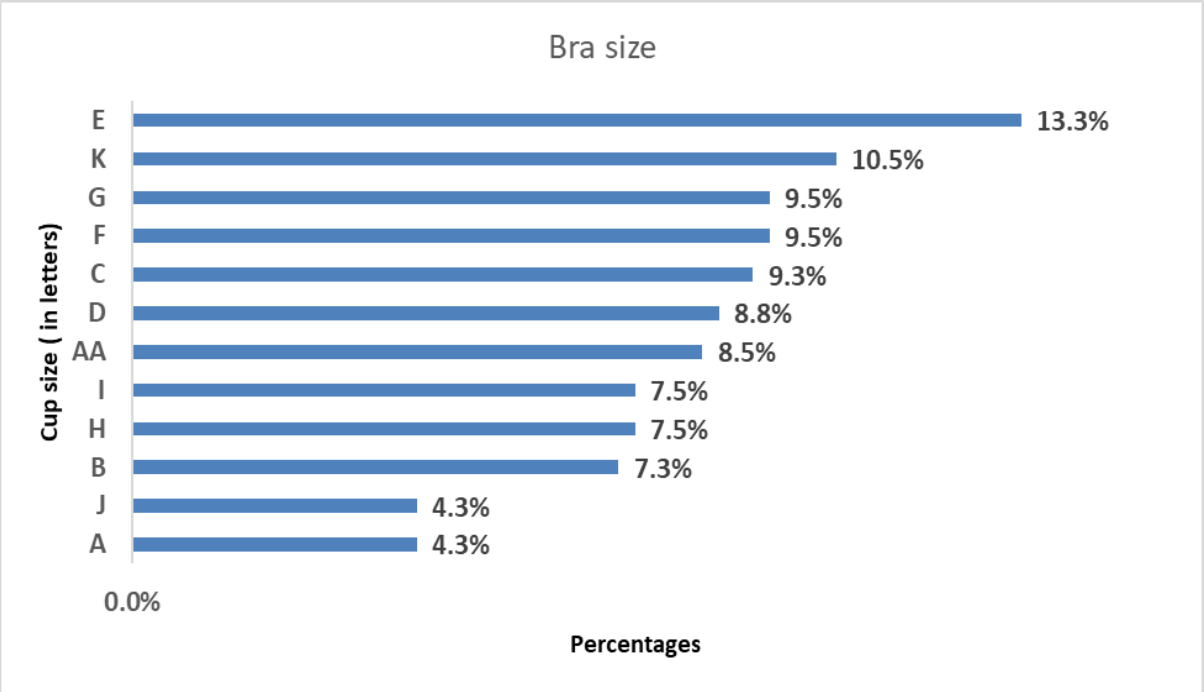


Figure 4.7. Cup Size in Letter with Frequency of Cases

Demonstrates that the relation between cup size in letter based on bust measurements in centimeter with frequency of cases, ranging from high to low number of patients. Cup size letter (E) was consisting of the majority (13.3%) of the participants while the Cup size letter (J&A) were consisting of the few (4.3%, 4.3%) of participants.

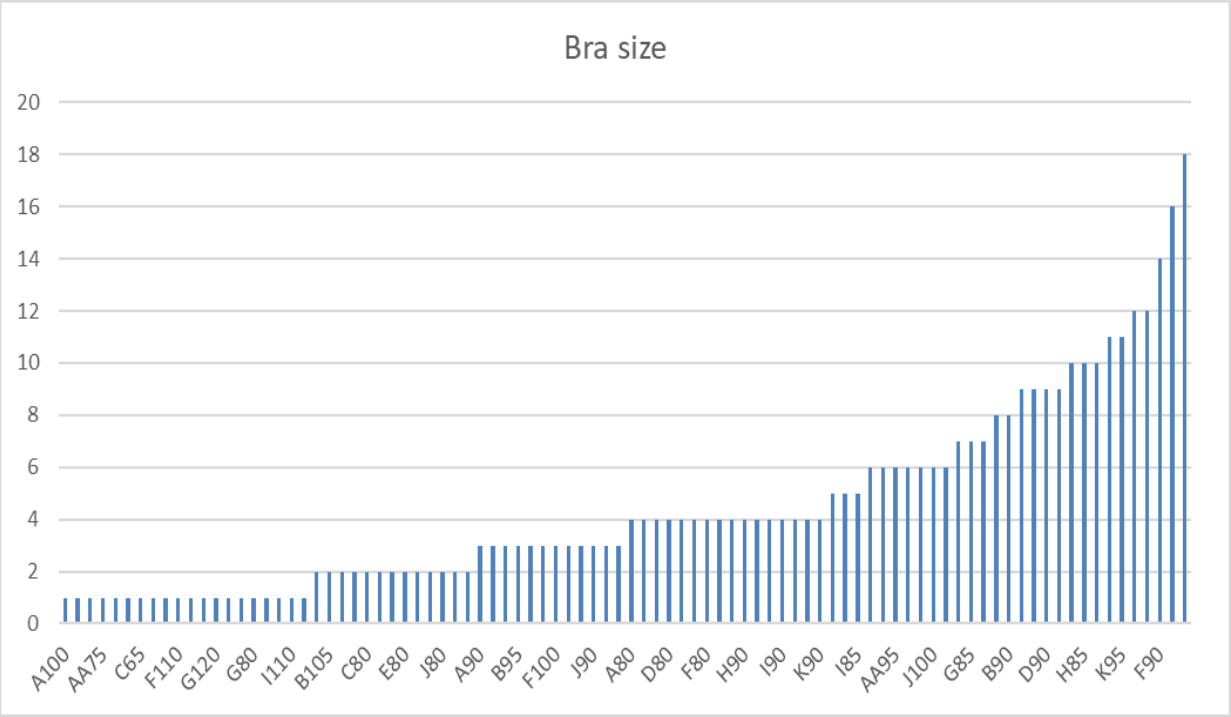


Figure 4.8. Bra size based on band size and cup size

Bra size based on Band and Cup size measurement in centimetre; most of the participants were (F90) Bra size and (K95) Bra size. Majority of patients had cup size D or larger and band size more than 90 cm. Only few of them had (A100, AA75, C65, F110, G120, G80, l110) Bra size.

Table 4.15. Bra sizes based on Cup and Band size.

Bra Size		Frequency	Percent
Cup size:	A or AA	51	12.75%
	B	29	7.25%
	C	37	9.25%
	D or larger	283	70.75%
Band size:	Small (≤ 75)	30	7.50%
	Medium (80 - 85)	126	31.50%
	Large (≥ 90)	244	61.00%
Total		400	100.00%

Table 4.15 explains bra size for patients based on cup size and band size. Majority (70.75%) of patients had cup size D or larger, while (9.25%) patients had cup size C, followed by (7.25%) patients that had cup size B, and only (12.75%) participants had cup size A or AA. Regarding band size; most of patients (61%) had large (≥90) band size, (31.5%) had medium band size (80 – 85), and only (7.5%) had small (≤75) band size respectively.

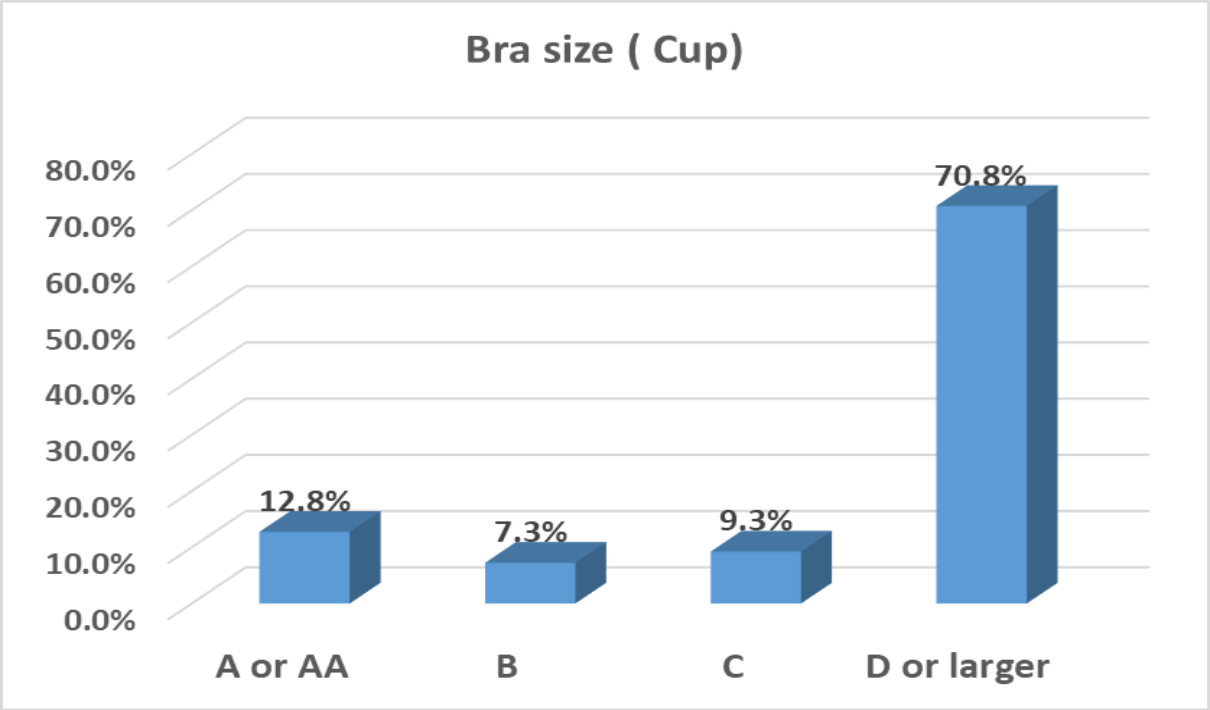


Figure 4.9. Cup size of patients based on bust measurements (cm)

Shows cup size of patients based on bust measurements in centimetre; majority (70.8%) of patients had cup size D or larger, (9.3%) of patients had cup size C, (7.3%) of patients had cup size B, and only (12.8%) of the participants had cup size A or AA. It can be deduced that cup size (D or larger) had a significantly effect on higher incidence of breast cancer than women who reported (A or smaller).

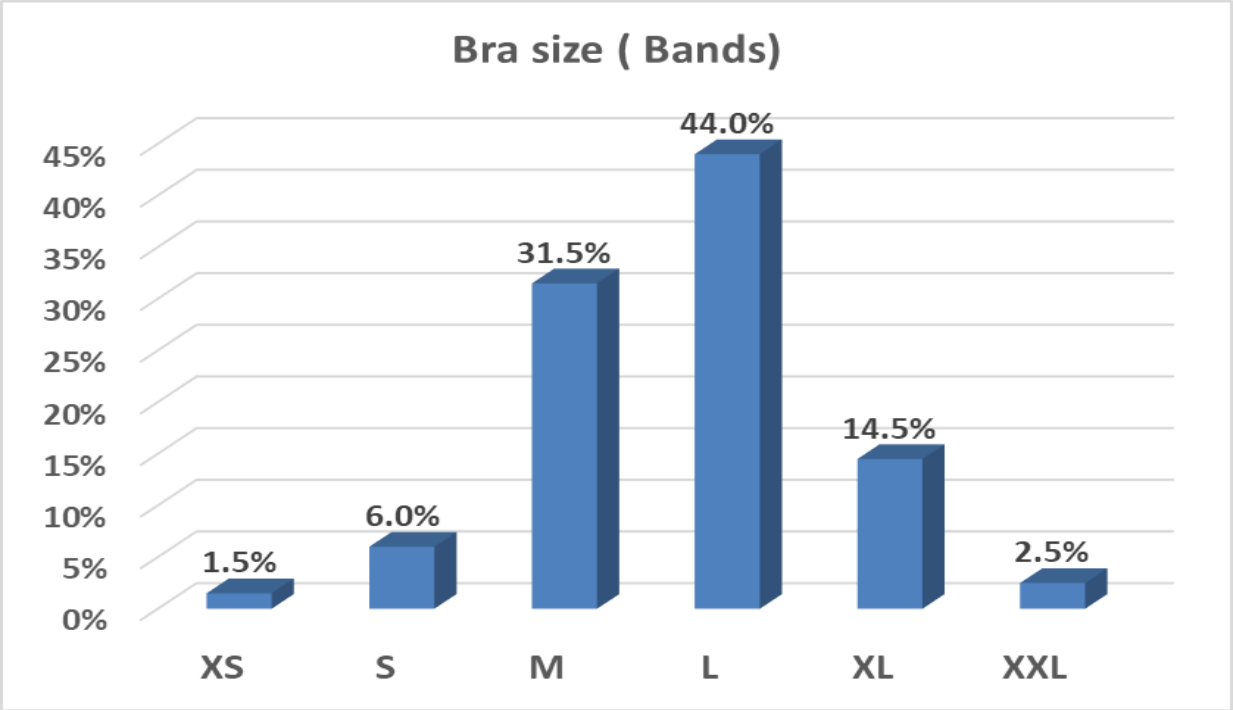


Figure 4.10. Bra size based on band size (XS-XXL)

Illustrates that bra size of patients based on band size. Most of patients (44.0%) of patients had large bra size, while only (6.0%) of patinets had small bra size.

Table 4.16. The Relation between BMI and Bra Cup Sizes

BMI groups	Bra Cup Sizes				Total	P value
	A or smaller	B	C	D or larger		
Underweight (BMI < 18.5)	1 (2.0%)	0 (0%)	0 (0%)	0 (0%)	1 (2.0%)	< 0.001
Normal weight (BMI 18.5 -24.99)	13 (25.5%)	6 (20.7%)	5 (13.5%)	20 (7.1%)	43 (10.8%)	
Overweight (BMI 25.0 -29.99)	19 (37.3%)	12 (41.4%)	10 (27.0%)	95 (33.6%)	136 (34.0%)	
Obese (BMI ≥ 30)	18 (35.3%)	11 (37.9%)	22 (59.5%)	168 (59.4%)	219 (54.8%)	
Total	51 (100%)	29 (100%)	37 (100%)	283 (100%)	400 (100%)	

Table 4.16. Relation between Body Mass Index and Bra cup sizes among study sample; the A or smaller bra cup size was used by (2.0%) Underweight, (25.5%) of Normal BMI, (37.25%) of Overweight, and (35.3%) of Obese participants, while size D or Larger was used by Normal BMI (7.1%), Overweight (33.6%) and more than half (59.4%) of obese patients. The BMI was significantly correlated with breast size the (P value < 0.001).

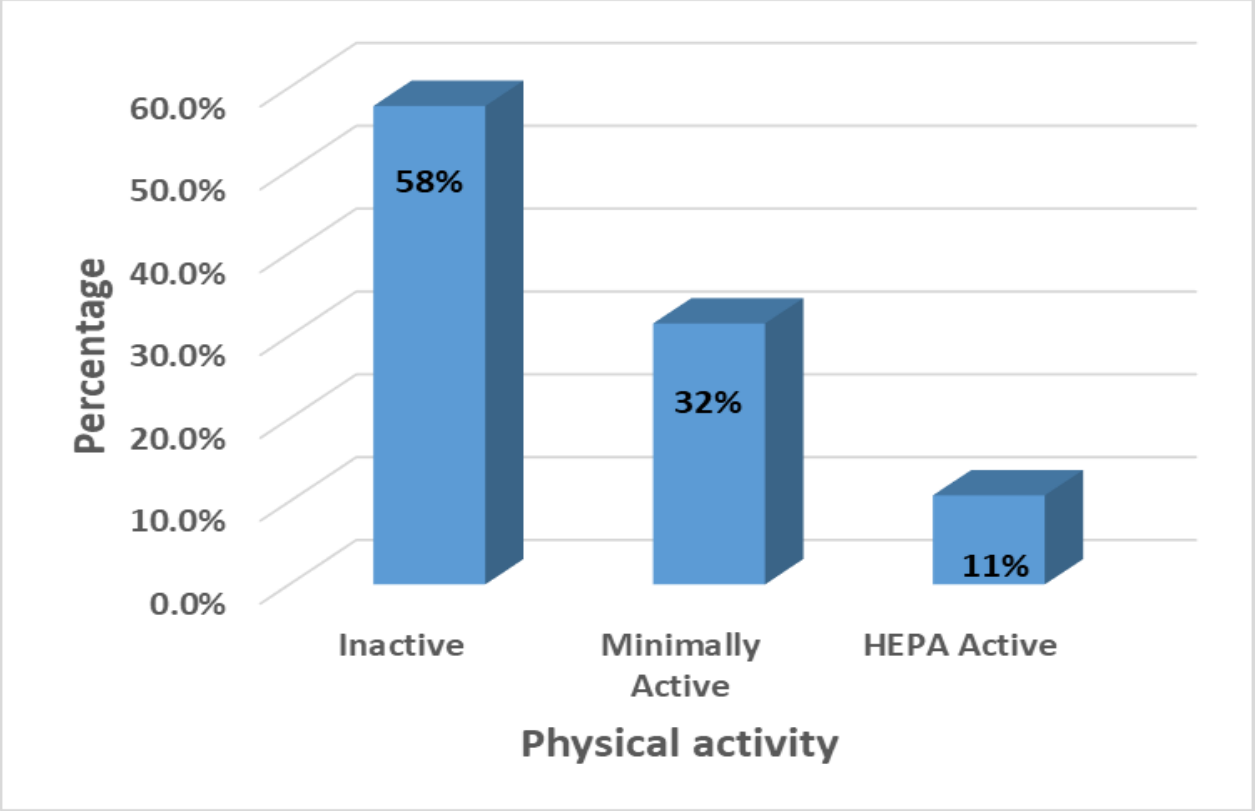


Figure 4.11. Physical Activity of Studied Patients

Demonstrates that the physical activity of studied patients; More than half (58%) of the participants had physically inactive, (32%) patients had minimally active, and finally (11%) patients had health enhancing physical activity (HEPA) in a weekday respectively.

CHAPTER FIVE

DISCUSSION

CHAPTER FIVE

DISCUSSION

5.1: Introduction

This cross sectional study was carried out among Kurdish women in Sulaymaniyah City - Iraq who aged 18 years and older. The aim of this study was to find out the effect of breast size, body mass index and Physical activity on the developing of breast cancer. BC is the leading cause of morbidity and mortality among the non-communicable diseases identified in developing countries ((Duche et al., 2021)**.** The researcher identified the socio-demographic characteristics of studied patients with blood groups and Rh. Factors. Also described gynecological history as a risk factor of the incidence of breast cancer. Clinical sign and symptoms of breast cancer were presented. Illustrated the features of breast cancer such as; type of breast cancer, stage of cancer, metastasis to other organs, recurrence, and type of breast surgery with non-surgical managements like radiation, chemotherapy, and biology. Patients' previous breast disease was clarified and family history of breast cancer with family history of other cancers. Other risk factors of breast cancer; breast lactation, smoking and alcohol consumption, and dietary habits of studied patients were identified in this study (these are more explained in tables and figures).

In this chapter, all findings of the current study were interpreted and discussed with other literature findings. This chapter encompassed seven sections, which were about; Firstly, description of sociodemographic characteristics for the study population. Secondly, the clinical findings of studied patients. Thirdly, Features of breast cancer. Fourthly, some contributes factors, which have relation with breast cancer. Fifthly, discuss breast size affect on the incidence of breast cancer with breast features. Sixthly, relation between body mass index

(BMI) and breast size with breast cancer. Finally, relation between physical activities with occurrence of breast cancer among women.

5.2: Description of the study population

This study shows that the mean age ± SD of patients at the time of interview was 51.24±10.15 in the age period of 28 to 84 years, more than half of participants were between 45-64 years. The mean age± SD on admission was 47.33±9.90, in the age period of 25 to 76 years, fifty-nine percent of patients were between 41-60 years. This result proved that the breast cancer was common among middle age adults in our region. Shoemaker et al. (2018) explained that younger women diagnosed with breast cancer have poorer prognosis and higher mortality compared to older women. In another developing countries such as Ethiopia the mean age of participants was 43.80 years (SD±12.63) and 39.64 years (SD ±12.91) for cases and controls, respectively (Duche et al., 2021). While study undertook in USA explained that, the mean age at initial breast cancer diagnosis was 61.2 (SD 1/4 11.8) years (Feigelson et al., 2021).

In this present study, all patients were of Kurdish nationality, Sulaymaniyah residents, and all of them were Muslims. More than two-thirds of patients were married. More than sixty percent of the participants were living the in outer city. The financial status for more than half was equal to expenditure. Regarding the level of education one-thirds were no formal education, more than twenty nine were primary school, fourteen percent were secondary school, and one-fifth were Institute or University graduate. Finally, more than seventy percent were housewives.

The blood groups among studied patients were distributed as followings; (30.25%) of Patients O+ve, (22.5%) of patients A+ve, (11%) of patients B+ve, (2.75%) of patinets A-ve and (3%) of patinets AB+ve, (1.5%) of patients O-ve, Finally only (1.25%) of patients AB-ve with (1%) of patinets B-ve. While

(26.75%) of patients had no known blood group also not recorded in the electronic systm at Hiwa Cancer Hospital. It can be concluded that more than half of the patients were blood grooup O+ve and A+ve.

5.3: The clinical findings of studied patients

The clinical findings of studied patients at diagnosis was explained; vast majority of patients had mass, While only few of them had nipple discharge, most of them had no lump pain and one-sixth of them had lump pain. Only one-tenth of patients presented with inflammation of breast and few of them patients presented with itching. Nearly one-thirds had other clinical findings such as night sweating, fatigue, loss of appetite, upper limb pain and Shoulder pain. Regarding the colour of nipple discharge, the majority of them had no nipple discharge, four percent had bloody discharge, two percent had bloody with infection, two and half percent had yellowish color, and few of them had yellowish with infection. More than eighty percent of participants had mass detected by herself and only one-sixth of them mass detected by doctor. More than half of patients had diagnosis of breast cancer in left side.

5.4: Features of breast cancer

In current study type of breast cancer; more than two-third had invasive ductal carcinoma, while few percent of the patients had papillary carcinoma. The stage of cancer one–fifth of patients was diagnosed in stage l, more than one-fourth of participants in stage ll, more than half of patients in stage III, and only few of them in stage lV. Conversely, Majid et al. conducted a study among Kurdish women in (2009) proved that diagnosis was at clinical stage 1 for 4.1%, stage 2 for 43.5%, stage 3 for 26.0%, and stage 4 for 8.1% of patients, for 18.2 stage was unknown. Another inconsistent study undertook in Australia (2020), they

proved that at time of diagnosis about 46% of women were classified as stage I, 39% as stage II, 12% as stage III and 4% as stage IV. Also they explained that after adjusting for sociodemographic factors, advanced stage was more common, for ages <50 years, and although not statistically significant for ages 80+ years (Li et al., 2020).

In the present study, the almost all of participants had no metastasis to other organs also the vast majority of patients had no recurrence of breast cancer. Regarding the type of surgery, more than half of patients was done radical mastectomy, lumpectomy was done for one-thirds patients, eight percent of patients was done partial mastectomy, and only few of them did not undergone surgery. This study is consistent with the study done in Jordan (2021); A total of 180 women diagnosed with unilateral early-stage breast cancer (stage 1-11) were recruited from the radiotherapy departments and outpatient surgical and breast cancer clinics at King Hussein Cancer Center (KHCC). Mastectomy is the preferred surgical treatment option for the majority of Jordanian women diagnosed with unilateral early-stage breast cancer at KHCC. Another similar study is retrospective cohort study undertook in USA, about 36% of women undergone mastectomy to treat their breast cancer (Obeidat et al., 2021).

5.5: Some contributes factors, which have relation with breast cancer

This section explained that more than half of participants had menarche between 13-14 years. Most of them had regular cycles, and more than sixty percent of patients did not reach menopause. Nearly half of participants had five and more gravida while parity had one-third of studied patients, and most of them had no first child after 30 years. More than half of particpants did not use contraceptive pills. Regarding hormonal repalcement therapy seventy percent of patients did not used it.

The similar study carried out in Ethiopia majority of (90.9%) cases and (91.8%) controls reached their menarche after 12 years of age conversly, menopausal status was a risk factor for breast cancer. Conversly, using oral contraceptive pills 67(60.9%) of cases and 91(82.7%) of controls used it in their lifetime (Duche et al., 2021). While in a prospective cohort study undertook in Denmark (2017) proved that the risk of breast cancer was higher among women who currently or recently used contemprary hormonal contraceptives than among women who had never used hormonal contraceptives, and this risk increased with longer durations of use; however, absolute inceases in risk were small (Mørch et al., 2017). Another inconsistent study was done in Saudi Arabia proved that the determinant of breast cancer was associated significantly with usig of hormonal contraceptive (Alsolami et al., 2019).

In this present study, the majority of participants had no previous breast disease shown. Regarding family history of breast cancer of studied patients was negative among nearly two-third of patients and positive among one-thirds of patients. Also family history of other cancer was negative among more than half of patients and positive among more than fourty percents of patients. The similar study was done in Ethiopia 14(12.3%) of cases and 8(7.3%) of controls had a family history of breast cancer (Duche et al., 2021). It could be said, that family history of breast cancer and family history of other cancer was not an effective role in the development of breast cancer.

Concerning the history of breast-feeding was positive among two-thirds of participants were lactated by both breasts. The duration of lactation for all children one-thirds of patients were lactated for four years. The number of child lactated more than thirty percent of patients three to four children were lactated. This result was inconsistent with the results of study undertook by Duche et al.

(2021) found that never breastfeed was associated with higher chances of breast cancer relative to breast-feeding. Another inconsistent study was done in Saudi Arabia, they found that breast cancer was associated significantly ($p < 0.05$) with duration of breastfeeding (Alsolami et al., 2019). It can be concluded that, the breast feeding, duration of lactation, and the number of child were not a protective role for the incdience of breast cancer among kurdish women.

Smoking among breast cancer patients was negative; the majority of participants had no smoking. Among smoker patients, seven percent had 1 to 10 cigarettes per day and only few of them had more than 10 cigarettes per day. The duration of smoking was six percent of patient for 1 to 5 years and only four percent of patients had smoking for more than 5 years. Regarding passive smoker or family member smoking had more than half of patients. Finally, only few of participants had alcohol consumption respectively. This result was inconsistent with the results of a cohort study conducted for 1815 women found that smoking was associated with a modest but significantly increased risk of breast cancer, particularly among women who started smoking at adolescent or peri-menarcheal ages. The relative risk of breast cancer associated with smoking was greater for women with a family history of the disease (Jones et al., 2017).

A review study undertook in the United Kingdom, proved that women who commence smoking at a young age seem to have a higher lifetime BC risk than those who take up smoking in later life (Daly et al., 2021). Another inconsistent study was done in Saudi Arabia, they found that breast cancer was associated significantly ($p < 0.05$) with smoking (Alsolami et al., 2019). This finding is similar to results of a prospective cohort study of 17,435 women, found that there was no statistically significant association between smoking status or alcohol consumption with BC risk (former smokers HR 1.06, 95% CI 0.92-1.22; current smokers HR 1.02, 95% CI 0.85-1.23, compared with never smokers).

While Moderate alcohol intake was associated with increased BC risk, particularly for women with ER-positive BC, but only for those at lower predicted familial BC risk (5- year BOADICEA < 1.25). For women with a high familial risk profile (5-year BOADICEA ≥ 6.5%) who also consumed alcohol, being a current smoker was associated with increased BC risk (Zeinomar et al, 2019). Another similar study is a review study carried out by Momenimovahed and Salehiniya (2019) proved that spouses' exposure to passive smoking is a risk factor for developing BC. It can be deduced that, passive smoking is effective for the occurrence of breast cancer in the research area.

In this study, the effect of dietary habits among breast cancer patients; nearly half of patients like all types of sweets daily, and nearly of them ate fatty meals daily. More than eighty percent of patients ate fruits and more than two-third ate vegetables daily. Conversely, two-thirds of the participants ate fish monthly, and more than eighty percents ate red meat and poultry weekly. Most of the patients drunk milk and milk products daily. Regarding fast food more than two-third of the participants ate fast food weekly. A review study was conducted regarding modifiable risk factors of breast cancer, found that lower red meat intake, and higher intake of plants appear to decrease the risk of developing breast cancer among adolescents and young adults female (Cathcart-Rake et al., 2018).

In a prospective cohort study carried out by Wang et al. in (2020) of post-menopausal breast cancer, proved that more anti-inflammatory diet after breast cancer diagnosis was associated with lower risks of both all-cause mortality and breast cancer-specific mortality. They concluded that long-term anti-inflammatory diet might be a means of improving survival of breast cancer survivors. There is no good, consistent evidence that milk and dairy products can cause breast cancer. Some studies have found that dairy might increase the risk of breast cancer. Whilst others have found it may decrease breast cancer

risk. We need more high-quality studies to understand whether there is a link (Cancer research UK, 2021).

5.6: Breast size has an effect on the development of breast cancer

Within the literature, breast size has commonly been classified according to bra size. An A cup bra size has been used to represent a small breast size and ≥D cup to represent a large breast size (McGhee & Steele, 2011; McGhee et al., 2013; White et al., 2015; Coltman et al., 2017). In the present study, two-thirds of patients had cup size D or larger, while one-sixth of patients had medium cup size B and C, and only few of participants had cup size A or smaller. Regarding band size; more than half of patients had large (≥90) band size, one thirds had medium band size (80 – 85), and only few of them had small (≤75) band size all these findings were shown in (Figure 4.6, 4.7). The same finding was reported in a Kusano et al. study (2006) in USA they found that those with a bra cup size of ‘‘D or larger’’ had a significantly higher incidence of breast cancer than women who reported ‘‘A or smaller’’. They proved that larger bra cup size at a young age was associated with a higher incidence of premenopausal breast cancer, though this association was limited to leaner women. Another similar study undertook by a William (2013), found that bra cup size was the strongest predictor of breast cancer mortality and explained that Risk increase per cup size. It was 4.0-fold greater for C-cup, and 4.7-fold greater for D cup vs. A-cup when adjusted for BMI and other covariates. From the information, it can be concluded that large breast size had a significantly effect on high incidence of breast cancer than women who reported (A or smaller) in the research area.

Despite the fact that many studies have been conducted extensively on breast size as a risk factor of breast cancer but the results are inconclusive (Lim et al., 2018**).** A review study was carried out using MEDLINE from 1950 to November 2010. The search was updated again in February 2014; fifty papers

were included in this review. They proved that increasing breast size appears to be a risk factor for breast cancer, but studies are limited by their retrospective nature, imperfect size measurement techniques and confounding variables. The evidence is stronger for risk reduction with breast reduction, including prophylactic subcutaneous mastectomy at the extreme. Generally, the breast augmentation population has a lower risk of breast cancer than the general population, but it is unclear whether or not this is related to the bias of small breasts in this patient population and the presence of other confounders (Jansen et al., 2014). Overall, a significant proportion of the literature supports an association between breast size and breast cancer. While studies directly assessing the issue remain inconclusive, the majority of the literature relating to changes in breast size is in keeping with a positive correlation (Jansen et al., 2014).

There are various methods have been used to measure breast volume; it include Anthropomorphic measurements, Archimedes-water displacement procedure, Grossman-Rounder Device, Casting techniques, Plastic cups, Imaging such as Mammography, Magnetic resonance imaging (MRI), Computer tomography (CT), Ultrasonography, and Biostereometric analysis 3-D surface imaging (Kayar et al., 2011; Hansson et al., 2014). Although, several methods have claimed to be accurate in breast volume measurement. They have failed to gain acceptance as routine due to high costs technical difficulties and patient discomfort (Kayar et al., 2011). Patients themselves often discuss breast size in terms of bra size. However, cup size labelling is not standardised; different brands of bras differ in their labelling of cup size for the same breast volume (Hansson et al., 2014). This is the first study regarding the breast size, there were no available recognized methods for breast volume calculation in the study area. Only traditional methods are available, using an anthropometric measuring tap for measuring breast volumes. For that reason, direct breast volume

measurements by using tape measure was the only option to find out the actual bra size.

5.7: Relation between Body Mass Index (BMI) and breast size with breast cancer

Many studies highlighted the association between obesity and breast cancer. In this study revealed that; the majority of patients were obese and overweight, only few of participants were healthy weight, and only one of the patient was underweight respectively. The P value (0.99) was not significant for BMI groups with types of breast cancer. This finding is similar to results of two studies done in Sulaymaniyah City/ Iraq; First study, which reported BMI are associated with increased risk of breast cancer among Iraqi Kurdish women (Karim et al., 2015). Second study, revealed that the percentage of obesity and overweight among breast cancer patients were 47.2% and 36.4%, respectively. In addition, she proved that there was a strong association between high BMI and breast cancer in the age period of 40 to 49 years (p=0.03) (Ameen, 2018). Another similar study undertook at Baghdad/Iraq found that nearly half of the study population (45.6%) were obese, (81.6%) were obese and overweight, and only (18.4%) of them were with normal weight (AL-Safi et al., 2015**).** It can be deduced that the BMI has positively effect on the development of breast cancer.

The results in this study is consistent with the results of study was done on USA women in (2021), they proved that body mass index was not only effect on the incidence of breast cancer, but also statistically significant increased risk of second cancers associated with increasing BMI. Most cases were overweight (33.4%) or obese (33.8%) and diagnosed at stage l (62.0%) (Feigelson et al., 2021). A review study carried out in the United State, explained that More than 70% of Americans women are overweight or obese (Ligibel et al., 2019). Also familial risk and obesity had positive association with the increase the incidence

of breast cancer especially in postmenopausal women; study carried out by Hopper et al. (2018) found that the negative association with BMI for premenopausal women has a much smaller influence than the positive association with BMI for postmenopausal women. Women at higher familial risk have a much larger difference in absolute risk depending on their BMI than women at lower familial risk. While, high BMI was associated with a statistically significant reduced risk of premenopausal breast cancer (AL-Safi et al., 2015; Shawon et al., 2017)**.** It can be concluded that the BMI has positively effect on increased risk of second cancers and postmenopausal breast cancer with high familial risk, conversely reduced risk in premenopausal women.

The percentage of overweight and obesity has been steadily increasing over the last two decades (Ameen, 2018)**.** Overweight and obesity are the abnormal or excessive accumulation of body fat that present a risk to health. The body-mass index (BMI, the weight in kilograms divided by the square of the height in meters) is a good proxy for assessing overall body fatness (Lauby-Secretan., 2016). In this study Body mass index was presented into four categories; Underweight (BMI < 18.5 kg/m_2), Healthy weight (18.5-24.9 kg/m_2), Overweight (25-29.9 kg/m_2), and Obese (BMI ≥ 30 kg/m_2) as defined by WHO BMI classification (Karim et al., 2015). The same finding was reported in a study undertook in Ethiopia (2021), proved that Body mass index above 25.1 kg/m_2 was associated as a risk factors for breast cancer at a 0.05 level of significance in the multivariable analysis after controlling the possible confounders (Duche et al., 2021). Another similar study was done in Saudi Arabia, they found that breast cancer was associated significantly ($p < 0.05$) with Obesity (Alsolami et al., 2019).

A large cohort study was done among Australian women aged 18 years and older, proved that breast volume was not significantly affected by age, it was significant affected by BMI, with the breast volume of overweight and obese

women being two-to-three times greater than women with normal BMI (Coltman et al., 2017). On the other hand, BMI and bra cup size were positively associated with cancer stage. Women in the highest tertile of BMI and those who wore a bra cup size D had an odd of regional/ distant disease that was 50% greater than the odds among women in the lowest BMI tertile and those who wore cup size A (Hall et al., 1999). In the current study, the researcher found a significant correlation between breast size and obesity the p value was ($p < 0.001$) respectively.

5.8: Relation between physical activities with occurrence of breast cancer

Finally, the physical activity of studied patients; More than half of the participants were physically inactive, one thirds patients were minimally active, and finally only few of them had health enhancing physical activity (HEPA) in a weekday prior breast cancer diagnosis, all these findings were shown in (Figure 4.12). The result of current study was consistent with the result of the study undertook by Amen (2016), He proved that majority of participants (61.64%) were inactive, (35.85%) were insufficiently active, while sufficiently active were (2.52%) only. The similar study was carried out in Ethiopia, proved that Physical activity was associated with reduce risk of breast cancer, the odds of developing breast cancer among women who perform high physical activities decreased by 80% compared to those who practiced low physical activities (Duche et al., 2021). A review study was conducted by Cathcart-Rake et al. (2019) is another similar study found that higher levels of physical activity was associated with decrease the risk of developing breast cancer among adolescents and young adults female. It can be concluded that physical activity is an important risk factor for prevention of the incidence of breast cancer.

CHAPTER SIX

CONCLUSION AND RECOMMENDATION

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This chapter presents the main finding and conclusions of the study. It also includes the recommendation for preventing breast cancer incidence.

6.1: Conclusion

This study was to examine the risk of a breast size, obesity and physical activity-related cancers specifically. An important finding in this study is that there is a positive association between Breast size and obesity with breast cancer risk among the Sulaimani/ Iraqi Kurdish women 18 years and older. In addition, physical in activity, passive smoking, Blood group ‘‘O’’, and dietary habits were significant risk factors for the development of BC among this group of women.

Marriage and gynaecological history were not protective factors for the development of breast cancer; such as age at menarche between 13-14 years, regularity period, menopausal status, gravida, parity, first child after 30 years, breast lactation, duration of lactation and number of child lactated had no protective role. Using of contraceptive pills with hormonal replacement therapy are also not strong association with BC.

The clinical findings of studied patients at diagnosis; majority of patients had mass, While only few of them had lump pain and presented with inflammation of breast, also a small number of patients presented with itching, nearly one-thirds had other clinical findings. Regarding the colour of nipple discharge, the majority of them had no nipple discharge. The majority of participants had mass detected by herself and only few of them mass detected by doctor. More than half of patients had diagnosis of breast cancer in left side.

The features of breast cancer, more than two third had invasive ductal carcinoma, while few of the patients had papillary carcinoma. The stage of cancer more than half of patients were diagnosed in stage III, more than one-fourth of patients in stage ll, one–fifth in stage l, and only few of them in stage lV. The majority of participants had no metastasis to other organs and had no recurrence of breast cancer. Regarding the type of surgery, more than half of patients was done radical mastectomy, lumpectomy was undergone for one-third patients.

The majority of participants had no previous disease; family history of BC was adverse in two third of patients and family history of other cancer was negative among more than half of patients. Regarding dietary habits was difference according to the amount of consumption and type of diet; nearly half of patients had daily consumption of sweets and fat seemed to be risk factors. Also, red meat and poultry with fast food more than 2 times weekly were particularly relevant. However, daily consumption of fruits and vegetables seemed to have not preventive role on breast cancer.

6.2: Recommendations:

The following points have been recommended.

- There is an urgent need to raise breast cancer awareness among population, which can be achieved by a coordinated effort by government, health facilities with ministry of higher education through Establishing conferences, seminars, training courses, media, panel and workshops.

- The women should be informed regarding the importance of maintaining a healthy weight to control the development of breast cancer.

- Proper awareness is essential especially among women who have large breast size, regarding screening programs should be done regularly. This is to control

the mortality and morbidity from this disease and can promote early access to the treatment, thus increase survival rate among this group.

- Enhancing physical activity and weight reduction in our population is important especially among females, through proper awareness by preparing the workshop and seminars in the secondary schools, in the public and private settings.

- A professional nurse should learn or teach the women to do breast self-examination regularly after completion of each monthly menstrual cycle, to familiarize herself with how her breasts normally look and feel. In addition, giving information regarding the importance of breast self-exam in early detection of breast cancer, especially in women who is living in outer city, illiterate, low expenditure and cannot visited the screening center.

- Educate them to be familiar with the risk factors, signs and symptoms of breast cancer to detect any problem in their breasts for early seeking of medical attention and treatment.

- Work on young female groups by creating leaflets and images of steps of breast self-exam for high schools and Universities to educate improve and motivate students to do breast self-exam.

- Awareness among population about the risk of passive smoking inside the family's home, that has an effect on controlling the number of breast cancer patients in the community.

- Control of modifiable risk factors such as advice them to keep a balanced diet will aid to control the incidence of breast cancer in our population.

- Encourage women to wear a good quality and fitting bra; the band not too tight or not too loose, the cup not too big or too small and straps not too tight also decrease the duration of daily using underwire tight bra. Thus, increasing the blood flow and the motivate lymphatic system clearance around the breast.

- Further studies with a large number of patients and case controls are recommended to validate these initial findings and other issues among women who have surviving with breast cancer.

REFERENCES

List of References:

Advani SM, Zhu W, Demb J, Sprague BL, Onega T, Henderson LM, et al. Association of breast density with breast cancer risk among women aged 65 years or older by age group and body mass index. JAMA network open. 2021;4(8):e2122810-e.

Akbari M, Nabatzade M, Azargashb E, Nafissi N, Haghighatkhah HR, Moayeri H, et al. Evaluation of clinical assessment, mammography, and ultrasonography in diagnosis of benign and malignant breast lesions and determining their cost-effectiveness. Int J Cancer Manag. 2019;12(9).

Al-Kafajy M. Breast Cancer Risk Trends of Iraqi Women. Medico Legal Update. 2020; 20(1):383-6.

AL-Safi AMH, GhalibYassin BA, AL-Tameemi EA. Body Mass Index among Women with Proved or Suspected Breast Cancer Attending National Center for Early Detection, Baghdad Teaching Hospital.

Alsolami FJ, Azzeh FS, Ghafouri KJ, Ghaith MM, Almaimani RA, Almasmoum HA, et al. Determinants of breast cancer in Saudi women from Makkah region: a case-control study (breast cancer risk factors among Saudi women). BMC public health. 2019;19(1):1-8.

Amano M, Shimizu T. Mondor's disease: a review of the literature. Internal Medicine. 2018:0495-17.

Ameen HAM, Abdullah H. ALLRED SCORE DIRECTLY ASSOCIATED TO BODY MASS INDEX IN KURDISH PREMENOPAUSAL WOMEN WITH BREAST CANCER. JOURNAL OF SULAIMANI MEDICAL COLLEGE. 2018;8(3):181-7.

Amen MR. Assessment of Physical Activities of Breast Cancer PatientsAttending Hiwa Hospital in Sulaymania City. kufa Journal for Nursing sciences. 2016;6(3).

American Cancer Society (2023) Breast cancer statistics: How common is breast cancer?, Breast Cancer Statistics | How Common Is Breast Cancer? Available at: https://www.cancer.org/cancer/types/breast-cancer/about/how-common-is-breast-cancer.html (Accessed: 09 April 2023).

Anderson J, Chandler SC, Mason M, Khan CB, Lindsay JE, Sandler RM, et al. Scientific analysis reveals major differences in the breast size of women in different countries. Journal of female health sciences JFHS Aug. 2013;8:01086-9.

Azam S, Lange T, Huynh S, Aro AR, von Euler-Chelpin M, Vejborg I, et al. Hormone replacement therapy, mammographic density, and breast cancer risk: a cohort study. Cancer Causes & Control. 2018;29(6):495-505.

Bhandari A, Xia E, Wang Y, Sindan N, Kc R, Guan Y, et al. Impact of sentinel lymph node biopsy in newly diagnosed invasive breast cancer patients with suspicious node: a comparative accuracy survey of fine-needle aspiration biopsy versus core-needle biopsy. American Journal of Translational Research. 2018;10(6):1860.

Breast Cancer & Lymph Node status (2022) Susan G. Komen®. Available at: https://www.komen.org/breast-cancer/diagnosis/factors-that-affect-prognosis/lymph-node-status/ (Accessed: 10 January 2023).

Breast cancer (2019) World Health Organization. Available at: https://www.who.int/news-room/fact-sheets/detail/breast-cancer (Accessed: 10 January 2022).

Breast cancer signs and symptoms (2022) Most Common Symptoms. Available at: https://www.cancer.org/cancer/types/breast-cancer/screening-tests-and-early-detection/breast-cancer-signs-and-symptoms.html (Accessed: 08 October 2022).

Breast cancer surgery (2023) ACS. Available at: https://www.facs.org/for-patients/home-skills-for-patients/breast-cancer-surgery/ (Accessed: 16 February 2023).

Breast cancer-patient version (2021) National Cancer Institute. Available at: https://www.cancer.gov/types/breast (Accessed: 20 May 2023).

Britt KL, Cuzick J, Phillips K-A. Key steps for effective breast cancer prevention. Nature Reviews Cancer. 2020;20(8):417-36.

Burnett E, White J, Scurr J. The influence of the breast on physical activity participation in females. Journal of Physical Activity and Health. 2015;12(4):588-94.

Cabrera L, Trapero I. Evaluation of the Effectiveness of Breastfeeding as a Factor in the Prevention of Breast Cancer. Endocrine, Metabolic & Immune Disorders-Drug Targets (Formerly Current Drug Targets-Immune, Endocrine & Metabolic Disorders). 2022;22(1):15-25.

Can milk and dairy products cause cancer? (2021) Cancer Research UK. Available at: https://www.cancerresearchuk.org/about-cancer/causes-of-cancer/cancer-myths/can-milk-and-dairy-products-cause-cancer (Accessed: 04 June 2022).

Cancer Staging (2018) American College of Surgeon. Available at: https://www.pdfdrive.com/ajcc-cancer-staging-manual-e176397432.html©, p.p(624 - 625)

Cathcart-Rake EJ, Ruddy KJ, Johnson RH. Modifiable risk factors for the development of breast cancer in young women. The Cancer Journal. 2018;24(6):275-84.

Chan DS, Abar L, Cariolou M, Nanu N, Greenwood DC, Bandera EV, et al. World Cancer Research Fund International: Continuous Update Project—Systematic literature review and meta-analysis of observational cohort studies on physical activity, sedentary behavior, adiposity, and weight change and breast cancer risk. Cancer Causes & Control. 2019;30(11):1183-200.

Chandra P, Ravichander SK, Babu SM, Jain D, Nath S. Evaluation of diagnostic accuracy and impact of preoperative positron emission tomography/computed tomography in the management of early operable breast cancers. Indian Journal of Nuclear Medicine: IJNM: The Official Journal of the Society of Nuclear Medicine, India. 2020;35(1):40.

Chandran S, Jesudoss I. Benign Breast Disorders–An Overview. 2020.

Chen Y-Y, Fang W-H, Wang C-C, Kao T-W, Chang Y-W, Yang H-F, et al. Examining the associations among fibrocystic breast change, total lean mass, and percent body fat. Scientific reports. 2018;8(1):1-6.

Chung M, Elie R, Haslett G. Ergonomic Brassiere and Sizing System. 2016.

Coltman CE, Steele JR, McGhee DE. Breast volume is affected by body mass index but not age. Ergonomics. 2017;60(11):1576-85.

Curran, A. (2022) Breast cancer nursing diagnosis and nursing care plan, NurseStudy.Net. Available at: https://nursestudy.net/breast-cancer-nursing-diagnosis/ (Accessed: 28 March 2023).

Daly AA, Rolph R, Cutress RI, Copson ER. A review of modifiable risk factors in young women for the prevention of breast cancer. Breast Cancer: Targets and Therapy. 2021;13:241.

Doré I, Plante A, Peck SS, Bedrossian N, Sabiston CM. Physical activity and sedentary time: associations with fatigue, pain, and depressive symptoms over 4 years post-treatment among breast cancer survivors. Supportive Care in Cancer. 2022;30(1):785-92.

Duche H, Tsegay AT, Tamirat KS. Identifying Risk Factors of Breast Cancer Among Women Attending Selected Hospitals of Addis Ababa City: Hospital-Based Unmatched Case-Control Study. Breast Cancer: Targets and Therapy. 2021;13:189.

Feigelson HS, Bodelon C, Powers JD, Curtis RE, Buist DS, Veiga LH, et al. Body mass index and risk of second cancer among women with breast cancer. JNCI: Journal of the National Cancer Institute. 2021;113(9):1156-60

Filipe AB, Carvalho C, Montagna G, Freire J. The fitting of plus size bra for middle aged women. Procedia Manufacturing. 2015;3:6393-9.

Franceschi S. Breast size, breast reduction, and cancer risk. Cancer Causes & Control. 1997;8(2):125-6.

Ghalib HHA, Ali DH, Karim SAM, Gubari MIM, Mohammed SA, Marif DH, et al. Risk factors assessment of breast cancer among Iraqi Kurdish women: Case-control study. Journal of family medicine and primary care. 2019;8(12):3990.

Ghazi H, Baobaid MF, Hasan TN, Pillai PM, Hassan MR, Wen HY. AWARENESS AND BELIEF REGARDING BREAST CANCER AMONG WOMEN LIVING IN SELANGOR, MALAYSIA. Malaysian Journal of Public Health Medicine. 2020;20(1):30-9.

Hall HI, Coates RJ, Uhler RJ, Brinton LA, Gammon MD, Brogan D, et al. Stage of breast cancer in relation to body mass index and bra cup size. International journal of cancer. 1999;82(1):23-7.

Hansson E, Manjer J, Ringberg A. Reliability of plastic cups to measure breast volume. Journal of Plastic Surgery and Hand Surgery. 2014;48(4):254-8.

Harris HR, Tamimi RM, Willett WC, Hankinson SE, Michels KB. Body size across the life course, mammographic density, and risk of breast cancer. American journal of epidemiology. 2011;174(8):909-18.

Haskell WL, Lee I-M, Pate RR, Powell KE, Blair SN, Franklin BA, et al. Physical activity and public health: updated recommendation for adults from the American College of Sports Medicine and the American Heart Association. Circulation. 2007;116(9):1081.

Hassan MR, Shah SA, Ghazi HF, Mujar NMM, Samsuri MF, Baharom N. Anxiety and depression among breast cancer patients in an urban setting in Malaysia. Asian Pacific Journal of Cancer Prevention. 2015.

Hopper JL, Dite GS, MacInnis RJ, Liao Y, Zeinomar N, Knight JA, et al. Age-specific breast cancer risk by body mass index and familial risk: prospective family study cohort (ProF-SC). Breast Cancer Research. 2018;20(1):1-11.

Hormone (endocrine) therapy (2021) Breast Cancer Now. Available at: https://breastcancernow.org/information-support/facing-breast-cancer/going-through-treatment-breast-cancer/hormone-therapy (Accessed: 26 March 2023).

Hormone therapy for breast cancer (2023) Mayo Clinic. Available at: https://www.mayoclinic.org/tests-procedures/hormone-therapy-for-breast-cancer/about/pac-20384943 (Accessed: 02 April 2023).

How radiation therapy is used to treat cancer (2019) Information and Resources about for Cancer: Breast, Colon, Lung, Prostate, Skin. Available at: https://www.cancer.org/treatment/treatments-and-side-effects/treatment-types/radiation/basics.html (Accessed: 08 February 2023).

How to measure for a mastectomy bra - oncovia (2017) Advices. Available at: https://www.oncovia.com/blog/en/expert/how-to-measure-for-a-mastectomy-bra/ (Accessed: 08 October 2020).

Hsieh C-c, Trichopoulos D. Breast size, handedness and breast cancer risk. European Journal of Cancer and Clinical Oncology. 1991;27(2):131-5.

Hu Q, Whitney HM, Giger ML. A deep learning methodology for improved breast cancer diagnosis using multiparametric MRI. Scientific reports. 2020;10(1):1-11.

Jansen L, Backstein R, Brown M. Breast size and breast cancer: a systematic review. Journal of Plastic, Reconstructive & Aesthetic Surgery. 2014;67(12):1615-23.

Jones ME, Schoemaker MJ, Wright LB, Ashworth A, Swerdlow AJ. Smoking and risk of breast cancer in the Generations Study cohort. Breast Cancer Research. 2017;19(1):1-14.

Karim SAM, Ghalib HHA, Fattah F, Gubari M, Majeed AB. Height, weight, and body mass index association with breast cancer risk in Iraqi Kurdish women. Case Study in Surgery. 2015;1(1):1-7.

Kayar R, Civelek S, Cobanoglu M, Gungor O, Catal H, Emiroglu M. Five methods of breast volume measurement: a comparative study of measurements of specimen volume in 30 mastectomy cases. Breast cancer: basic and clinical research. 2011;5:BCBCR. S6128.

Kerlikowske K, Bissell MCS, Sprague BL, Buist DSM, Henderson LM, Lee JM, et al. Advanced Breast Cancer Definitions by Staging System Examined in the Breast Cancer Surveillance Consortium. JNCI: Journal of the National Cancer Institute. 2020;113(7):909-16.

Kovacs L, Eder M, Hollweck R, Zimmermann A, Settles M, Schneider A, et al. Comparison between breast volume measurement using 3D surface imaging and classical techniques. The Breast. 2007;16(2):137-45.

Kummerow KL, Du L, Penson DF, Shyr Y, Hooks MA. Nationwide trends in mastectomy for early-stage breast cancer. JAMA surgery. 2015;150(1):9-16.

Kusano AS, Trichopoulos D, Terry KL, Chen WY, Willett WC, Michels KB. A prospective study of breast size and premenopausal breast cancer incidence. International journal of cancer. 2006;118(8):2031-4.

Lauby-Secretan B, Scoccianti C, Loomis D, Grosse Y, Bianchini F, Straif K. Body fatness and cancer—viewpoint of the IARC Working Group. New England Journal of Medicine. 2016;375(8):794-8.

Leithner D, Moy L, Morris EA, Marino MA, Helbich TH, Pinker K. Abbreviated MRI of the breast: does it provide value? Journal of Magnetic Resonance Imaging. 2019;49(7):e85-e100.

Leithner D, Wengert G, Helbich T, Thakur S, Ochoa-Albiztegui R, Morris E, et al. Clinical role of breast MRI now and going forward. Clinical radiology. 2018;73(8):700-14.

Li M, Roder D, D'Onise K, Walters D, Farshid G, Buckley E, et al. Monitoring TNM stage of female breast cancer and survival across the South Australian population, with national and international TNM benchmarking: A population-based cohort study. BMJ open. 2020;10(6):e037069.

Ligibel JA, Basen-Engquist K, Bea JW. Weight management and physical activity for breast cancer prevention and control. American Society of Clinical Oncology Educational Book. 2019;39:e22-e33.

Lim LY, Ho PJ, Liu J, Chay WY, Tan M-H, Hartman M, et al. Determinants of breast size in Asian women. Scientific reports. 2018;8(1):1-9.

Lin C-Y, Lin C-L, Kao C-H. Staging/restaging performance of F18-fluorodeoxyglucose positron emission tomography/magnetic resonance imaging in breast cancer: a review and meta-analysis. European Journal of Radiology. 2018;107:158-65.

Loughry CW, Sheffer DB, Price Jr TE, Lackney MJ, Bartfai RG, Morek WM. Breast volume measurement of 248 women using biostereometric analysis. Plastic and Reconstructive Surgery. 1987;80(4):553-8.

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

Majid RA, Mohammed HA, Saeed HM, Safar BM, Rashid RM, Hughson MD. Breast cancer in kurdish women of northern Iraq: incidence, clinical stage, and case control analysis of parity and family risk. BMC women's health. 2009;9(1):1-6

Malherbe K, Fatima S. Fibrocystic breast disease. 2019.

Maliniak ML, Patel AV, McCullough ML, Campbell PT, Leach CR, Gapstur SM, et al. Obesity, physical activity, and breast cancer survival among older breast cancer survivors in the Cancer Prevention Study-II Nutrition Cohort. Breast Cancer Research and Treatment. 2018;167(1):133-45.

Mann RM, Kuhl CK, Moy L. Contrast-enhanced MRI for breast cancer screening. Journal of Magnetic Resonance Imaging. 2019;50(2):377-90.

Mastectomy - what you need to know (2022) Susan G. Komen®. Available at: https://www.komen.org/breast-cancer/treatment/type/surgery/mastectomy (Accessed: 10 January 2023).

Mastectomy (2022) (Breast Removal Surgery): What it is & types, Cleveland Clinic. Available at: https://my.clevelandclinic.org/health/treatments/21221-mastectomy-breast removal (Accessed: 18 February 2023).

Mastectomy Bra and swimwear fitting guide - Amoena. Available at: https://www.amoena.com/global/about-us/lingerie-and-swimwear-measuring-guide/ (Accessed: 08 October 2020).

Mayo clinic staff (2023) Breast cysts, Mayo Clinic. Available at: https://www.mayoclinic.org/diseases-conditions/breast-cysts/symptoms-causes/syc-20370284 (Accessed: 07 June 2023).

McCarthy AM, Friebel-Klingner T, Ehsan S, He W, Welch M, Chen J, et al. Relationship of established risk factors with breast cancer subtypes. Cancer medicine. 2021;10(18):6456-67.

McGhee DE, Ramsay LG, Coltman CE, Gho SA, Steele JR. Bra band size measurements derived from three-dimensional scans are not accurate in women with large, ptotic breasts. Ergonomics. 2018;61(3):464-72.

McGhee DE, Steele JR, Zealey WJ, Takacs GJ. Bra–breast forces generated in women with large breasts while standing and during treadmill running: Implications for sports bra design. Applied ergonomics. 2013;44(1):112-8.

McGhee DE, Steele JR. Breast volume and bra size. International Journal of Clothing Science and Technology. 2011.

Miller KD, Nogueira L, Mariotto AB, Rowland JH, Yabroff KR, Alfano CM, et al. Cancer treatment and survivorship statistics, 2019. CA: a cancer journal for clinicians. 2019;69(5):363-85.

Momenimovahed Z, Salehiniya H. Epidemiological characteristics of and risk factors for breast cancer in the world. Breast Cancer: Targets and Therapy. 2019;11:151.

Moran MS, Kaufman C, Burgin C, Swain S, Granville T, Winchester DP. What currently defines a breast center? Initial data from the national accreditation program for breast centers. Journal of oncology practice. 2013;9(2):e62-e70.

Mørch LS, Skovlund CW, Hannaford PC, Iversen L, Fielding S, Lidegaard Ø. Contemporary hormonal contraception and the risk of breast cancer. New England Journal of Medicine. 2017;377(23):2228-39.

Muhammad M, Zeebaree D, Brifcani AMA, Saeed J, Zebari DA. Region of interest segmentation based on clustering techniques for breast cancer ultrasound images: a review. Journal of Applied Science and Technology Trends. 2020;1(3):78-91.

Navigating cancer care (2022) Cancer.Net. Available at: https://www.cancer.net/navigating-cancer-care/how-cancer treated/chemotherapy /what-chemotherapy (Accessed: 08 February 2023).

Neilson HK, Farris MS, Stone CR, Vaska MM, Brenner DR, Friedenreich CM. Moderate-vigorous recreational physical activity and breast cancer risk, stratified by menopause status: a systematic review and meta-analysis. Menopause. 2017;24(3):322-44.

Obeidat RF, Masri MA, Marzouq M. Factors Affecting Jordanian Women's Surgical Treatment Decisions for Early-Stage Breast Cancer. Asia-Pacific Journal of Oncology Nursing. 2021;8(6):711-9.

Partin JF. Special Considerations in Patients with Early-Stage Breast Cancer and Survivors. Obstetrics and Gynecology Clinics. 2022;49(1):195-208.

Qiao Q, Zhon G, Ling Y. Breast volume measurement in young Chinese women and clinical applications. Aesthetic Plast Surg. 1997;21:362–8.

Radiation for Breast Cancer (2021) Breast Cancer Treatment. Available at: https://www.cancer.org/cancer/breast-cancer/treatment/radiation-for-breast-cancer.html (Accessed: 08 June 2023).

Rebecca Shannonhouse (2022) Mastectomy vs. Lumpectomy, WebMD. Available at: https://www.webmd.com/breast-cancer/mastectomy-vs-lumpectomy (Accessed: 20 March 2022).

Ringberg A, Bågeman E, Rose C, Ingvar C, Jernström H. Of cup and bra size: reply to a prospective study of breast size and premenopausal breast cancer incidence. International journal of cancer. 2006;119(9):2242-3.

Robinson, J. (2021) Lumpectomy (partial mastectomy): Purpose, procedure, what to expect, WebMD. Available at: https://www.webmd.com/breast-cancer/lumpectomy-partial-mastectomy (Accessed: 12 March 2022).

Salati SA. Breast fibroadenomas: a review in the light of current literature. Polish Journal of Surgery. 2021;93:40-8.

Salvo D, Torres C, Villa U, Rivera JA, Sarmiento OL, Reis RS, et al. Accelerometer-based physical activity levels among Mexican adults and their relation with sociodemographic characteristics and BMI: a cross-sectional study. International journal of behavioral nutrition and physical activity. 2015;12:1-11.

Scurr J, Brown N, Smith J, Brasher A, Risius D, Marczyk A. The influence of the breast on sport and exercise participation in school girls in the United Kingdom. Journal of Adolescent Health. 2016;58(2):167-73.

Seiler A, Chen MA, Brown RL, Fagundes CP. Obesity, dietary factors, nutrition, and breast cancer risk. Current breast cancer reports. 2018;10(1):14-27.

Shapiro CL. Cancer survivorship. New England Journal of Medicine. 2018;379(25):2438-50.

Sharma GN, Dave R, Sanadya J, Sharma P, Sharma K. Various types and management of breast cancer: an overview. Journal of advanced pharmaceutical technology & research. 2010;1(2):109.

Shawon MSR, Eriksson M, Li J. Body size in early life and risk of breast cancer. Breast Cancer Research. 2017;19(1):1-11.

Shoemaker ML, White MC, Wu M, Weir HK, Romieu I. Differences in breast cancer incidence among young women aged 20–49 years by stage and

tumor characteristics, age, race, and ethnicity, 2004–2013. Breast Cancer Research and Treatment. 2018;169(3):595-606.

Siaeva (2017) Bra sizes - International Cup and band sizes, Sizeguide.net. Available at: https://www.sizeguide.net/bra-sizes.html (Accessed: 08 August 2020).

Siegel RL, Miller KD, Jemal A. Cancer statistics, 2020. CA: a cancer journal for clinicians. 2020; 70(1):7-30.

Singh R, Deo S, Dhamija E, Mathur S, Thulkar S. To evaluate the accuracy of axillary staging using ultrasound and ultrasound-guided fine-needle aspiration cytology (USG-FNAC) in early breast cancer patients—a prospective study. Indian Journal of Surgical Oncology. 2020;11(4):726-34.

Stachs A, Stubert J, Reimer T, Hartmann S. Benign breast disease in women. Deutsches Ärzteblatt International. 2019;116(33-34):565.

Staging & grade (2023) Staging & Grade - Breast Pathology | Johns Hopkins Pathology. Available at: https://pathology.jhu.edu/breast/staging-grade/ (Accessed: 10 April 2023).

Suzanne C. Smelter et al; Textbook of Medical-Surgical, eleventh edition, USA: Lippincott, 2008; pp. 391, 1712, 1713, 1715.

Targeted drug therapy: Breast cancer treatment (2023) Targeted Drug Therapy| Breast Cancer Treatment. Available at: https://www.cancer.org/cancer/breast-cancer/treatment/targeted-therapy-for-breast-cancer.html (Accessed: 20 February 2023).

Targeted therapy (2023) National Breast Cancer Foundation. Available at: https://www.nationalbreastcancer.org/breast-cancer-targeted-therapy/ (Accessed: 08 February 2023).

Thakur P, Seam RK, Gupta MK, Gupta M, Sharma M, Fotedar V. Breast cancer risk factor evaluation in a Western Himalayan state: A case–control study and comparison with the Western World. South Asian journal of cancer. 2017;6(03):106-9.

Wagner, M. (2023) Breast cancer nursing diagnosis & care plan, NurseTogether. Available at: https://www.nursetogether.com/breast-cancer-nursing-diagnosis-care-plan/ (Accessed: 28 March 2023).

Waks AG, Winer EP. Breast cancer treatment: a review. Jama. 2019;321(3):288-300.

Wang K, Sun J-Z, Wu Q-X, Li Z-Y, Li D-X, Xiong Y-F, et al. Long-term anti-inflammatory diet in relation to improved breast cancer prognosis: a prospective cohort study. NPJ breast cancer. 2020;6(1):1-11.

Wang L. Early diagnosis of breast cancer. Sensors. 2017;17(7):1572.

Weiss A, Chavez-MacGregor M, Lichtensztajn DY, Yi M, Tadros A, Hortobagyi GN, et al. Validation study of the American Joint Committee on Cancer eighth edition prognostic stage compared with the anatomic stage in breast cancer. JAMA oncology. 2018;4(2):203-9.

Welch HG, Prorok PC, O'Malley AJ, Kramer BS. Breast-cancer tumor size, overdiagnosis, and mammography screening effectiveness. New England Journal of Medicine. 2016;375(15):1438-47.

Wendler, R. (2022) How does hormone therapy for breast cancer work?, MD Anderson Cancer Center. Available at: https://www.mdanderson.org/cancerwise/what-is-hormone-therapy-for-breast-cancer.h00-159542112.html (Accessed: 08 March 2023).

What is breast cancer? (2021) Centers for Disease Control and Prevention. Available at: https://www.cdc.gov/cancer/breast/basic_info/what-is-breast-cancer.htm (Accessed: 07 January 2022).

What is breast cancer?, (2019)/ american cancer society. Available at: https://www.cancer.org/cancer/types/breast-cancer/about/what-is-breast-cancer.html (Accessed: 07 January 2022).

White J, Mills C, Ball N, Scurr J. The effect of breast support and breast pain on upper-extremity kinematics during running: implications for females with large breasts. Journal of Sports Sciences. 2015;33(19):2043-50.

Williams PT. Breast cancer mortality vs. exercise and breast size in runners and walkers. PloS one. 2013;8(12):e80616.

Yahyaa BT. Woman's Knowledge about Breast Cancer in Al-Ramadi City, Iraq. Annals of the Romanian Society for Cell Biology. 2021:4901-10.

Zeinomar N, Knight JA, Genkinger JM, Phillips K-A, Daly MB, Milne RL, et al. Alcohol consumption, cigarette smoking, and familial breast cancer

risk: findings from the Prospective Family Study Cohort (ProF-SC). Breast Cancer Research. 2019;21(1):1-14.

Zhou Y, Chen J, Li Q, Huang W, Lan H, Jiang H. Association between breastfeeding and breast cancer risk: evidence from a meta-analysis. Breastfeeding medicine. 2015;10(3):175-82.

Appendices

Appendix- A: Acceptance Letter 1.

ISSN 1012-8298

Dear Dr. Deman Ahmed Saeed,
Ph. D, Department of Adult Nursing, College of Nursing/ University of Sulaimani, Iraq.
Accepted Date: 17-01-2023.

Manuscript Title: Impact of Breast Size and Body Mass Index on the Prevalence of Breast Cancer in the Sulaimaniyah Province of Iraq

Dear Dr Deman Ahmed Saeed,

Co-author: Anwar Kader Ibrahim Sheikha

Re: Manuscript Number: BMB-23-403

I am pleased to inform you that the above manuscript has been accepted for publication in the Bahrain Medical Bulletin - Vol. 45.

Thank you for your interest in the Bahrain Medical Bulletin. We look forward to receive more of your future research works.

The Bahrain Medical Bulletin is published quarterly, appearing in March, June, September and December. It is indexed in the World Health Organization Index Medicus for Eastern Mediterranean Region [IMEMR], Extramed of the United Kingdom, International Serial Data System of France and SCOPUS. United States National Library of Medicine ID number is 8503052.

A medical journal can influence the profession by continuous publication from generation to generation.

Best regards.

Yours sincerely,

Dr. Jaffar M. Albareeq
Chief Editor
Bahrain Medical Bulletin – Established 1979
Telephone: +973-17593600, +973-39652220
E-mail: bmbbahrain1979@gmail.com,
jmab@batelco.com.bh
Website: www.bahrainmedicalbulletin.com

Appendix- B: Acceptance Letter 2.

Journal of Zankoy Sulaimani – Part A
For Pure and Applied Sciences
(JZS-A) ISSN 1812-4100
Issued by the University of Sulaimani
www.univsul.edu.iq

Ref: JZS-NUR-05-2023

Date: March 28, 2023

Notification of Acceptance

Dears Deman Ahmed Saeed[1] & Anwar Kader Ibrahim Sheikha[2]

[1]*Department of Adult Nursing, College of Nursing, University of Sulaimani, Sulaymaniyah, Iraq*

[2]*Anwar Sheikha Medical City, Zargata Hill, Sulaymaniyah, Iraq*

Paper Code: JZS-NUR-05-2023

We are very pleased to inform you that your paper entitled: **Identifying Risk Factors for the Development of Breast Cancer among Women Attending Hiwa Hematology/Oncology Hospital in the Sulaimaniyah, Iraqi Kurdistan** is accepted by Chief Editor of *Journal of Zankoy Sulaimani-Part A (JZS-A)*, and it will be published in **Vol. 25 (No. 1): 2023**.

Nawroz

Prof. Dr. Nawroz Abdul-razzak Tahir

Journal of Zankoy Sulaimani-Part A (JZS-A)
University of Sulaimani, Sulaimaniyah, Iraq
E. mail: jzs-a@univsul.edu.iq
URL: https://www.univsul.edu.iq

Appendix- C: Questionnaire:

Form No…… **Code:** **Tel No:**

Title: "BREAST SIZE, BODY MASS INDEX, AND PHYSICAL ACTIVITY AS A RISK FACTOR OF BREAST CANCER IN SULAYMANIYAH CITY-IRAQI KURDISTAN REGION"

Part One: Socio-demographic Data:

1.1. Age/ Year: ……..… -Age on admission/ Year: …….

1.2. Date of admission: ..…../…..…/ ……. – Blood group: ……..

1.3. Gender: … Female ....

1.4. Religion: Muslim ☐ Christian ☐ Yazidy ☐ Other ☐

1.5. Marital Status: Single ☐ Married ☐ Divorced ☐ Widow ☐

1.6. Residential area: Inside City ☐ Outer ☐

1.7. Economic status:

- Income < Expenditure ☐
- Income = Expenditure ☐
- Income > Expenditure ☐

1.8. Level of education:

- No formal education ☐
- Primary school graduate ☐
- Secondary school graduate ☐
- College/ Institute ☐

1.9. Occupation:

- Employed ☐
- Jobless ☐
- Retired ☐
- House wife ☐
- Others ☐

<u>Part Two</u>: Some contributing factors which have relation with Breast Cancer.

2.1. Menstrual history:

- Age at Menarche: ☐ Years
- Regularity of period: Regular ☐ Irregular ☐
- Menopause: No ☐ Yes ☐
  If yes; Premenopause ☐
  Menapause ☐
  Postmenapause ☐

2.2. Obstetric History:

- Nullipara ☐ Gravida ☐ Para ☐ Abortion ☐ Death ☐
- First child after 30 years of age Yes ☐ No ☐

2.3. Hormonal replacement therapy:

- Contraceptive pill: Yes ☐ No ☐
- Hormonal replacement therapy: Yes ☐ No ☐

2.4. Clinical Presentation:

Mass ☐ Nipple discharge ☐ Pain ☐ Inflammation ☐
Itching ☐ Other ☐
Mass detected By: Herself ☐ Doctor ☐
Color of nipple discharge: ……..

✓ Affected Site; in the: Left breast ☐ Right breast ☐ Both ☐

Diagnosis:
- Type of Breast Cancer: ……..……..
- Date: …..… / …..…. / ……...

- Stage of Breast cancer:
- 1st stage ☐
- 2nd stage ☐
- 3rd stage ☐
- 4th stage ☐

- Metastasis to other organ: Yes ☐ No ☐ Date:
- Recurrence: Yes ☐ No ☐ Date:

Type of Breast Treatment:

- Breast surgery: Yes ☐ No ☐

If Yes: - Date: …..... / …….. / ……..

- Type of breast surgery:…….

- Radiation ☐
- Chemotherapy ☐
- Biology ☐
- Medication ☐ If Yes: Type of medication: ……

2.5. Previous Breast disease:

Trauma ☐ Inflammation ☐ Mass ☐ Discharge ☐ Itching ☐

☐ Others

Color of nipple discharge: ……..

✓ Affected Site; in the: Left breast ☐ Right breast ☐ Both ☐

- Diagnosis: Benign ☐ Malignant ☐

Type of Previous Breast Treatment:

- Previous Breast surgery: Yes ☐ No ☐

If Yes: - Date: ..…... / …….. / ……..

- Type of breast surgery:

- Radiation ☐
- Chemotherapy ☐
- Biology ☐
- Medication ☐ If Yes: Type of medication: …….

2.6. Family history of Breast cancer: **Yes** ☐ **No** ☐

If Yes, Number of affected family members:

- First relative: Sister ☐ Daughter ☐ Mother ☐ Age ☐
- Second relative: Aunt ☐ Grandmother ☐ Other ☐ Age ☐

2.7. Family history of other cancers: Yes ☐ No ☐

If Yes, Type of Cancer: ……

Lifestyle:

2.8. Breast lactation: Yes ☐ No ☐

If Yes: Duration ☐ Years

- Lactation by: Left breast ☐ Right breast ☐ Both ☐
- Number of child lactated: ☐

2.9. Smoking: Yes ☐ No ☐

If yes; - How many cigarettes/ day? ☐ cigarettes/day

- How many years have you been smoking? ☐ Years

Ex. Smoker Yes ☐ No ☐ Family member:

2.10. Alcohol: **Yes** ☐ **No** ☐

- If your answer yes, specify the quantity ☐ Units/ week
- How many years have you drink alcohol? ☐ Years

2.11. Dietary patterns:	**Daily**	**Weekly**	**Monthly**	**Never**
- Eating Sweets	☐	☐	☐	☐
- Eating fatty food	☐	☐	☐	☐
- Eating fruits	☐	☐	☐	☐
- Eating vegetables & Legumes	☐	☐	☐	☐
- Eating Fish	☐	☐	☐	☐
- Eating red meat & poultry	☐	☐	☐	☐
- Milk and its products	☐	☐	☐	☐
- Eating fast food:	☐	☐	☐	☐

2.12. Radiation: (X-Ray)

- Exposure to radiation Yes ☐ No ☐

<u>Part three</u> Body Mass Index:

3.1. Recent BMI: - Weight ( ) kg

- Height ( ) cm - BMI ( )

- Under weight ☐ - Healthy weight ☐
- Over weight ☐ - Obese ☐

<u>Part Four:</u>. Breast Size and Breast Features:

4.1. Measurement of Breast:

-Cup size = Bust size (measure the non operated side × 2)

-Band Size = (measure the under bust)

Bra Size: ( )

4.2. Breast symmetry:

- Right breast large ☐
- Left breast large ☐
- Same size ☐

4.3. Reconstructive surgery: **Yes** ☐ **No** ☐

4.4. Using Breast Prosthesis: **Yes** ☐ **No** ☐

4.5. Breast self-examination **Yes** ☐ **No** ☐

<u>Part Five:</u> International Physical Activity Questionnaire (IPAQ-sf)

6.1. During the last 7 days, on how many days did you do vigorous physical activities like heavy lifting, digging, aerobics, or fast bicycling?
_____ days per week, No vigorous physical activities ! Skip to question 3

6.2. How much time did you usually spend doing vigorous physical activities on one of those days?
_____ hours per day
_____ minutes per day
Don't know/Not sure

Think about all the moderate activities that you did in the last 7 days. Moderate activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. Think only about those physical activities that you did for at least 10 min at a time.

6.3. During the last 7 days, on how many days did you do moderate physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking.
_____ days per week
No moderate physical activities! Skip to question 5

6.4. How much time did you usually spend doing moderate physical activities on one of those days?
_____ hours per day
_____ minutes per day
Don't know/Not sure

Think about the time you spent walking in the last 7 days. This includes at work and at home, walking to travel from place to place, and any other walking that you might do solely for recreation, sport, exercise, or leisure.

6.5. During the last 7 days, on how many days did you walk for at least 10 min at a time?
_____ days per week
No walking! Skip to question 7

6.6. How much time did you usually spend walking on one of those days?
_____ hours per day
_____ minutes per day
Don't know/ Not sure

The last question is about the time you spent sitting on weekdays during the last 7 days. Include time spent at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading, or sitting or lying down to watch television.

6.7. During the last 7 days, how much time did you spend sitting on a weekday?
_____ hours per day
_____ minutes per day
Don't know/Not sure

Appendix- D: List of experts

No.	Name of Expertise	Scientific Title	Work place
1.	Salwa Shakir Alkurwi	Professor/ Psychiatric & Mental Health	University of Sulaimani/ College of Nursing
2.	Zhian Salah Ramzi	Professor/ Community Medicine	University of Sulaimani/ College of Medicine
3.	Mohammed Rashid Ameen	Assist prof./ Adult Nursing	University of Sulaimani/ College of Nursing
4.	Heshu Sulaiman Rahman	Assist. prof/ PhD. in Hematology & Clinical pathology	University of Sulaimani/ College of Medicine
5.	Atiya Kareem Mohammed	Assist. prof./ Maternity & Neonate Nursing	University of Sulaimani/ College of Nursing
6.	Hazha Abdullah Mohammed	Assist prof./ Oncologist	University of Sulaimani/ College of Medicine
7.	Sanaria shwan Abdulrahem	PhD./Family Medicine	Breast Disease Treatment Center
8.	Sanna Sahib	Assist prof./ Community Health Nursing	University of Raparin/ College of Nursing
9.	Rozhan Omar Hassan	PhD./ Oncologist	Hiwa Hematology & Oncology Hospital
10.	Mohammed A W Hassan	PhD./ Family Medicine	Hiwa Hematology & Oncology Hospital
11.	Rebaz Mohammed Ali	PhD. /Oncologist	Hiwa Hematology & Oncology Hospital
12.	Raz Haidar	PhD. /Oncologist	Hiwa Hematology & Oncology Hospital
13.	Shallaw Hama Abdalla	PhD. /Oncologist	Hiwa Hematology & Oncology Hospital
14.	Rawaz Salih Dawd	PhD. /Oncologist	Hiwa Hematology & Oncology Hospital

Appendix- E: The Ethics Committee

Ministry of Higher Education
and Scientific Research
University of Sulaimani
College of Medicine
Ethics committee

وەزارەتی خوێندنی باڵا و توێژینەوەی زانستی
سەرۆکایەتی زانکۆی سلێمانی
کۆلێجی پزیشکی
لیژنەی ئاکار

Number: 63
Date : 7/3/12.21

The Ethics Committee of the College of Medicine

We the members of the ethical committee approved the research project below in the meeting (No : 18) on the date (7 /3 /12.21).

Title of the research project:

"INFLUENCE OF BREAST SIZE, BODY MASS INDEX AND PHYSICAL ACTIVITY ON THE PREVALENCE OF BREAST CANCER IN THE SULAYMANIYAH PROVINCE OF IRAQI KURDISTAN"

Name and tile of the participants:

1- Assist. Lecturer/ Deman Ahmed Saeed department of Adult Nursing/ College of Nursing/ University of Sulaimani
2- Professor Dr. Anwar Sheikha /Lecturer/ department of Hematology- Oncology/ College of Medicine/University of Sulaimani

Place of research study: Hiwa Cancer Hospital.

Members of Ethical committee of the College of Medicine

Ass. Prof. Dr Nizar Mohammed Tawfeeq
Head of the committee

Ass.lecturer .Dr. Kazhan Ali Towfiq
Member

Dr. Ali Mohammed Kareem Jabari
Member

Ass.Prof.Dr.Anwer Aboubaker kareem Jaff
Member

Ass.Prof. Dr.Kamaran Awrahman Majid
Member

Ass.Prof Dr. Nawzad Rashed Abdulrahman
Member

Dr. Hadeel Abdulelah Ibrahim Saeed
Member

Appendix- F: Official permission

KURDISTAN REGIONAL GOVERNMENT
Council Of Ministers
Ministry of Higher Education & Scientific Research
University of Sulaimani Presidency
College of Nursing

حکومەتی هەرێمی کوردستان – عێراق
سەرۆکایەتی نەنجوومەنی وەزیران
وەزارەتی خوێندنی باڵا و توێژینەوەی زانستی
سەرۆکایەتی زانکۆی سلێمانی
کۆلیجی پەرستاری

خوێندنی باڵا

No: ژمارە : ١٠٦ /١٩/٧
Date : ڕێکەوت: ٨١ /١ /٢٠٢١ زایینی
/ /٢٧٢٠ کوردی

بۆ / بەڕێوبەرایەتی تەندروستی سلێمانی
بابەت / ئاسانکاری

سلاوی زانست...

داواکارین لە بەڕێزتان ڕەزامەندی بفەرموون بە ئاسانکاری کردنی کارەکانی بەڕێز (دیمەن احمد سعید) ,خوێندکاری خوێندنی بالای کولێجەکەمان (دکتورا) بەمەبستی کۆکردنی زانیاری وداتا بۆ توێژینەوەکەی کە بە ناونیشانی
(INFLUENCE OF BREAST SIZE , BODY MASS INDEX AND PHYSICAL ACTIVITY ON THE PREVALENCE OF BREAST CANCER IN THE SULAYMANIY AH PROVINCE OF IRAQI KURDISTAN).

نەخۆشخانەی هیوا

هاوکاریتان جیگەی ڕێز وسوپاسە

پ. ی . د.ژیان صلاح رمزی
ڕاگری کۆلێجی پەرستاری بە وەکالەت
٢٠٢١/١/١٤

زانکۆی سلێمانی کۆلیجی پەرستاری

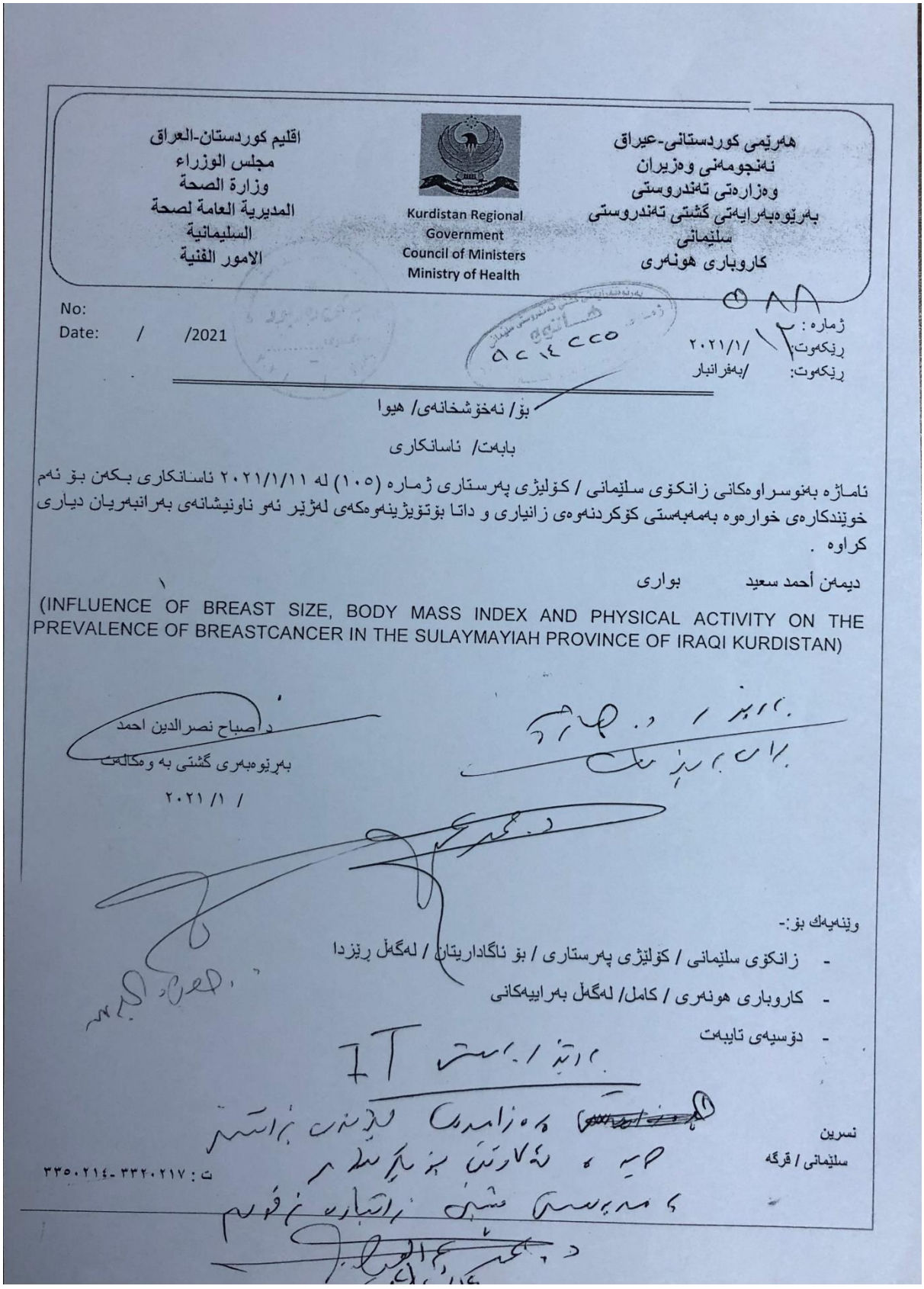
بەڕێوبەرایەتی گشتی تەندروستی سلێمانی
هاتوو
ژمارە: ٢٧٥
بەروار: ١٢/١/٢٠٢١

وێنەیەک بۆ/
- خوێندنی بالا.
- خۆیی.
- دۆسیەی دەرچوو.

شادان ٢٠٢١/١/١٠

University Old Campus / Sulaimani / Kurdistan/Iraq
Email : www.nur@Univsul.edu.iq

Appendix- G: Facilitation Letter



هەریمی کوردستانی-عیراق
نەنجومەنی وەزیران
وەزارەتی تەندروستی
بەڕێوەبەرایەتی گشتی تەندروستی
سلێمانی
کاروباری هونەری

Kurdistan Regional Government
Council of Ministers
Ministry of Health

اقليم كوردستان-العراق
مجلس الوزراء
وزارة الصحة
المديرية العامة لصحة السليمانية
الامور الفنية

ژمارە:
رێکەوت: ٢٠٢١/١/
رێکەوت: /بەفرانبار

No:
Date: / /2021

بۆ/ نەخۆشخانەی/ هیوا

بابەت/ ناسانکاری

ناماژە بەنوسراوەکانی زانکۆی سلێمانی / کۆلیژی پەرستاری ژمارە (١٠٥) لە ٢٠٢١/١/١١ ناسانکاری بکەن بۆ ئەم خوێندکارەی خوارەوە بەمەبەستی کۆکردنەوەی زانیاری و داتا بۆتۆژینەوەکەی لەژێر ناونیشانەی بەرانبەریان دیاری کراوە .

دیمەن أحمد سعید بواری

(INFLUENCE OF BREAST SIZE, BODY MASS INDEX AND PHYSICAL ACTIVITY ON THE PREVALENCE OF BREASTCANCER IN THE SULAYMAYIAH PROVINCE OF IRAQI KURDISTAN)

د.صباح نصرالدین احمد
بەڕێوەبەری گشتی بە وەکالەت
/ ١/ ٢٠٢١

وێنەیەک بۆ:-
- زانکۆی سلێمانی / کۆلیژی پەرستاری / بۆ ئاگاداریتان / لەگەڵ ڕێزدا
- کاروباری هونەری / کامل/ لەگەڵ بەراییەکانی
- دۆسیەی تایبەت

نسرین
سلێمانی / قرگە

ت: ٣٣٢٠٢١٧-٣٣٥٠٢١٤

Appendix-H: Measuring Guide for Mastectomy Patient

HOW TO MEASURE FOR A MASTECTOMY BRA

1. Suggested Band Size based on Under Bust Measurements (cm)												
Band Size (cm)	63-67	68-72	73-77	78-82	83-87	88-92	93-97	98-102	103-107	108-112	113-117	119-122
UK / EU bra sizes	30 / 65	32 / 70	34 / 75	36 / 80	38 / 85	40 / 90	42 / 95	44 / 100	46 / 105	48 / 110	50 / 115	52 / 120
2. Suggested Cup Size Based on Bust Measurements (cm)												
AA	75-77	80-82	85-87	90-92	95-97	100-102	105-107	110-112	115-117	120-122	125-127	130-132
A	77-79	82-84	87-89	92-94	97-99	102-104	107-109	112-114	117-119	122-124	127-129	132-134
B	79-81	84-86	89-91	94-96	99-101	104-106	109-111	114-116	119-121	124-126	129-131	134-136
C	81-83	86-88	91-93	96-98	101-103	106-108	111-113	116-118	121-123	126-128	131-133	136-138
D	83-85	88-90	93-95	98-100	103-105	108-110	113-115	118-120	123-125	128-130	133-135	138-140
E	85-87	90-92	95-97	100-102	105-107	110-112	115-117	120-122	125-127	130-132	135-137	140-142
F	87-89	92-94	97-99	102-104	107-109	112-114	117-119	122-124	127-129	132-134	137-139	142-144
G	89-91	94-96	99-101	104-106	109-111	114-116	119-121	124-126	129-131	134-136	139-141	144-146

***How to measure for a mastectomy bra - oncovia* (2017) *Advices*. Available at: https://www.oncovia.com/blog/en/expert/how-to-measure-for-a-mastectomy-bra/ (Accessed: 08 October 2020).**

Appendix-I: Measuring Guide for Mastectomy Patient

MEASURING GUIDE FOR MASTECTOMY PATIENTS

A	AA	75-77	80-82	85-87	90-92	95-97	100-102	105-107	110-112	115-117	120-122	125-127	130-132
	A	77-79	82-84	87-89	92-94	97-99	102-104	107-109	112-114	117-119	122-124	127-129	132-134
	B	79-81	84-86	89-91	94-96	99-101	104-106	109-111	114-116	119-121	124-126	129-131	134-136
	C	81-83	86-88	91-93	96-98	101-103	106-108	111-113	116-118	121-123	126-128	131-133	136-138
	D	83-85	88-90	93-95	98-100	103-105	108-110	113-115	118-120	123-125	128-130	133-135	138-140
	E	85-87	90-92	95-97	100-102	105-107	110-112	115-117	120-122	125-127	130-132	135-137	140-142
	F	87-89	92-94	97-99	102-104	107-109	112-114	117-119	122-124	127-129	132-134	137-139	142-144
	G	89-91	94-96	99-101	104-106	109-111	114-116	119-121	124-126	129-131	134-136	139-141	144-146
B		63-67	68-72	73-77	78-82	83-87	88-92	93-97	98-102	103-107	108-112	113-117	118-122
C		88-92	92-96	96-100	100-104	104-108	108-112	112-116	116-120	120-124	124-128	128-132	132-136
1		65 34	70 36	75 38	80 40	85 42	90 44	95 46	100 48	105 50	110 52	115 54	120 56
2		34	36	38	40	42	44	46	48	50	52	54	56
		XS	S		M		L		XL		XXL		

***Mastectomy Bra and swimwear fitting guide - Amoena*. Available at: https://www.amoena.com/global/about-us/lingerie-and-swimwear-measuring guide/ (Accessed: 08 October 2020).**

Appendix-J: Bra Size Guide

1. Convert to international band size:

USA	UK	Europe	France/Spain	Japan	Australia
28	28	60	75	60	6
30	30	65	80	65	8
32	32	70	85	70	10
34	34	75	90	75	12
36	36	80	95	80	14
38	38	85	100	85	16
40	40	90	105	90	18
42	42	95	110	95	20
44	44	100	115	100	22
46	46	105	120	105	24
48	48	110	125	110	26

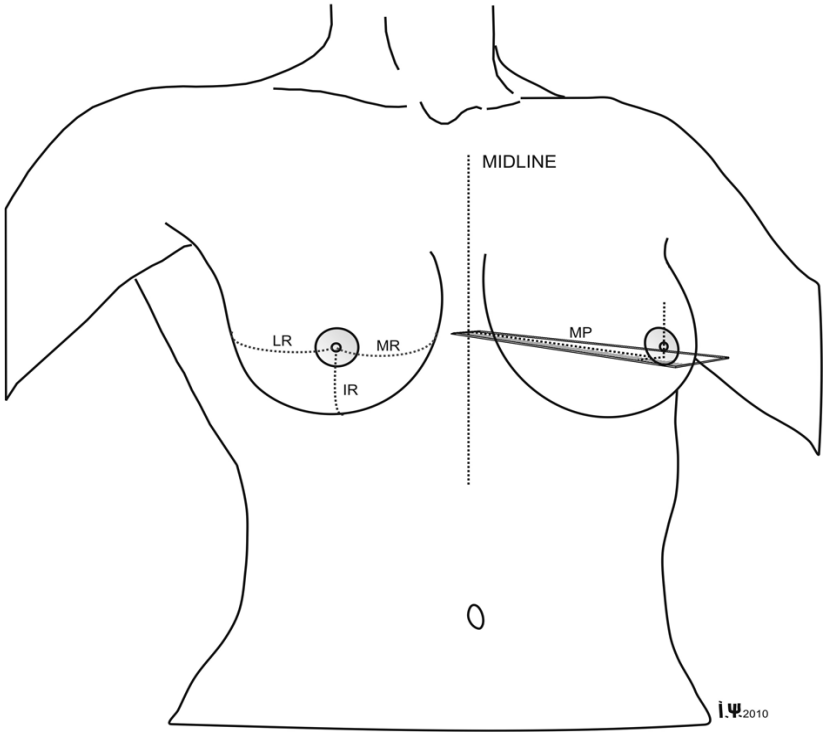
Siaeva (2017) *Bra sizes - International Cup and band sizes, Sizeguide.net.* Available at: https://www.sizeguide.net/bra-sizes.html (Accessed: 08 August 2020).

2. Convert to international cup size:

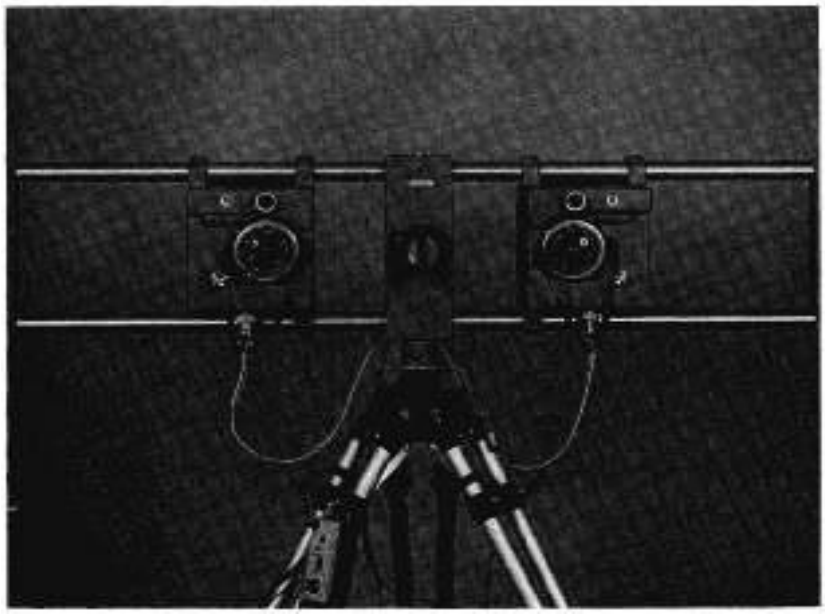
USA	UK	Europe	France/Spain	Japan	Australia
AA	A	A	A	A	AA
A	B	B	B	B	A
B	C	C	C	C	B
C	D	D	D	D	C
D	DD	E	E	E	D
DD	E	F	F	F	DD
DDD/E	F	G	G	G	E
F	G	H	H	H	F
G	H	I	I	I	G
H	I	J	J	J	H
I	J	K	K	K	I

Siaeva (2017) *Bra sizes - International Cup and band sizes, Sizeguide.net.* Available at: https://www.sizeguide.net/bra-sizes.html (Accessed: 08 August 2020).

Appendix -K **Methods for Measurements of Breasts**



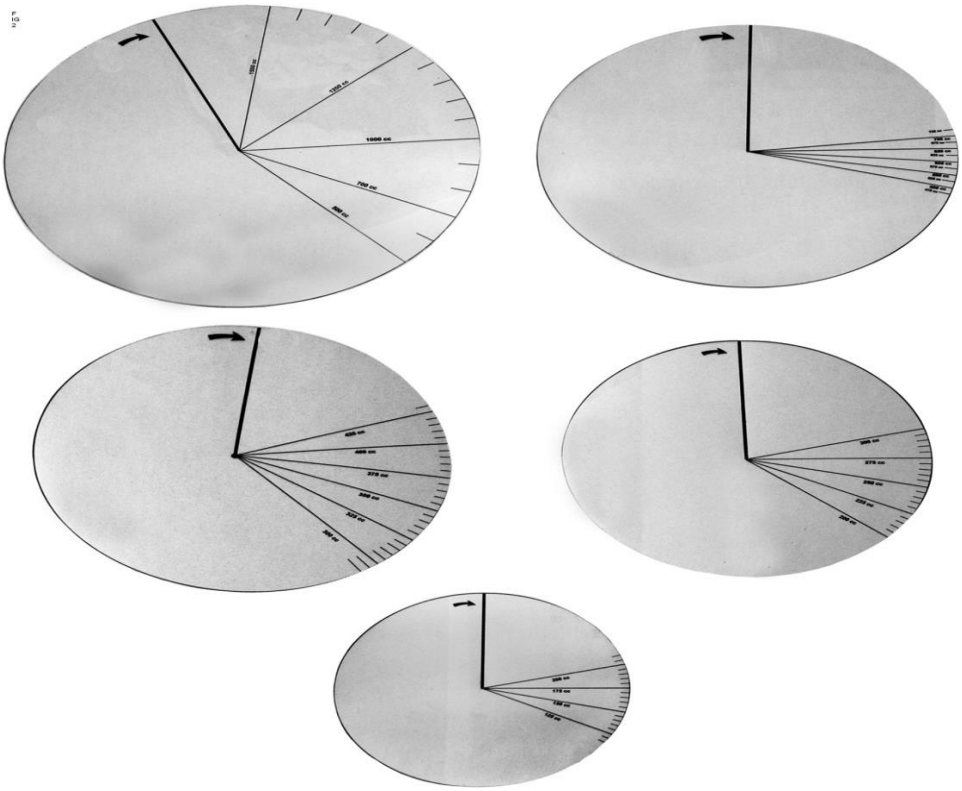
Anatomic (anthropometric) measurement (Kayar et al., 2011)

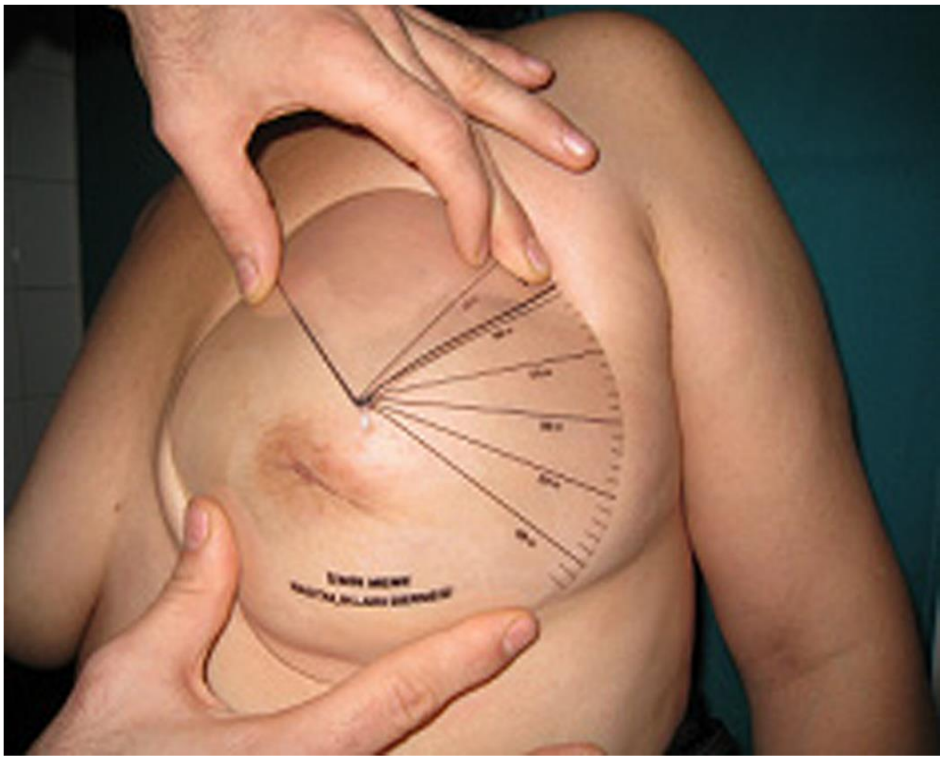


Biostereometric analysis (Loughry et al., 1987)

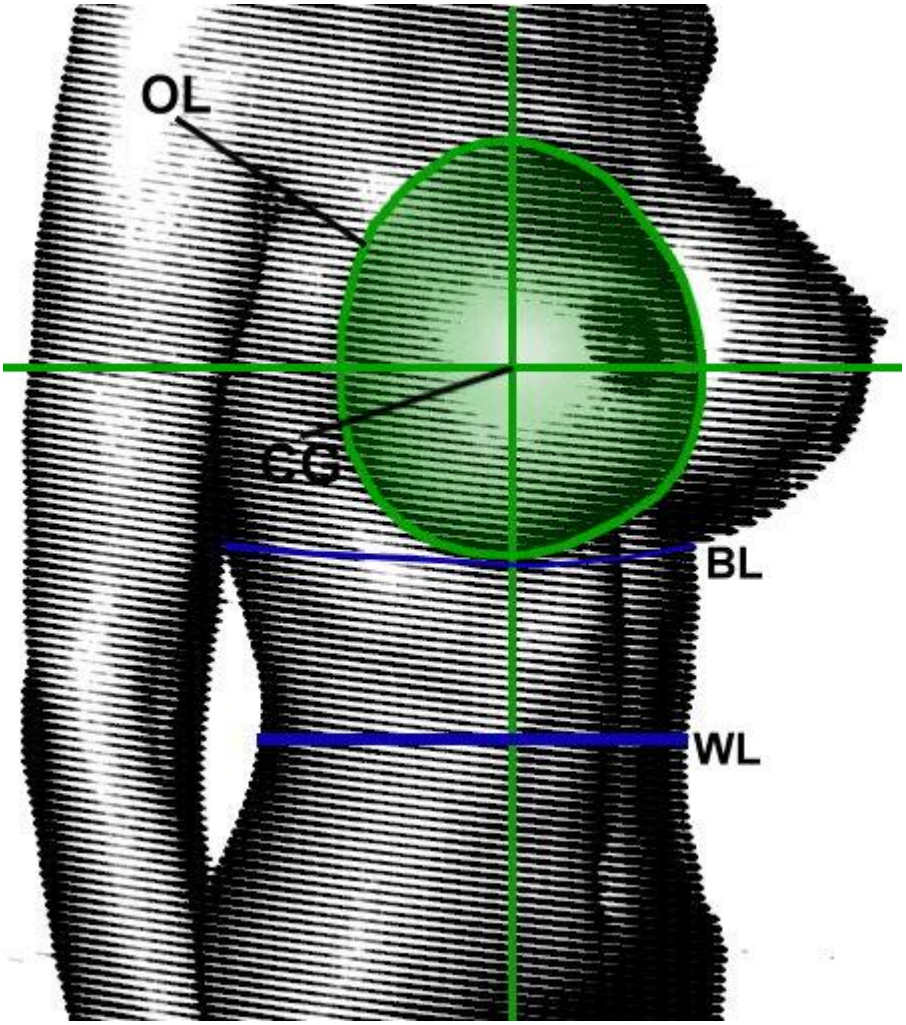
Archimedes-water displacement procedure (Kayar et al., 2011)

Casting techniques (Kayar et al., 2011)



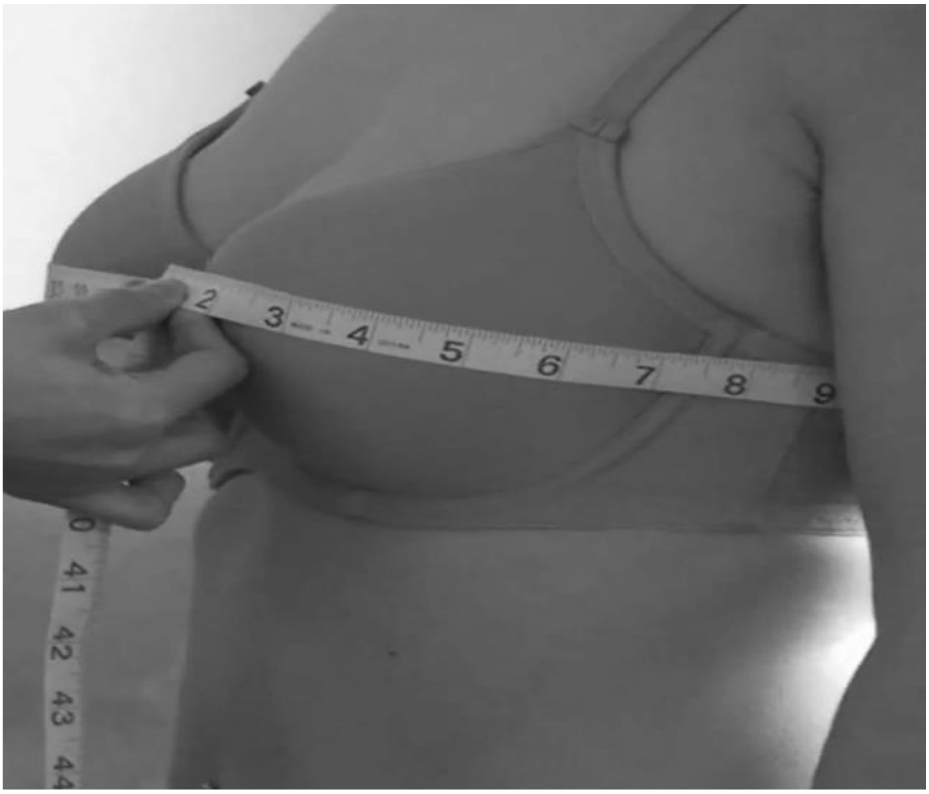


Grossman-Rounder Device (Kayar et al., 2011)



Radiological techniques (Anderson et al., 2013)

Plastic cups (Hansson et al., 2014)



Measuring tape (Anderson et al., 2013)

Appendix-L **پوختە**

پێشەکی: نەخۆشی شێرپەنجەی مەمك تائیستا، بەربڵاوترین شێرپەنجەیە کە دەست نیشان کراوە لەنیوان ئافرەتان لەجیهاندا، هەروەها کاریگەری شێرپەنجەی مەمك یەك لە بیست ئافرەتە لەجیهاندا و یەك لە هەشت ئافرەتە لە وڵاتانی پێشکەوتوو. بۆ زانیاری, داتای بڵاوکراوەمان نیە سەبارەت بە کاریگەری قەبارەی مەمك, زۆری کێشی لەش هەروەها چالاکی جەستەیی وەك هۆکارێك بۆ تووشبون بە شێرپەنجەی مەمك لەنێوان ئافرەتانی کوردستانی عیراق.

مەبەست: مەبەستی سەرەکی ئەم تویژینەوەیە بریتیە لە دۆزینەوەی پەیوەندی لەنیوان قەبارەی مەمك, بارستایی لەش هەروەها چالاکی جەستەیی ئەگەری تووش بوون بەنەخۆشی شێرپەنجەی مەمك لەم هەرێمەدا.

نەخۆشەکان و شێوازەکان: ئەم تویژینەوەیە بە شێوازی شیکاری و باسی (Cross Sectional Study) لەسەر 400 ئافرەتی تووش بوو بە شێرپەنجەی مەمك ئەنجام دراوە لە نەخۆشخانەی هیوا بۆ نەخۆشیەکانی خوێن و گرێ شێرپەنجەییەکان لە پارێزگای سلێمانی کوردستانی عێراق. فۆرمی ڕاپرسی دروست کراوە بۆ کۆکردنەوەی زانیاری لەلایەن تویژەرەوە. دەستپێکی کارەکەیان لە 14 ی شوباتی 2021 بۆ 1 ی حوزەیرانی 2022 ئەنجام درا . تویژینەوەیەکی تێرو تەسەل دەربارەی قەبارەی مەمك، بارستایی لەش و چالاکی جەستەیی لەسەر ئەو ئافرەتانە ئەنجام درا کەسەردانی کلینکی گرێ شێرپەنجەییەکانیان دەکرد. پاکێجی ئاماری زانستی کۆمەڵایەتی ڤێرژنی 21 بەکارهێنراوە بۆ شیکردنەوەی داتاکان.

ئەنجامەکان: تێکڕای تەمەنی نەخۆشەکان (47.33 ± 9.9) ساڵ بوو لەسەرەتای دەست نیشان کردنی بە شێرپەنجەی مەمك. فەبارەی مەمك: زۆرینە (71٪) نەخۆشەکان قەبارەی کەپ لە D و گەورەتر بوو، لەکاتێکدا تەنها 13٪ لەبەشداربووان قەبارەی کەپ لە A و بچووکتربوو. هەروەها، زۆرینەی نەخۆشەکان (61٪) قەبارەی باند لە 90 ≤ ، تەنها 7.5 قەبارەی باند 75 ≤. سەبارەت بە پێوەری بارستایی لەش، سەبارەت بە کێشی لەش، زۆرینە قەڵەوبوون (63٪) یان کێشیان زۆربوو (29٪). پەیوەندی بەهێز هەبوو لەنێوان زۆری بارستایی لەش، قەبارەی مەمك لەگەڵ شێرپەنجەی مەمك ($p < 0.001$). هەروەها، نیوە زیاتر (58٪) چالاکی جەستەییان کەم بوو.

دەرئەنجامەکان: ئەنجامەکانی ئەم تویژینەوەیە دەری دەخات گەورەیی قەبارەی مەمك, زۆری کێشی لەش هەروەها کەمی چالاکی جەستەیی پەیوەندی هەیە بەتووشبوون بە نەخۆشی شێرپەنجەی مەمك لەنێوان ئافرەتانی کوردستانی عێراق. ئامانج کارکردنە لەسەر پاراستنی کێشی لەش هەروەها هاندان بۆ زیادکردنی جوڵە لەگەڵ کۆنترۆڵ کردنی ئەو هۆکارانەی ئەتوانرێت بگۆڕدرێن پیویستە بۆکەم کردنەوەی ژمارەی تووش بوون بە شێرپەنجەی مەمك. تویژینەوەی زیاتر پێویستە بکرێت لەسەر ئەم بابەتە.

حکومەتی هەرێمی کوردستان-عێراق

وەزارەتی خوێندنی باڵاو توێژینەوەی زانستی

زانکۆی سلێمانی

کۆلێژی پەرستاری

قەبارەی مەمك، بارستایی لەش و چالاکی جەستەیی وەك هۆکارێك بۆ تۆشبون بە شێرپە نجەی مەمك لە پارێزگای سلێمانی - هەرێمی کوردستانی عێراق

ئەم لیکۆڵینەوەیە

پێشکەش کراوە بە ئە نجومەنی کۆلێژی پەرستاری زانکۆی سلێمانی وەك بەشێك لەداواکاری بۆ بەدەست هێنانی بڕوانامەی دکتۆرا لە بەشی پەرستاری پێگەیشتووان

ئامادەکردنی:

دیمەن احمد سعید

ماستەر لە زانستی پزیشکی- داهێنانە نوێکان-بەریتانیا

بە سەرپەرشتیاری:

پرۆفیسۆر ئەنوەر شێخە

پرۆفیسۆر لەبواری هیماتۆلۆجی- شاری پزیشکی ئەنوەر شێخە

2023 زایینی | 1444 کۆچی | 2723 کوردی