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FACULTY OF MEDICINE AND BIOMEDICAL SCIENCES

DEPARTMENT OF OBSTETRICS AND GYNAECOLOGY

THE IMPACT OF BREAST CANCER ON SEXUALITY AND THE PERSPECTIVE OF THE PARTNER

Dissertation submitted in partial fulfilment of the requirements for the award of a specialization diploma (DES) in Obstetrics and Gynaecology by:

Dr MOHAMMED AWAL SULE

MATRICULE: 20S1745

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Pr MEKA ESTHER Née NGO UM
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2023-2024 Academic year

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Date of defence: 23 September 2024

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Dr EYOUM Christian

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DEDICATION

This work is dedicated to my parents

Mr. SULE GARBA DANLADI

And

Mrs. SODA IDIRISU ZENABU

ACKNOWLEDGEMENTS

I would like to express my sincere gratitude to

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222	GUEWO FOKENG Magellan	L	Biochemistry
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235	MBEDE NGA MVONDO Rose	L	Oral medicine
236	MENGONG épouse MONEBOULOU Hortense	L	paediatric dentistry
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259	MINYEM NGOMBI Aude Périne épouse AFUH	AS	Pharmaceutical regulations

Key

P= Professor

AP= Associate Professor

SL= Senior lecturer

L= Lecturer

AS = Assistant

HoD= Head of Department

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LIST OF ABBREVIATIONS

ACR: American College of Radiology

AES: Auto-examen des seins

AJCC: American Joint Committee on Cancer

BC: Breast cancer

BCS: breast cancer survivor

BMI: Body mass index

BRCA: Breast Cancer gene

DCIS: Ductal carcinoma in-situ

DNA: Deoxyribonucleic acid

DSM-IV-TR: Diagnostic and Statistical Manual of mental health disorder, 4th edition, American Psychiatric Association

FMSB: Faculté de Médecine et de Sciences Biomédicales

FSFI: Female Sexual Function Index

GLOBOCAN: Global Cancer Observatory

Gy: Gray

HER2: Human Epidermal growth factor Receptor 2

HR : Hormone receptor

HGOPY : Hôpital Gynéco-Obstétrique et Pédiatrique de Yaoundé

HGY: Hôpital Général de Yaoundé

HRT: Hormone replacement therapy

IGF-1: Insulin-like growth factor-1

IMRT: Intensity-modulated radiation therapy

LCIS: Lobular carcinoma in-situ

MRI: Magnetic resonance imaging

PALB2: Partner and Localizer of BRCA2

PTEN: phosphatase and tensin homolog deleted on chromosome 10

PUFA: Polyunsaturated Fatty Acids

QoL: Quality of life

SBR: Scarff, Bloom and Richardson

SERM: Selective oestrogen receptor modulator

STK11: Serine/threonine kinase 11

TP53: Tumour suppressor gene 53

VMAT: Volumetric-modulated arc therapy

WHO: World health organization

XRCC2: X-ray repair complementing defective repair in Chinese hamster cells 2

ABSTRACT

Background: Breast cancer is a major global health problem with high incidence and mortality, particularly in low- and middle-income countries. The impact of breast cancer on sexuality is profound, leading to significant sexual dysfunction in the majority of patients. Recognising the importance of addressing sexuality in breast cancer patients is critical to their overall well-being. This study aims to provide valuable data on the impact of breast cancer on sexuality and to formulate recommendations for healthcare professionals in our setting. The study aims to determine the prevalence of female sexual dysfunction, the impact of treatment on couples' sex lives, the partners' perspectives and couples' accessibility to information.

Methodology: This was a descriptive cross-sectional study conducted at the oncology departments of the Yaoundé Gynaeco-Obstetric and Paediatric Hospital and the Yaoundé General Hospital, which are the main referral centres for breast cancer management in Yaoundé. The study took place over a 5-month period from January 2024 to May 2024, during which women diagnosed with breast cancer and their partners were interviewed based on specific inclusion criteria. The minimum sample size was calculated at 289 using the LORENTZ formula to ensure sufficient data for statistical analyses. The study focused on the assessment of female sexual function and response using the Female Sexual Function Index (FSFI) scale, and various statistical analyses were performed to meet the study objectives.

Results: The study found a high frequency of sexual dysfunction (72,3%) in women with breast cancer. Significant associations were found between female sexual dysfunction and factors such as clinical stage at diagnosis (X^2 (3, N=307) =167,21, p<0,0001), SBR grade (X^2 (2, N=307) =15,19, p=0,001), chemotherapy (X2 (1, N=307) =73,53, p<0,0001), hormone therapy (X^2 (1, N=307) =8,11, p=0,004), partner distress (X^2 (3, N=307) =228,18, p<0,0001), conservative surgery (X^2 (1, N=307) =22,78, p<0,0001) and frequency of intercourse (X^2 (3, N=307) =223,55, p<0,0001). Breast cancer was shown to have a significant impact on the couple's relationship and sexual intimacy, and couples expressed an unmet need for discussion about the impact of breast cancer treatment on sexuality and a desire for professional help and information.

Conclusion: The study highlights the negative impact of breast cancer on couples' sexual well-being. Improved support and communication within healthcare is needed to address sexual dysfunction and emotional distress. Comprehensive care and information are essential for couples facing breast cancer.

Keywords: Sexuality; Breast cancer; Sexual function; FSFI

RESUME

Introduction: Le cancer du sein est un problème de santé publique majeur avec une incidence et une mortalité élevée, en particulier dans les pays à revenu faible et intermédiaire. L'impact du cancer du sein sur la sexualité est profond, entraînant un dysfonctionnement sexuel important chez la majorité des patientes. Reconnaître l'importance d'aborder la sexualité chez les patientes atteintes d'un cancer du sein est essentiel à leur bien-être général. Cette étude vise à fournir des données importantes sur l'impact du cancer du sein sur la sexualité et à formuler des recommandations à l'intention des professionnels de la santé dans notre contexte. L'étude vise à déterminer la prévalence des troubles sexuels féminins, l'impact du traitement sur la vie sexuelle des couples, le point de vue des partenaires et l'accès des couples à l'information.

Méthodologie: Il s'agissait d'une étude transversale descriptive menée dans les services d'oncologie de l'Hôpital Gynécologique et Pédiatrique de Yaoundé et de l'Hôpital Général de Yaoundé, qui sont les principaux centres de référence pour la gestion du cancer du sein à Yaoundé. L'étude s'est déroulée sur une période de 5 mois, allant de janvier 2024 à mai 2024, au cours de laquelle les femmes diagnostiquées avec un cancer du sein et leurs partenaires ont été interrogées sur la base de critères d'inclusion spécifiques. La taille de l'échantillon minimale a été calculée à 289 en utilisant la formule LORENTZ pour garantir des données suffisantes pour les analyses statistiques. L'étude s'est concentrée sur l'évaluation de la fonction et de la réponse sexuelles féminines à l'aide de l'échelle de l'indice de la fonction sexuelle féminine (FSFI), et diverses analyses statistiques ont été effectuées pour atteindre les objectifs de l'étude.

Résultats: L'étude a révélé une prévalence élevée de dysfonctionnement sexuel (72,3 %) chez les femmes atteintes d'un cancer du sein. Des associations significatives ont été trouvées entre le dysfonctionnement sexuel féminin et des facteurs tels que le stade clinique au diagnostic(X^2 (3, N=307) =167,21, p<0,0001), le grade SBR (X^2 (2, N=307) =15,19, p=0,001), la chimiothérapie (X2 (1, N=307) =73,53, p<0,0001), l'hormonothérapie (X^2 (1, N=307) =8,11, p=0,004), le niveau de détresse du partenaire (X^2 (3, N=307) =228,18, p<0,0001), la chirurgie conservatrice (X^2 (1, N=307) =22,78, p<0,0001) et la fréquence des rapports sexuels(X^2 (3, N=307) =223,55, p<0,0001). Il a été démontré que le cancer du sein avait un impact substantiel sur les relations et l'intimité sexuelle. Le couple a exprimé un besoin non satisfait de discussions sur l'impact du traitement du cancer du sein sur la sexualité et un désir d'aide et d'information professionnelles.

Conclusion: L'étude met en évidence l'impact négatif du cancer du sein sur le bien-être sexuel des couples. Un soutien et une communication améliorés au sein des soins de santé sont

nécessaires pour lutter contre le dysfonctionnement sexuel et la détresse émotionnelle. Des soins complets et des informations sont essentiels pour les couples confrontés à un cancer du sein.

Mots-clés : sexualité ; cancer du sein ; fonction sexuelle ; FSFI

CHAPTER I: INTRODUCTION

I.1. BACKGROUND

Breast cancer (BC) is defined as a genetic alteration in a cell of the mammary gland with uncontrolled proliferation, invasion and destruction of breast tissue, and the ability to metastasize to distant sites[1]. It is a major global public health problem due to its high incidence and mortality. BC is the most common cancer in women worldwide, with more than 2,3 million (11,6 %) new cases, and the leading cause of cancer death in women, with 665 684 (6,6 %) deaths in 2022 according to GLOBOCAN[2], with most deaths occurring in low- and middle-income countries[3]. Seven million women were diagnosed with breast cancer between 2016 to 2020[4].

Its incidence is four to ten times higher in Western countries than in Asia and Africa [5]. The estimated incidence and mortality per 100,000 women in major countries and regions of the world are as follows In the Americas, 60 with a mortality of 12; in Europe, 79,3 with a mortality of 14,6; in Asia, 37,1 with a mortality of 12,4. In Africa, the average incidence is 38 with a mortality of 16,6. There is a variable distribution in Africa by region, with a maximum for North Africa (48,9). This is followed by South Africa (46,2), West Africa (37,3), East Africa (29,9) and Central Africa (27,9) [5]. In Cameroon, the incidence of breast cancer is 2625 new cases and 26,8% of female mortality [6]. It is also the most common gynaecological cancer with 34% of cases, followed by cervical cancer in the city of Yaoundé[7].

The incidence of BC in women under the age of 40 varies from 6,6 % to 31,6 %[6]. In 2011, Ngowa et al. found that approximately 31,9 % of breast cancers occur before the age of 40,8 years[8]. The mean age at diagnosis was 33,5±5.0 years by Essiben et al. in 2017[9]. In developed countries BC patients have a 5-year survival rate of 80-90 %[10]. In Cameroon, the have been a positive evolution of 5-year survival rate from 30 % between 1995-2007 by Ngowa et al.[11] to 62 % between 2010-2020 by Ndoua et al.[12].

The increasing number of survivors due to early diagnosis and treatment has led to a greater focus on quality of life (QoL), including those related to sexuality and intimacy[13,14]. Treatments for BC have an impact on the female body which can directly affect a woman's self-esteem, appearance and sexual desire[6,15]. In 2021, Tchenté et al found that the mean age of mastectomy was 48,2 years, with all patients having altered QoL and an impaired sexual function of 1,2 on a scale of 4[6].

The prevalence rates for sexual dysfunction due to breast cancer treatment vary between 30 % and 100 % [13,16,17]. Breast cancer survivors (BCS) have poorer sexual functioning than

women without a history of cancer[10,15,18]. Commonly reported problems include decreased sexual desire (23-64 %), decreased sexual arousal or vaginal lubrication (20-48 %), anorgasmia (16-36 %), and dyspareunia (35-38 %)[19].

I.2. PROBLEM STATEMENT AND JUSTIFICATION

Breast cancer and its treatment can affect every phase of a woman's sexual response cycle[13], with approximately three in four breast cancer survivors reporting clinically significant sexual dysfunction [20]. While many recent studies support the recognition of sexuality as an essential part of women's lives that is significantly affected by the diagnosis and treatment of breast cancer, to the best of our knowledge no study evaluates the impact of breast cancer on sexuality in our setting.

The diagnosis of breast cancer involves not only physical but also social and psychological concerns due to the importance of the breast in women's body image, sexuality and motherhood [21]. Sexuality is an integral part of breast cancer patients' quality of life [22]. One study found that oxytocin released during sexual activity can promote sleep [23]. In addition, sex can release endorphins, which prevent breast cancer progression by regulating stress and immune processes [24]. Another study suggests that increased serotonin during sexual contact may produce pleasurable feelings and reduce the risk of depression [25]. Sexuality provides a means for expressing vulnerability, reassurance, reconciliation and interdependence; for enjoying and 'playing' with each other; for releasing tension and stress; for providing care and nurturance; for enacting and negotiating gender roles; and even for negotiating dominance and interdependence[26].

Studies have also shown that partners play the most important role in providing social support for women with chronic illnesses [17]. Women with BC who perceived greater emotional support from their partners had less sexual dysfunction [22]. Adequate information and support regarding intimacy and sexuality can reduce distress in patients and partners[27,28]. Therefore, involving partners in discussions about the impact of cancer on sexual function is of paramount importance.

Our study aims to provide baseline data on the impact of breast cancer on sexuality in our setting and to provide recommendations for healthcare professionals on how to better address the issue.

I.3. RESEARCH QUESTION

How does breast cancer affect sexuality?

I.4. RESEARCH HYPOTHESIS

The diagnosis and treatment of breast cancer has a negative impact on sexuality.

I.5. RESEARCH OBJECTIVES

I.5.1. General Objective:

To assess the impact of breast cancer on sexuality.

I.5.2. Specific Objectives:

1. To establish the prevalence of sexual dysfunction in women with breast cancer.
2. To determine the effect of different treatment protocols on couples' sex lives
3. To evaluate the partner's sexual perspective on breast cancer and its treatment.
4. To investigate the accessibility of information regarding the impact of breast cancer diagnosis and management on the couple's sexuality.

I.6. DEFINITION OF OPERATIONAL TERMS AND CONCEPTS.

Breast cancer : malignant proliferation of cells in the mammary glands.[29]

Sexuality : the ability to derive pleasure from various forms of sexual activity and behaviour, especially intercourse.[10]

Sexual health is a state of physical, emotional, mental and social well-being related to sexuality [WHO 2002].

Sexual dysfunction can be any problem that prevents an individual or couple from experiencing satisfaction from sexual activity.[18]

Sexual response : is the sequence of physiological and emotional events involving sexual desire, central and peripheral arousal, and genital responses.[30]

Sexual desire or libido: This is an increase in the frequency and intensity of sexual thoughts or fantasies and the desire to engage in sexual activity [16].

Sexual arousal: This is a subjective feeling of sexual pleasure accompanied by physiological changes [17].

Vaginal lubrication: A physical response triggered during sexual arousal in women that results in the secretion of a clear fluid that forms a viscous coating on the vaginal mucosa.

Orgasm: This is the physiological response that occurs at the peak of sexual arousal [27].

Dyspareunia: Pain experienced during or after sexual intercourse.

Sexual activity is any activity that results in stimulation or pleasure (the presence of a partner is not necessary).

Sexual intercourse (or coitus): is a human relationship of a sexual nature between two or more people. It involves the female and/or male genital tract and can occur between two people of the same or different sex.

Stable relationship: presence of a regular sexual partner

Lumpectomy: is surgery to remove cancerous breast tissue together with a border of normal tissue around it, called the surgical margin.

Mastectomy: surgical removal of all or part of the breast and sometimes the associated lymph nodes and muscles.

Chemotherapy: the use of chemical agents to treat or control cancer

Radiotherapy: the use of radiation to treat cancer

Hormone therapy: the use of drugs or surgery to suppress the production of, or inhibit the effects of, a hormone (such as oestrogen or testosterone) in the treatment or control of breast cancer.

CHAPTER II: LITERATURE REVIEW

CHAPTER II. LITERATURE REVIEW

PART: I

II.1. HISTORICAL ASPECTS[31]

- Herodotus: 484-425 BC, amputation and/or cauterization
- Ambroise Pare: 1510, local excision for small tumours and will compress the base of the breast between lead plates to induce ischemia and slow progress.
- Andreas Vesalius: 1514, removal of large tumours
- Johannes Scultetus: 1595, excised the breast after traction, haemostasis being induced by applying a hot iron to the chest wall.
- Ernst Kuster: 1871, systemic axillary dissection
- Richard von Volkmann: 1875, en block removal of fascia of pectoralis major muscle and mammary arteries
- W.S. Halsted: 1894 and the mechanistic theory justifying his radical mastectomy.
- Patey: in 1948, modified radical mastectomy with preservation of the pectoralis major muscle and survival identical to radical mastectomy.
- 1960 Introduction of conservative treatment of breast cancer combined with radiotherapy.
- Madden: In 1972, mastectomy preserving pectoral muscles and axillary curettage of the 1st and 2nd levels of Berg.
- W. Audrestch: In 1990, developed oncoplastic surgery.
- 1993: Sentinel lymph node

II.2. DEFINITION [29]

Breast cancer is a disease in which abnormal breast cells grow out of control and form tumours. If left unchecked, the tumours can spread throughout the body and become fatal. Breast cancer cells begin inside the milk ducts and/or the milk-producing lobules of the breast. The earliest form (in situ) is not life-threatening. Cancer cells can spread into nearby breast tissue (invasion). This creates tumours that cause lumps or thickening. Invasive cancers can spread to nearby lymph nodes or other organs (metastasize). Metastasis can be fatal.

II.3. EPIDEMIOLOGY[2,4,32]

In every country in the world, regardless of economic development, the breast is the most common site of cancer in women. According to WHO data, in 2022, there were 2,3 million women with breast cancer and 665 684 deaths from breast cancer worldwide. By the end of

2020, 7,8 million women had been diagnosed with breast cancer in the last 5 years, making breast cancer the most common cancer in the world.

In Africa, breast cancer is the number one cancer for all sexes combined, and has seen a multiplication in terms of incidence, from 92 600 new cases in 2008 to 168 690 new cases in 2018. However, mortality has remained stable, from 80 600 deaths in 2008 to 74 072 deaths in 2018. A total of 370 015 women were living with breast cancer in 2018.

According to Globocan 2020 data, breast cancer is the leading cancer of all sexes in Cameroon, with a prevalence rate of 61,42/100,000 inhabitants. It is also the leading cause of cancer mortality in our country, with 2 108 deaths caused by this cancer recorded in Cameroon in 2020. It is ahead of cervical cancer and prostate cancer.

II.4. RISK FACTORS OF BREAST CANCER[1,3,33,34]

There are many risk factors for breast cancer, both modifiable and non-modifiable.

II.4.1. NON-MODIFIABLE FACTORS

- **Age:** The incidence is highest among women ages 65 to 74 years. Median age at diagnosis is 63 years.

- **Race and ethnicity:** The median age at diagnosis is slightly younger for Black women (60 years old) compared to White women 63 years old). Black women have the highest death rate from breast cancer compared with other races or ethnicities; this may be in part because they have a higher rate of triple-negative breast cancer (negative for oestrogen and progesterone receptors and human epidermal growth factor receptor [HER2] oncogene), which has a poorer prognosis than other types. White, Asian, and Pacific Islander women are more likely to be diagnosed with localized breast cancer than Black, Hispanic, American Indian, and Alaska Native women.
- **Family history:** Having a 1st-degree relative (mother, sister, daughter) with breast cancer doubles risk of developing the cancer, but breast cancer in more distant relatives increases risk only slightly. When ≥ 2 1st-degree relatives have breast cancer, risk may be 3 to 4 times higher.
- **Breast cancer gene mutations:** About 5 to 10 % of women with breast cancer carry a mutation in one of the two known breast cancer genes, BRCA1 or BRCA2. The risk of developing breast cancer by age 80 is about 72 % with a BRCA1 mutation and about 69 % with a BRCA2 mutation. Women with BRCA1 mutations also have a 44 % lifetime risk of developing ovarian cancer; risk among women with BRCA2 mutations is about

17 %. Men who carry a BRCA mutation have a 1 to 2 % lifetime risk of developing breast cancer. The mutations are more common among people with Ashkenazi Jewish ancestry. Women with BRCA1 or BRCA2 mutations require closer surveillance or preventive measures, such as screening with both mammography and MRI, taking tamoxifen, or undergoing risk-reducing mastectomy.

- **Personal history of breast cancer:** Having had in situ or invasive breast cancer increases risk. Risk of developing cancer in the contralateral breast after mastectomy is about 0,4 % per year of follow-up.
- **Lobular carcinoma in situ (LCIS):** Having LCIS increases the risk of developing invasive carcinoma in either breast by about 7 to 12 times; invasive carcinoma develops in about 1 to 2 % of patients with LCIS annually.
- **Gynaecologic history:** Early menarche or late menopause increases risk. Risk increases with increasing age at first pregnancy.
- **Benign breast disease:** History of a lesion that required a biopsy is associated with a slightly increased risk. Women with multiple breast masses but no histologic confirmation of a high-risk histology should not be considered at high risk. Benign lesions associated with a slightly increased risk of developing invasive breast cancer include complex fibroadenoma, moderate or florid hyperplasia (without atypia), sclerosing adenosis, and papilloma. Risk is about 3 to 5 times higher than average in patients with atypical ductal or lobular hyperplasia.
- **Dense breast tissue:** Dense breast tissue seen on screening mammography is associated with a 1,2- to 2,1-fold increased risk of breast cancer.
- **Radiation therapy:** Exposure to radiation therapy of the chest up through 45 years old increases risk, with the highest increase for those exposed between ages 10 to 14 years. Mantle-field radiation therapy for Hodgkin lymphoma about quadruples risk of breast cancer over the next 20 to 30 years.

II.4.2. MODIFIABLE FACTORS

- **Hormone therapy:** In the Women's Health Initiative randomized trial, menopausal hormone therapy (oestrogen plus a progestin) increased risk modestly after only 3 years of use. After 5 years of use, the increased risk is about 3 additional cases per 1 000 women for each year of use (approximately a 24 % increase in relative risk). Use of oestrogen alone does not appear to increase risk of breast cancer. Selective oestrogen-receptor modulators (e.g. raloxifene) reduce the risk of developing breast cancer.

- **Use of oral contraceptives:** Study results vary regarding the use of oral contraceptives and risk of breast cancer. Some studies have found a small increased risk in current or recent users.
- **Diet:** Diet may contribute to development, growth, or prognosis of breast cancers, but conclusive evidence about the effect of a particular diet (e.g. one high in fats) is lacking.
- **Obesity:** Postmenopausal women with obesity are at increased risk of breast cancer; studies show a 10 % increase in risk for each additional 5 body mass index (BMI) units above normal BMI.
- **Smoking and alcohol:** Smoking and alcohol use appear to be associated with an increase in breast cancer risk; the increase with alcohol intake is dose dependent.

Table I:Modifiable and non-modifiable risk factors of breast cancer[35]

Non-Modifiable Factors	**Modifiable Factors**
Female sex	Hormonal replacement therapy
Older age	Diethylstilbesterol
Family history (of breast or ovarian cancer)	Physical activity
Genetic mutations	Overweight/obesity
Race/ethnicity	Alcohol intake
Pregnancy and breastfeeding	Smoking
Menstrual period and menopause	Insufficient vitamin supplementation
Density of breast tissue	Excessive exposure to artificial light
Previous history of breast cancer	Intake of processed food
Non-cancerous breast diseases	Exposure to chemicals
Previous radiation therapy	Other drugs

II.5. BREAST ANATOMY AND PHYSIOLOGY

II.5.1. EMBRYOLOGY[36]

Although the breast is of double origin, ectodermal and mesodermal, the mammary gland can be considered, strictly speaking, as a skin appendage, since the mesoderm only provides the vessels and the supporting connective tissue. It has even been argued, although we may find this somewhat pejorative, that the embryological origin of the breast allows the assertion that it is no more than a specialized sweat gland. In the fifth week of embryonic development, the mammary strips, consisting of two to four layers of ectodermal cells, appear on the lateral wall of the chest and abdomen. Between 6 and 7 weeks, these strips thicken to form the primitive mammary ridges, which extend symmetrically from the axillary region to the inguinal region. Next, the primitive mammary buds appear in pairs, which in the human species normally regress completely, except in the thoracic region at the level of the 4th thoracic vertebra. From the 13th week, cellular proliferation of ectodermal origin continues in depth in the underlying mesenchyme; 15 to 25 dense epithelial cords become embedded in the mesenchyme: these are the future lactiferous ducts, and their deep extremities are the future acini. In the 5th month, a period of active growth begins. The main lactiferous ducts, composed of a double layer of cells (glandular and myoepithelial), are hollowed out with a lumen (20-25 weeks) and distal outgrowths form the second-order lactiferous ducts. The nipple region forms a more pronounced prominence with a peri-areolar sulcus, while the "primitive mammary field" is formed, the lower part of which is the future inframammary fold. In the 8th month, the lactiferous ducts open into the epithelial depression at the centre of the rudimentary nipple, and in depth the glandular acini develop, separated by connective tissue septa.

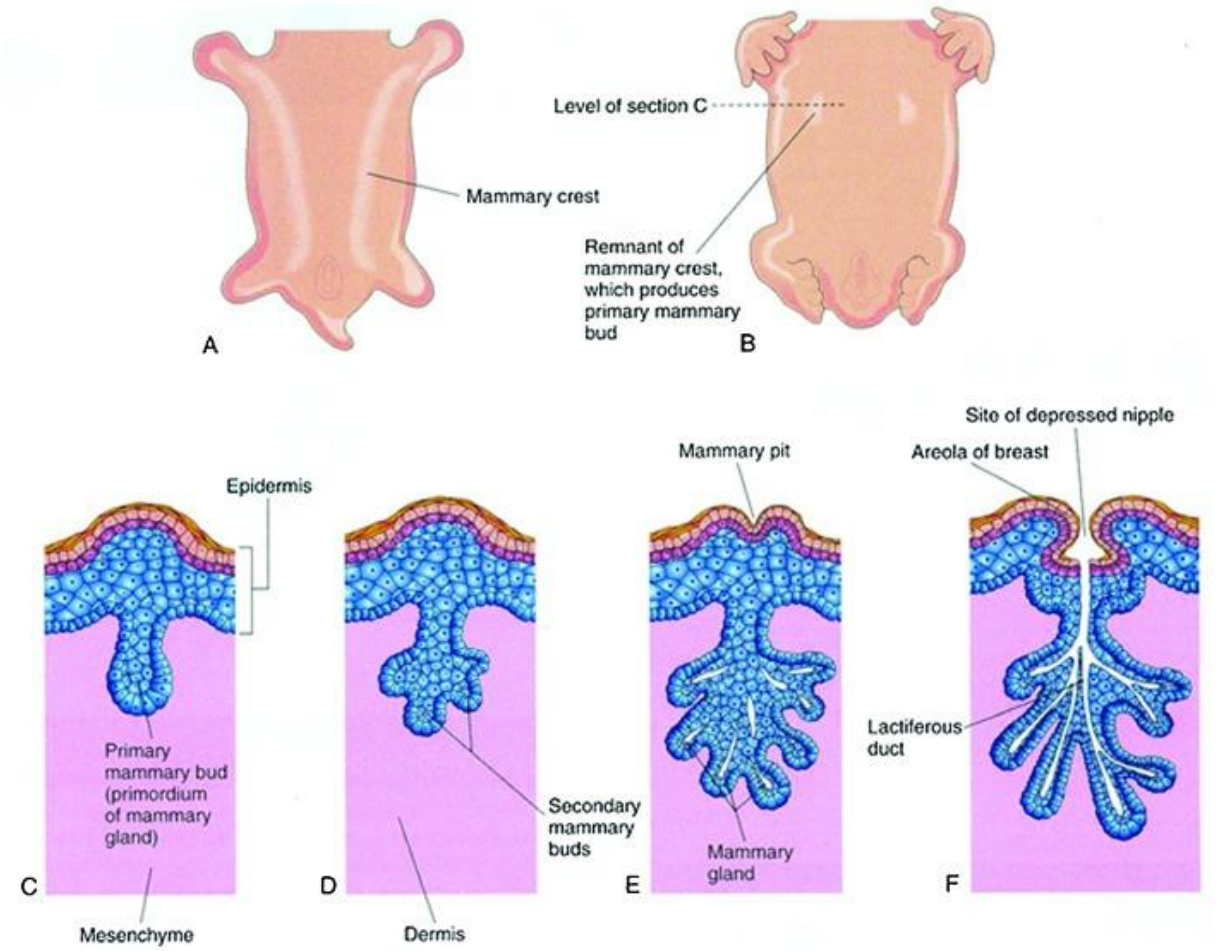


Figure 1 :Development of the mammary gland. (A) Ventral view of an embryo at 28-days gestation showing mammary crests. (B) Similar view at 6-week gestation showing the remains of the mammary crests. (C) Transverse section of a mammary crest at the site of the developing mammary gland. (D–F) Similar sections showing successive stages of breast development between the 12th week of gestation and birth. (Clinically Oriented Embryology. 9th ed. 2013 Copyright Elsevier).

II.5.2. DESCRIPTIVE ANATOMY[37–39]

II.5.2.1. Breast mound

The breasts are located on the anterior and partly on the lateral aspect of the thorax. Each breast extends superiorly to the second rib, inferiorly to the sixth costal cartilage, medially to the sternum and laterally to the midaxillary line. The superolateral part of the mammary gland extends towards the axilla, along the inferior border of the pectoralis major, forming the axillary tail of Spence. Breast shape and size depend on genetic, racial, and nutritional factors, as well as the age, parity, and menopausal status of the individual. Breasts may be hemispherical, conical, variably pendulous, piriform, or thin and flattened. Each breast is usually conical in shape, with a base of 10-12 cm and a thickness of 5-7 cm. Most of the breast tissue is usually located in the upper outer quadrant. This is the quadrant most often involved in breast cancer and most benign breast lesions.

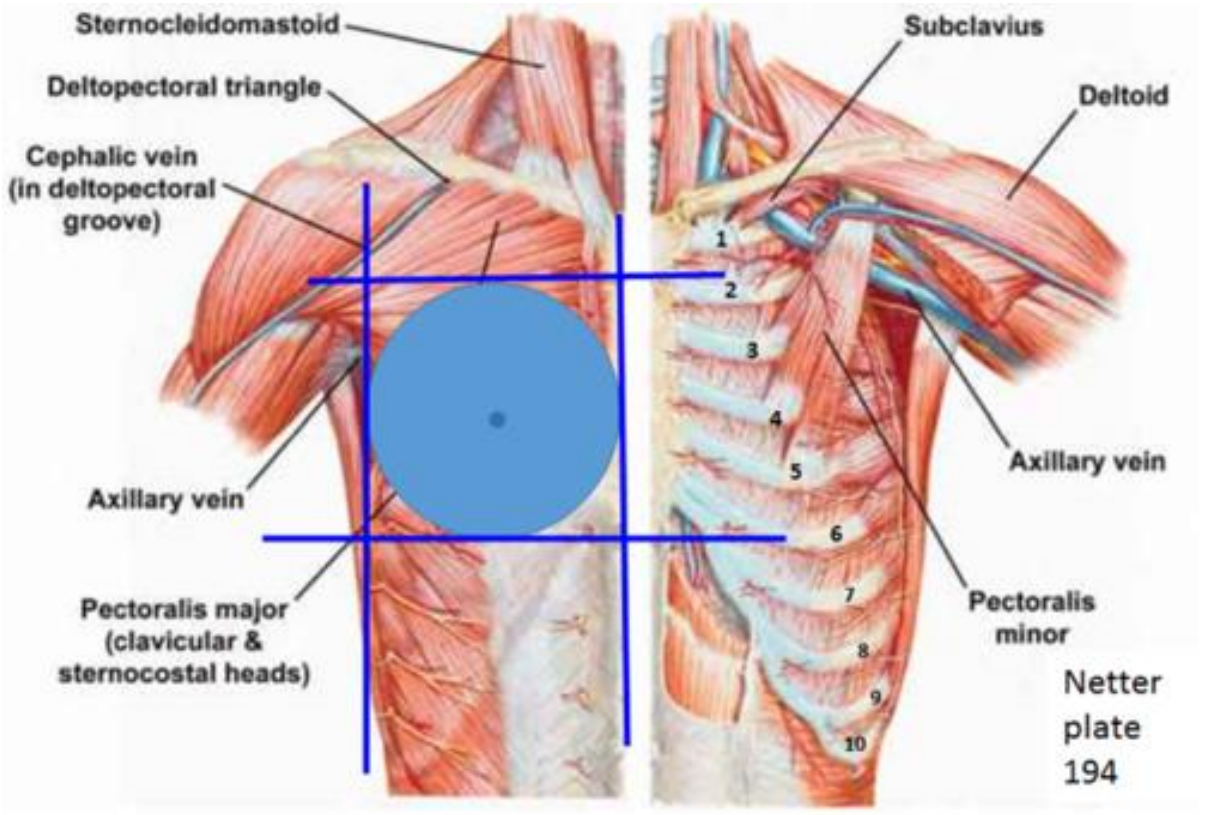


Figure 2 : The breast mound[39]

II.5.2.2. Fascial support and chest wall

Along its deep surface, the breast lies on the deep pectoral fascia, which in turn lies over the pectoralis major and serratus anterior, and inferiorly over the external oblique and its aponeurosis, as the latter forms the anterior wall of the rectus abdominis sheath. The fascial relationships of the breast are of practical importance. The superior pectoral fascia, with its anterior layer, envelops the breast ventrally and a posterior layer dorsally. The superficial layer lies immediately beneath the dermis and allows quick dissection of skin flaps from the glandular mass of the breast in a relatively avascular plane.

The deep layer of the superficial pectoral fascia is thicker than the subcutaneous component and lies on the posterior surface of the breast. Between this and the deep pectoral fascia is a layer of filmy areolar tissue (retromammary bursa). This is visible during mastectomy and allows a bloodless dissection plane. It also allows the breast to move freely on the underlying fascia of the pectoralis major and serratus anterior. Deep infiltration of a cancer through this space into the underlying pectoralis fascia produces the typical sign of deep tethering of a malignant breast mass. Connecting these two fascial layers are the suspensory ligaments of Cooper, which provide some structural support to the parenchyma. These ligaments have a degree of laxity and stretch that allows the breast to move while maintaining structural integrity. Contraction of this tissue by malignant infiltration results in the characteristic skin dimpling over a breast carcinoma (peau d'orange).

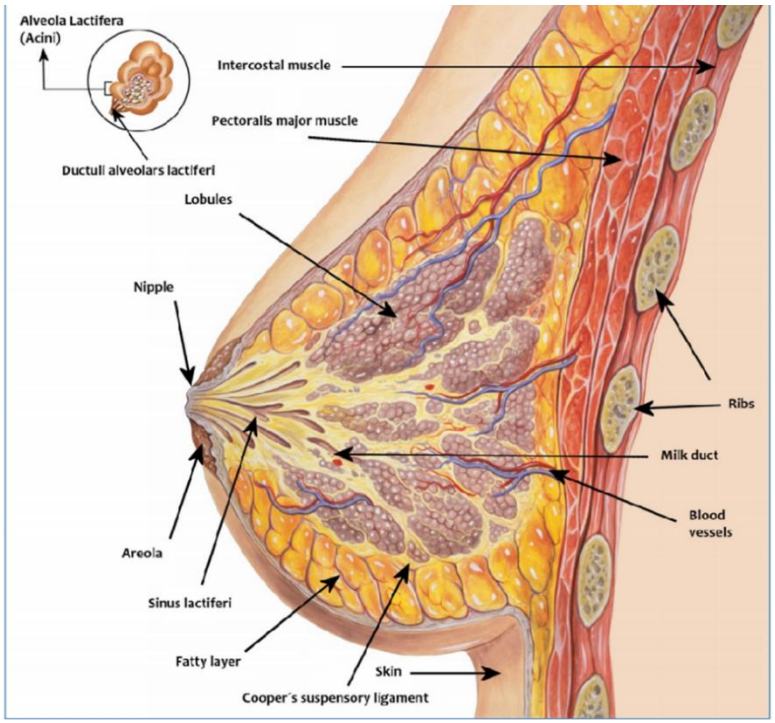


Figure 3:Anatomy of the female (breast sagittal section)[37]

II.5.2.3. Parenchyma

The breast parenchyma and associated fat make up most of the breast volume. The fibroglandular tissue, or parenchyma, of the breast is divided into 15-20 lactiferous ducts that arise from deep within the breast lobules and converge in a radial arrangement at the nipple. These ducts are not always evenly distributed across the breast. The upper half of the breast, particularly the upper outer quadrant, usually contains more glandular tissue than the rest of the breast. Each duct defines a lobe made up of 20-40 lobules, each made up of 10-100 alveoli. The main duct of each lobe opens separately at the tip of the nipple and has a dilated sinus just before it terminates in the subareolar tissue. The ductal-lobular unit is the functional unit of the breast. The ducts are lined with stratified squamous epithelium and gradually become a double layer, then a single layer of cuboidal cells towards the nipple.

The epithelial lining of the lobule consists of superficial (luminal) A cells, which are involved in milk synthesis. The B cells (basal) have stem cell activity. Finally, there are myoepithelial cells located around the alveoli and small excretory ducts between the inner aspect of the basement membrane and the tunica propria. These cells are hormonally stimulated. The lobules are surrounded by connective tissue, but there is no distinct fascia separating the lobules. The connective tissue (stroma) surrounding the lobules (intralobar) is dense and fibrocollagenous, whereas the intralobular connective tissue has a loose texture that allows for rapid expansion of the secretory tissue during pregnancy. The fibrous tissue surrounds the glandular components and extends to the skin and nipple, providing mechanical cohesion to the gland. The interlobar stroma contains variable amounts of adipose tissue, which contributes significantly to the increase in breast size at puberty.

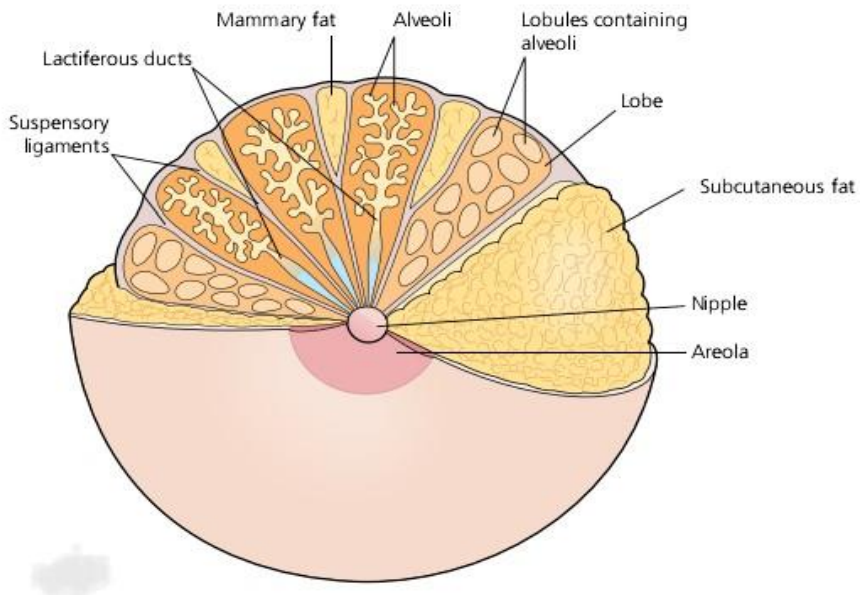


Figure 4 : Section of the female breast[37]

II.5.2.4. Blood supply

The blood supply to the breast comes from the axillary artery, the internal thoracic artery (internal mammary artery) and the intercostal arteries. The largest vessels arise from the internal thoracic artery, whose perforating branches pierce the chest wall near the sternal edge in the first to fourth intercostal spaces, supplying blood to the inner quadrants. In addition, the internal thoracic artery gives rise to the posterior intercostal arteries, and branches of the intercostal arteries penetrate the deep surface of the chest. The axillary artery gives rise to the superior thoracic artery, the pectoral branch of the thoracoacromial artery, the lateral thoracic artery, and the subscapular artery. Several muscle-perforating branches of the thoracoacromial artery perforate the pectoralis major to enter the breast from the upper quadrant. The lateral thoracic artery passes along the inferior border of the pectoralis minor muscle. As it passes along the muscle, it gives rise to the external mammary artery, which passes ventrally through the muscle to supply the upper outer quadrant of the breast. All these arteries are interconnected by collateral branches in both the breast and the overlying skin. Overall, 60 % of the breast is supplied by the internal thoracic artery, 30 % by the lateral thoracic artery and 10 % by minor contributions from the thoracoacromial, intercostal, subscapular, and thoracodorsal arteries. The venous drainage drains to an anastomotic plexus in the subcutaneous tissue under and around the areola. This plexus then drains to the periphery via large subcutaneous veins. These veins then follow their arteries and drain into the intercostal, axillary, and internal thoracic veins. Of note is their communication with the prevertebral venous plexus.

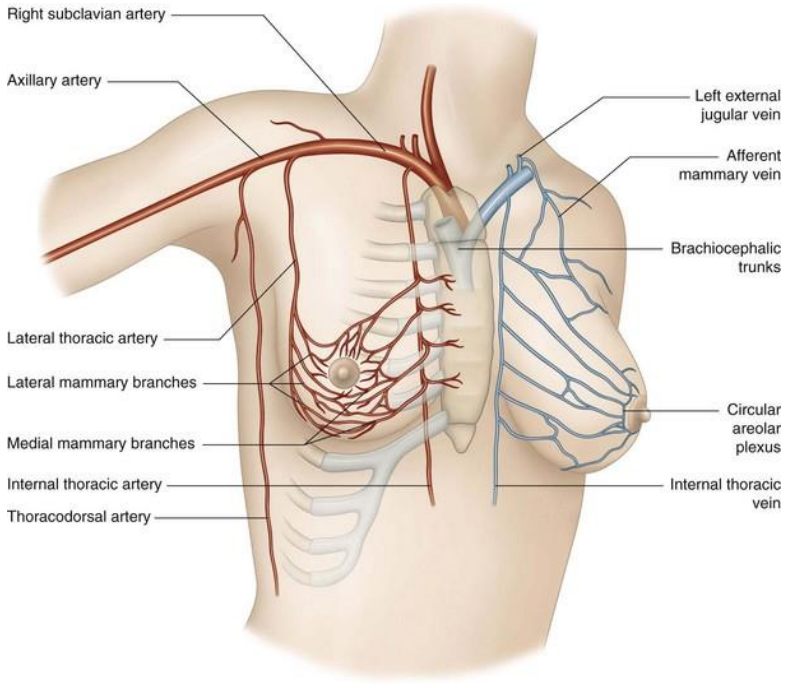


Figure 5: Vascular anatomy of the breast area[37]

II.5.2.5. Lymphatic drainage

The lymphatic drainage of the breast is diffuse and variable. It works through two sets of lymphatic vessels: the superficial (subepithelial or subdermal) and the deep. The subepithelial plexus connects to subdermal lymphatic vessels by vertical lymphatics and from them to the deep plexus. In the breast, the subepithelial and subdermal plexus are confluent with the subareolar plexus in which the fine lymphatics of the lactiferous ducts and the lymphatics of the NAC also converge. From the deep lymphatics, the lymph flows towards the axillary and internal thoracic nodes. There are 20–30 lymph nodes in the axilla, divided into five anatomical groups. The apical nodes unite into the subclavian trunk; on the left side this trunk drains directly into the thoracic duct whereas on the right side it may empty directly into the jugulosubclavian junction or into a common right lymphatic duct.

From a clinic and pathologic point of view the lymph nodes within the axilla are divided into three levels based on the location of the nodes relative to the pectoralis minor muscle. Level I nodes are situated inferiorly or laterally to the lower border of the pectoralis minor. This group includes the external mammary, axillary vein and scapular lymph nodes. Level II nodes lie deep or behind the pectoralis minor and include the central lymph node group and the subclavicular nodes. Finally, level III nodes are situated above the upper border of the pectoralis minor muscle and include the subclavicular and node groups.

The internal thoracic lymph nodes lie along the internal thoracic vessels and are very small. They drain the inner aspect of the mammary gland and the anterior chest wall, the anterior portion of the diaphragm, the upper portion of the rectus sheath and muscle and the superior portion of the liver. Another group of nodes, the intercostal nodes take a small part to the lymphatic drainage of the breast. These lie near the rib heads and receive deep lymph vessels from the posteromedial aspect of the chest and some drainage from the lateral extremity of the mammary gland. The lymphatic drainage from the breast can run different routes before getting to the nodes. It may go lateral, medial, transpectoral and retropectoral. The lateral route is the most important, about 75 % of all lymphatic drainage passes to the axillary nodes whereas the reminder principally drains medially into the internal thoracic lymph nodes.

It is important to underline that any part of the breast could drain into either group although there is a tendency of the lateral group to drain towards the axilla and of the medial to drain towards the internal thoracic lymph nodes. Transpectoral drainage happens through Rotter's nodes that are situated beneath the pectoralis major muscle. They drain into lymphatics along the thoracoacromial artery to the subclavicular group of level III. The last route of drainage is the retropectoral, in which the superior and internal aspects of the breast drain into the subclavicular node group in the axilla, passing through the lymphatics located along the inferior

portions of the pectoralis muscles. Lymphatics do not normally drain across the contralateral side, and this must be taken into consideration in cancer patients.

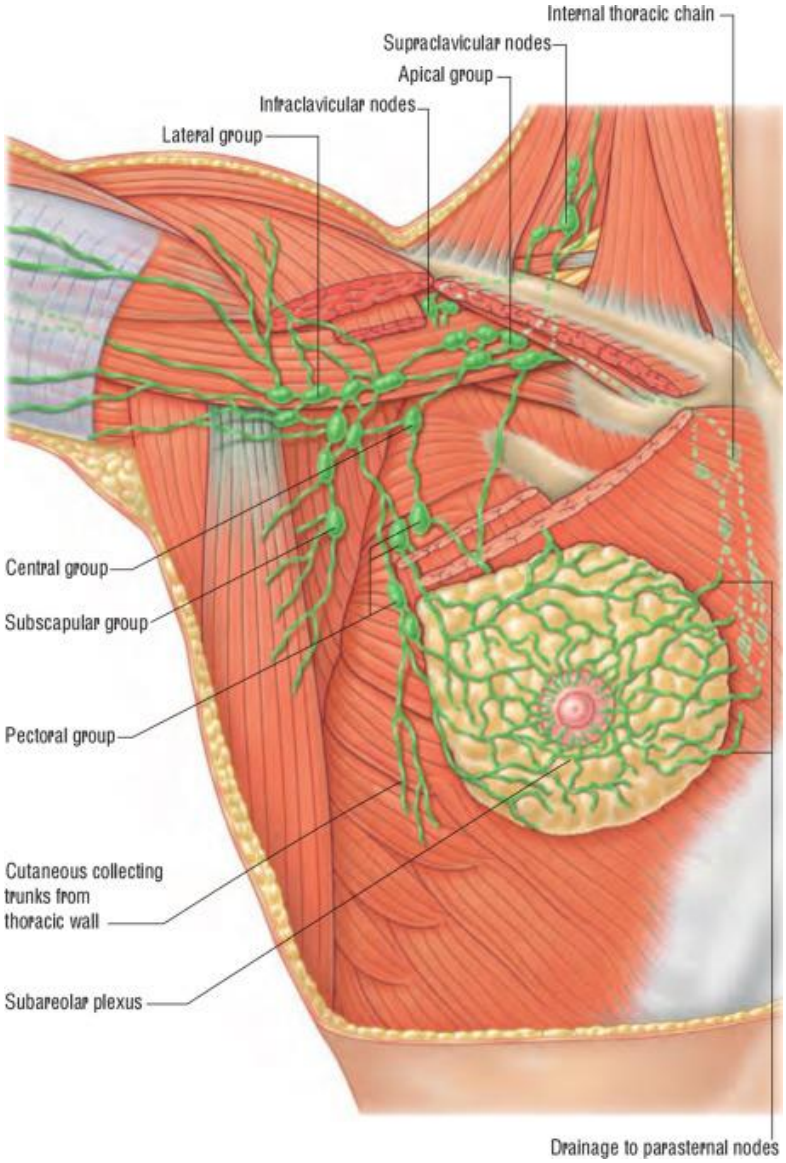


Figure 6: Lymphatic drainage of the breast[38]

II.5.2.6. Nerve supply

The innervation of the breast is principally by somatic sensory nerves and autonomic nerves accompanying the blood vessels. The somatic sensory nerve supply is via the supraclavicular nerves (C3, C4) superiorly and laterally from the lateral branches of the thoracic intercostal nerves. The medial aspects of the breast receive supply from the anterior branches of the thoracic intercostal nerves, which penetrate the pectoralis major to reach the breast skin. These lateral and medial cutaneous branches come from the second through to the sixth intercostal nerves. The major supply of the upper outer quadrant of the breast is via the intercostobrachial nerve (C8, T1). It gives a large branch to the breast as it traverses the axilla. The location of the

nerves within the breast varies quite often. After passing through the intercostal spaces, the nerves ramify within the breast, sometimes passing along the deep fascia, sometimes passing superficially through the substance of the breast.

Table II: Key facts about the female breast anatomy

KEY FACTS ABOUT THE FEMALE BREAST ANATOMY	
Mammary gland	Gross arrangement: 15-20 secretory lobes separated by suspensory ligaments. Secretory lobes: consist of lobules and tubuloalveolar glands, which produce milk in response to prolactin. Lactiferous ducts: these secretory ducts of the lobes are formed by converging lobules and intralobular ducts.
Lymphatic drainage	Subareolar lymphatic plexus -> pectoral lymph nodes -> axillary lymph nodes -> subclavian lymphatic trunks (75 %) Subareolar lymphatic plexus -> parasternal lymph nodes -> bronchomediastinal lymphatic trunks (25 %)
Arterial supply	**Axillary artery** via several branches: superior thoracic, thoracoacromial, lateral thoracic and subscapular arteries **Internal thoracic artery** via the medial mammary arteries Perforating branches of second, third and fourth **intercostal arteries**
Venous drainage	Axillary, internal thoracic and second to fourth intercostal veins
Innervation	Anterior and lateral cutaneous branches of the second to sixth intercostal nerves Fourth intercostal nerve (nipple)

II.5.2.7. Histology of breast

To understand mammary oncogenesis and the current classification of breast cancer, it is necessary to understand the histology of the normal mammary epithelium. The epithelium is composed of two types of differentiated cells, luminal cells, and myoepithelial cells. In addition, there are stem cells and progenitor cells that are committed to a differentiation pathway. Luminal cells line the lumen of the ducts and lobules. They are responsible for milk secretion.

The myoepithelial cells surround the luminal cells and are in contact with the basal lamina and the surrounding stroma. They are responsible for milk secretion. Stem cells, which are less common, are located basally or suprabasally, probably in specialized niches.

II.5.3. PHYSIOLOGY OF THE BREAST[38]

II.5.3.1. Breastfeeding

The breast is an organ specialized for milk formation (lactation), including synthesis, secretion, and ejection of milk. The secretory units of the breasts are the alveoli, small saccules in continuity with the lactiferous ducts. A complex network of hormones and growth factors controls the production of milk by these secretory units. The fluctuation of these hormones results in important histologic changes in the breast during pregnancy and during the menstrual cycle.

II.5.3.2. Organ of seduction

It attracts the male gaze and is involved in sexual pleasure: when stimulated, it causes erections in men and vaginal lubrication in women.

II.6. PATHOPHYSIOLOGY[1,40]

Breast cancer develops because of DNA damage and genetic mutations that can be influenced by exposure to oestrogen. Sometimes there is an inheritance of DNA defects or cancer-promoting genes such as BRCA1 and BRCA2. For example, a family history of ovarian or breast cancer increases the risk of developing breast cancer. In a normal person, the immune system attacks cells with abnormal DNA or growth. This fails in people with breast cancer, leading to tumour growth and spread.

Breast cancer originates from the epithelium of the terminal bud that precedes the lobule or ducto-lobular unit. It begins with a moderate increase in the number of cell layers, known as simple hyperplasia, followed by a marked increase in the thickness of the lesions, to which are added cytological abnormalities, known as atypical hyperplasia, and finally anarchic proliferation with respect for the basement membrane. The final stage is the transition from cancer in situ to invasive cancer by crossing the basement membrane, which makes metastasis possible. Progression from one stage to the next is rare and explains the small proportion of cases that progress to invasive cancer.

II.7. CLASSIFICATION OF BREAST CANCER [1,3,41]

II.7.1. HISTOLOGICAL CLASSIFICATION

Most breast cancers are epithelial tumours (carcinomas) that develop from cells lining ducts or lobules; nonepithelial cancers of the supporting stroma (e.g. angiosarcoma, primary stromal sarcomas, phyllodes tumour) are less common.

Epithelial cancers are divided into carcinoma in situ and invasive cancers depending on their relationship to the basement membrane. Non-invasive breast neoplasia is broadly divided into two main types, lobular carcinoma in situ (LCIS) and ductal carcinoma in situ (DCIS).

LCIS is considered a risk factor for the development of breast cancer. LCIS is recognized by its conformation to the outline of the normal lobule, with enlarged and filled acini. DCIS is more morphologically heterogeneous than LCIS and pathologists recognize four broad types of DCIS: papillary, cribriform, solid and comedo.

DCIS is recognized as discrete spaces filled with malignant cells, usually with a recognizable basal cell layer of presumably normal myoepithelial cells. The papillary and cribriform types of DCIS are generally lower grade lesions and may take longer to progress to invasive cancer.

The solid and comedo types of DCIS are generally higher-grade lesions. If left untreated, DCIS usually progresses to invasive cancer. Invasive breast cancers are characterized by a lack of overall architecture, infiltration of cells haphazardly into a variable amount of stroma, or formation of sheets of continuous and monotonous cells without respect to the form and function of a glandular organ. Pathologists broadly divide invasive breast cancer into ductal and lobular histological types.

Invasive ductal carcinoma tends to grow as a cohesive mass; it appears as discrete abnormalities on mammograms and is often palpable as a discrete lump in the breast that is smaller than lobular carcinoma. Invasive lobular cancer tends to spread through the breast in a single file, which explains why it remains clinically occult and is often not detected on mammography or physical examination until the disease is extensive. Invasive ductal carcinoma, also known as infiltrating ductal carcinoma, is the most common form of breast cancer, accounting for 50% to 70% of invasive breast cancers.

Invasive lobular carcinoma accounts for 10% of breast cancers, and mixed ductal and lobular carcinomas are increasingly recognized and described in pathology reports. When invasive ductal carcinomas become differentiated, they are named according to the features they display. If the infiltrating cells form small glands lined by a single row of bland epithelium, they are called infiltrating ductal carcinoma. The infiltrating cells may secrete large amounts of mucin and appear to float in this material. These lesions are called mucinous or colloid tumours.

Tubular and mucinous tumours are usually low-grade (grade I) lesions; these tumours account for about 2 % to 3 % of invasive breast cancers. Medullary carcinoma is characterized by bizarre invasive cells with high-grade nuclear features, many mitoses and no in situ component. The malignancy forms sheets of cells in an almost syncytial fashion, surrounded by an infiltrate of small mononuclear lymphocytes. The edges of the tumour push into the surrounding breast rather than infiltrating or penetrating the stroma. In its pure form, medullary carcinoma accounts for only about 5 % of breast cancers.

Paget disease of the nipple is a form of ductal carcinoma in situ that extends into the skin over the nipple and areola, manifesting with a skin lesion (e.g. an eczematous or a psoriaform lesion). Characteristic malignant cells called Paget cells are present in the epidermis. Women with Paget disease of the nipple often have underlying invasive or in situ cancer.

Inflammatory breast cancer is a fast-growing, particularly aggressive, and often fatal cancer. Cancer cells block the lymphatic vessels in breast skin; as a result, the breast appears inflamed, and the skin appears thickened, resembling orange peel (peau d'orange). Usually, inflammatory breast cancer spreads to the lymph nodes in the armpit. The lymph nodes feel like hard lumps. However, often no mass is felt in the breast itself because this cancer is dispersed throughout the breast.

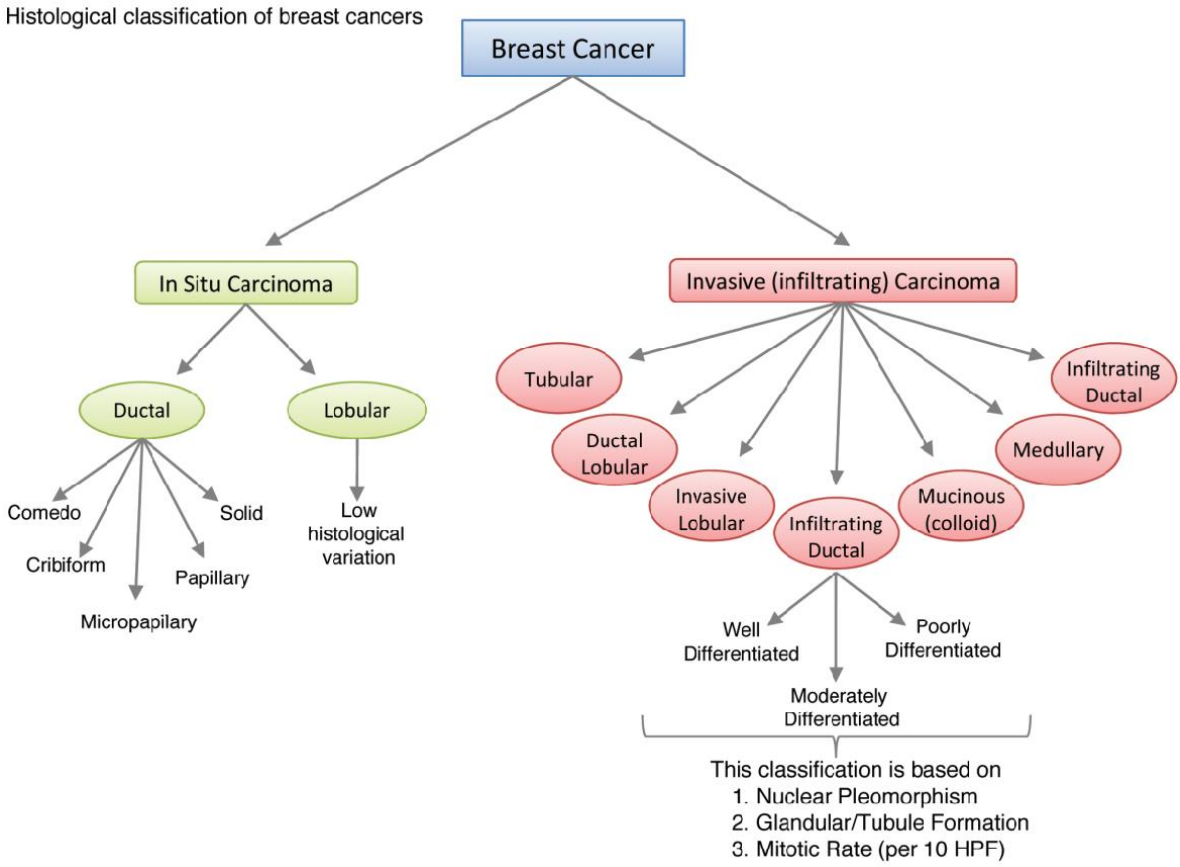


Figure 7: Histological classification of breast cancer subtypes. This scheme, currently used by clinicians, categorizes the heterogeneity found in breast cancer based on architectural features and growth patterns. HPF: high power field.[42]

II.7.2. TNM CLASSIFICATION

Breast cancer staging is determined clinically by physical examination and imaging studies before treatment, and breast cancer stage is determined pathologically by pathologic examination of the primary tumour and regional lymph nodes after definitive surgical treatment. Staging is performed to group patients into risk categories that define prognosis and guide treatment recommendations for patients with a similar prognosis. Breast cancer is classified with the TNM classification system, which groups patients into 4 stage groupings based on the primary tumour size (T), the regional lymph nodes status (N), and if there is any distant metastasis (M). The most widely used system is that of the American Joint Committee on Cancer:

Table III: TNM classification[43]

TNM Definitions and Staging	
TNM	**Description**
T_{is}	Carcinoma in situ
T1	Tumor 2 cm or less in greatest dimension
T1a	0.5 cm or less
T1b	>0.5 cm but 1 cm
T1c	>1 cm but 2 cm
T2	Tumor > 2 cm but 5 cm
T3	Tumor > 5 cm
T4	Tumor of any size with direct extension to chest wall, skin
N0	No regional lymph node metastases
N1	Metastases to moveable ipsilateral axillary lymph nodes
N2	Metastases to fixed ipsilateral axillary lymph nodes
N3	Metastases to ipsilateral internal mammary lymph nodes
M0	No distant metastases
M1	Distant metastases (including supraclavicular lymph nodes)
TNM Stage	
Stage	**Description**
0	Tis, N0, 0
I	T1, N0, M0
II A	T0, NI, M0 *or* T1, NI, M0 *or* T2, N0, M0
IIB	T2, N1, M0 *or* T3, N0, M0
III A	T0-T2, N2, M0 or T3, N1, M0
III B	T4, any N, M0, *or* any T, N3, M0
IV	any T, any N, M1

II.7.3. GRADING

Modified Scarff Bloom Richardson

Table IV: Modified Scarf Bloom Richardson[44]

	Feature	Subcategory	Score
1	Tumour tubule or gland formation	> 75 % of tumour	1
		10 – 75 % of tumour	2
		< 10 % of tumour	3
2	Nuclear pleomorphism	Minimal variation in nuclear size and shape	1
		Moderate variation in nuclear size and shape	2
		Marked variation in nuclear size and shape	3
3	Mitotic count (per 10 high power fields)	(dependent on microscope field area)	1
			2
			3
	Total score	**Grade I (well differentiated)**	**3 - 5**
		Grade II (moderately differentiated)	**6 or 7**
		Grade III (poorly differentiated)	**8 or 9**

II.7.4. MOLECULER CLASSIFICATION[34]

Epithelial cancers may express hormone receptors (stromal tumours do not express hormone receptors, e.g. phyllodes tumours). Approximately 80 % of postmenopausal and 20 % of premenopausal patients with breast cancer have an oestrogen receptor–positive (ER+) tumour; approximately 70 % of all breast cancers are progesterone receptor-positive. Another cellular receptor is human epidermal growth factor receptor 2 (HER2; also called HER2/neu or ErbB2); its presence correlates with a poorer prognosis at any given stage of cancer. In approximately 15% of patients with breast cancer, HER2 receptors are overexpressed. Most breast cancers are hormone receptor-positive and HER2 negative (approximately 70 %); 12 % are triple negative (hormone receptor-negative and HER2-negative).

Table V: Biological classification of breast cancer (St Gallen Consensus, 2011)[42]

Breast cancer subtype	Definition
Liminal A	ER positive and/or PR positive, HER2 negative, Ki67 index low (defined as < 14 %)
Luminal B	
• **Luminal B HER2 negative**	ER positive and/or PR positive, HER2 negative, Ki67 index high (defined as≥ 14)
• **Luminal B HER2 positive**	ER positive and/or PR positive, HER2 overexpressed or amplified, any Ki67
HER2 overexpression	ER negative, PR negative, HER2 overexpressed or amplified
Triple negative	ER negative, PR negative, HER2 negative

II.8. HISTORY AND PHYSICAL EXAMINATION[1,41,45]

Most patients with early breast cancer are asymptomatic and are found on screening mammography. As the cancer grows, the patient may discover it as a lump that is felt incidentally, usually while combing or showering. Breast pain is an unusual symptom, occurring in 5 % of cases. Locally advanced disease may present with peau d'orange, frank ulceration or fixation to the chest wall. Inflammatory breast cancer, an advanced form of breast cancer, often resembles a breast abscess and presents with swelling, redness, and other local signs of inflammation. Paget's disease of the nipple usually presents with nipple changes that must be differentiated from nipple eczema.

II.9. PARACLINICAL INVESTIGATION[1,45]

The evaluation of patients with breast cancer requires a triple assessment using clinical assessment, imaging, and tissue biopsy. Mammography is the most used modality for the diagnosis of breast cancer. Most asymptomatic cases are diagnosed on screening mammography. Breast cancer always presents as calcifications, dense lumps, with or without architectural distortion. However, mammography is not sensitive in young women for whom breast ultrasound can be used.

Ultrasound is useful in assessing the consistency and size of breast lumps. It has an important role in guided needle biopsy. Magnetic resonance imaging has good sensitivity for describing

abnormalities in soft tissues, including the breast. It is indicated for occult lesions or suspected multifocal or bilateral malignancy, especially ILC, and in assessing response to neoadjuvant chemotherapy or planning breast-conserving surgery and screening in high-risk patients. Tissue biopsy is an important step in the evaluation of a breast cancer patient. There are several ways to obtain a tissue sample, including fine-needle aspiration cytology, core biopsy (Trucut), and incisional or excisional biopsy.

II.10. DIAGNOSIS[1,45]

Fine needle aspiration (FNA) is generally reserved for palpable cyst-like lumps that are visible on a mammogram or ultrasound. False-positive results are negligible, but false-negative results occur in 15 % to 20 %, leading to the recommendation that if the cyst or lump doesn't disappear with FNA, further biopsy is mandatory. Core needle biopsy has generally replaced fine needle aspiration for all but the most obvious cysts. Core needle biopsies fail to identify areas of invasion in about 20 % of cases initially diagnosed as ductal carcinoma in situ. Atypical ductal hyperplasia on core needle biopsy has a relatively high incidence of coexistent carcinoma (approximately 50 %). This diagnosis therefore requires excisional biopsy. Seventy-five to 80 % of excisional biopsies are expected to be benign. Of the remaining 20 % to 25 % that are cancerous, a second operation is often needed to make sure all the cancerous tissue has been removed.

Sentinel lymph node biopsy is a biopsy of stage I axillary lymph nodes. It has a positive predictive value of almost 100 %, with a sensitivity of 89 % and a specificity of 100 %. However, three per cent of positive sentinel nodes are found in non-axillary regions. There appears to be a 15 % incidence of "skip" metastases, defined as metastases in axillary nodes level II and III without involvement of nodes level I. Thus, the cost of performing sentinel node biopsy alone is reflected in a study in which the 10-year survival rate for stage I breast cancer patients with complete axillary dissection drops from 85 % to 66 % when axillary dissection is not performed.

II.11. DIFFERENTIAL DIAGNOSIS[1,41]

- Mammary abscess
- Fat necrosis
- Fibroadenoma

II.12. TREATMENT / MANAGEMENT[1,34,35,40,45]

The 2 basic principles of treatment are to reduce the chance of local recurrence and the risk of metastatic spread. Surgery with or without radiotherapy achieves local control of the cancer.
If there is a risk of metastatic recurrence, systemic therapy is indicated in the form of hormonal therapy, chemotherapy, targeted therapy, or a combination of these. In locally advanced disease, systemic therapy is used as palliative therapy with little or no role for surgery.

II.12.1. SURGICAL ONCOLOGY

Surgery plays an important role in the treatment of breast cancer. It is the basic method used for local control of the disease. The Halsted radical mastectomy, in which the breast is removed with axillary lymph node dissection and excision of both pectoral muscles, is no longer recommended due to high morbidity without survival benefit. Patey's modified radical mastectomy is now better known. This involves the removal of all the breast tissue together with a large part of the skin and the axillary lymph nodes. The pectoralis major and minor muscles are preserved. Removal of the breast only without axillary dissection is called a simple mastectomy.
This procedure can be used for small tumours with negative sentinel lymph nodes. Breast-conserving surgery (BCS) aims to remove the tumour plus a margin of at least 1 cm of normal breast tissue (wide local excision). A quadrantectomy removes the entire part of the breast containing the tumour. The last 2 procedures are usually combined with an axillary clearance through a separate incision. Axillary procedures may include sentinel lymph node biopsy, sampling, partial (II) or complete (III) axillary lymph node dissection. Lumpectomy is the removal of a benign mass without removing normal breast tissue.

II.12.2. RADIOTHERAPY

Radiotherapy plays an important role in local disease control. The risk of cancer recurrence is reduced by about 50 % after 10 years, and the risk of death from breast cancer is reduced by almost 20 % after 15 years if radiotherapy is given after BCS. However, radiotherapy is not necessary for women aged 70 years and older with small, lymph node-negative, hormone receptor-positive (HR+) cancers because it has not been shown to improve survival in patients who take hormone therapy for at least 5 years. Radiotherapy is useful for large tumours (more than 5 cm) or if the tumour has spread to the skin or chest wall and there are positive lymph nodes. It can also be used as palliative therapy in advanced cases, such as those with central

nervous system (CNS) or bone metastases. It can be given as external beam radiotherapy, brachytherapy, or a combination of the two.

II.12.3. MEDICAL ONCOLOGY

Chemotherapy, hormone therapy and targeted therapy are the systemic therapies used to treat breast cancer. First-generation chemotherapy regimens such as cyclophosphamide, methotrexate, and 5-fluorouracil (CMF) in a 6-month cycle are associated with a 25 % reduction in the risk of recurrence over 10 to 15 years. Anthracyclines (doxorubicin or epirubicin) and the newer agents such as the taxanes are modern regimens used for breast cancer. Adjuvant and neoadjuvant chemotherapy are given for three to six months. Adjuvant treatment of early HR+ breast cancer with tamoxifen for at least 5 years has been shown to reduce the recurrence rate by about half in the first 10 years and to reduce breast cancer mortality by about 30% in the first 15 years.

More recently, studies have shown that extended use of adjuvant tamoxifen (10 years versus 5 years) further reduces the risk of breast cancer recurrence and mortality, and clinical practice guidelines now recommend consideration of adjuvant tamoxifen therapy for 10 years. The mainstay of treatment for most premenopausal women with HR+ tumours is tamoxifen. Some women may also benefit from surgical removal (oophorectomy) or chemical suppression of the ovaries, which are the main source of premenopausal oestrogen. Treatment guidelines recommend that aromatase inhibitors (AIs), such as anastrozole, should usually be included in the treatment of postmenopausal women with HR+ breast cancer. Targeted therapy is usually indicated in about 17% of breast cancers that overproduce the growth-promoting protein HER2/neu. Trastuzumab, the first approved drug, is a monoclonal antibody that directly targets the HER2 protein. It reduces the risk of recurrence and death in HER2+ early breast cancer by 52% and 33% respectively compared with chemotherapy alone.

II.14. PROGNOSIS[34,35]

The prognosis for early breast cancer is quite good. Stage 0 and stage I both have a 5-year survival rate of 100 %. The 5-year survival rates for stage II and stage III breast cancer are around 93 % and 72 % respectively. If the disease spreads systemically, the prognosis worsens dramatically. Only 22 % of stage IV breast cancer patients survive the next 5 years.

Long-term prognosis depends on tumour stage. Nodal status (including number and location of nodes) correlates with disease-free and overall survival better than any other prognostic factor. The 5-year survival rate depends on cancer stage:

- Localized (confined to primary site): 99,0 %
- Regional (confined to regional lymph nodes): 85,8 %

- Distant (metastasized): 29,0 %
- Unknown: 57,8 %

Poorer prognosis is associated with the following other factors:

- **Young age:** Prognosis appears worse for patients diagnosed with breast cancer during their 20s and 30s than for patients diagnosed during middle age.
- **Race:** Breast cancer death rates from 2015 to 2019 were higher in the United States in non-Hispanic Black females (28 per 100 000) than in non-Hispanic White females (19,9 per 100 000). Black women are diagnosed at a younger age compared with White women (median 60 versus 63 years) and are more likely to have triple negative disease.
- **Larger primary tumour:** Larger tumours are more likely to be node-positive, but they also confer a worse prognosis independent of nodal status.
- **High-grade tumour:** Patients with poorly differentiated tumours have a worse prognosis.
- **Absence of oestrogen and progesterone receptors:** Patients with ER+ tumours have a somewhat better prognosis and are more likely to benefit from endocrine therapy. Patients with progesterone receptors on a tumour may also have a better prognosis. Patients with both oestrogen and progesterone receptors on a tumour may have a better prognosis than those who have only one of these receptors, but this benefit is not clear.
- **Presence of HER2 protein:** When the HER2 gene (HER2/neu [erb-b2]) is amplified, HER2 is overexpressed, increasing cell growth and reproduction, and often resulting in more aggressive tumour cells. Overexpression of HER2 is an independent risk factor for a poor prognosis; it may also be associated with high histologic grade, ER− tumours, greater proliferation, and larger tumour size, which are all poor prognostic factors.
- **Presence of BRCA gene mutations:** For any given stage, patients with the BRCA1 gene mutation appear to have a worse prognosis than those with sporadic tumours, perhaps because they have a higher proportion of high-grade, hormone receptor–negative cancers. Patients with the BRCA2 gene mutation probably have the same prognosis as those without the mutation if the tumours have similar characteristics. With either gene mutation, risk of a 2nd cancer in remaining breast tissue is increased (to perhaps as high as 40 %).

II.15. RECOMMENDED BREAST CANCER SURVEILLANCE[46]

Routine history and physical examination and regular mammography are the mainstay of care for breast cancer survivors. Breast cancer recurrence is more often detected by the patient (71 %) than by her doctor (15 %). Women should be encouraged to perform monthly breast self-exams. Mammograms should be done at 6 and 12 months after surgery, and then annually.

Table VI: Post-Treatment Surveillance Recommendations for Women Treated for Primary Breast Cancer[47]

	Year	History & Physical Examinations	Mammography	Other Studies
American Society of Clinical Oncology (11, 58)	2012	Every 3-6 months for first 3 years Every 6-12 months for years 4-5 Annual follow-up thereafter	Posttreatment mammography 1 year after initial mammography At least 6 months after completion of radiation therapy Yearly mammography evaluation, unless otherwise indicated	Chest radiography, bone scans, liver US, CT, PET, MRI, or other laboratory tests: not recommended in otherwise asymptomatic patient with no specific findings on clinical examinations
National Comprehensive Cancer Network	2013	Every 4-6 months for 5 years, then annually	Mammography every 12 months	MRI considered in women with lifetime risk of second primary breast cancer greater than 20% Other tests not recommended
European Society of Medical Oncology (1)	2013	Every 3-4 months for first 2 years Every 6 months from year 3-5 Annual follow-up thereafter	Ipsilateral (after B(S) & Contralateral mammography every 1-2 years	MRI may be indicated for young women with dense breasts, genetic or familial predispositions Other laboratory or imaging tests not recommended in asymptomatic patients
National Institute for Clinical Excellence	2011	Regular check-up, determined by physician or patient	Annual mammography	Other additional studies not routinely recommended

II.16. BREAST CANCER SCREENING AND PREVENTION[34]

II.16.1. SCREENING

Breast cancer screening recommendations should be based on risk stratification. Women are divided into two basic groups: average risk and increased risk (e.g. BRCA1/2 mutations). Mammography remains the most important imaging modality for screening, as it is the only modality that has been shown to reduce mortality. Digital mammography produces an electronic image that can be stored and processed by a computer, thereby increasing cancer detection rates, particularly in younger women with dense breasts. The addition of ultrasound to mammography in women with dense breasts increased cancer detection and increased recall and biopsy of benign breasts. A large prospective screening study showed that adding ultrasound to mammography detected an additional 4,3 cancers per 1 000 cases in women with dense breasts and a high risk of breast cancer. In women with dense breasts, the sensitivity of mammography was 50 % and that of mammography plus ultrasound was 77,5 %.

Contrast-enhanced breast magnetic resonance imaging (MRI) is highly sensitive for detecting breast cancer, with a sensitivity of 90 %-93 %, which is higher than the sensitivity of 48 %-63 % for mammography and ultrasound combined in women at high risk. However, the specificity of MRI screening is lower, resulting in a high false-positive rate. Current evidence does not support the use of breast MRI as a screening modality in average-risk women, whereas several trials have shown the benefit of MRI screening for early detection in women at high risk of breast cancer, such as those with a known genetic predisposition or a strong family history. Some countries recommend MRI screening for women at increased risk of breast cancer.

Table VII: Recommendations for breast cancer screening mammography in women with average risk[48]

Recommendations	USPSTF	ACS	ACP	AAFP	ACOG	ACR	NCCN
Initiation age (years)	40	45	50	50	40	40	40
Frequency (years)	2	Yearly until age 54, then every 1-2 years	2	1-2	1-2	1	1
Cessation age (years)	75	Life expectancy < 10 years	75†	75†	75†	Limited life expectancy	75†

† Women age > 75: Screening may be done based on shared decision-making taking into consideration health status and life expectancy.
AAFP = American Academy of Family Physicians; ACOG = American College of Obstetricians and Gynaecologists; ACP = American College of Physicians; ACR = American College of Radiology; ACS = American Cancer Society; NCCN = National Comprehensive Cancer Network; USPSTF = US Preventive Services Task Force.

II.16.2. PREVENTION[1,45]

Measures for breast cancer prevention include:

- Lifestyle modifications
- Surgery
- Chemoprevention

Some studies have found that eating a healthy diet, maintaining a healthy weight, exercising regularly, and limiting alcohol intake are associated with a decreased risk of breast cancer. In addition, patients should be counselled about avoiding modifiable factors that increase risk of breast cancer (e.g. HRT)

Certain high-risk populations (BRCA mutation carriers) may benefit from risk-reducing mastectomy.

Chemoprevention with SERM, or an aromatase inhibitor may be indicated for women age ≥ 35 years with the following:

- Previous lobular carcinoma in situ (LCIS) or atypical ductal or lobular hyperplasia
- A 5-year risk of developing breast cancer > 1,67 %, based on the Gail model
- History of thoracic radiation received at < 30 years old
- Presence of high-risk mutations (e.g. BRCA1 or BRCA2 mutations, Li-Fraumeni syndrome)

A computer program to calculate breast cancer risk by the Gail model is available from the National Cancer Institute (NCI).

PART: II

II.1. FEMALE SEXUALITY[15]

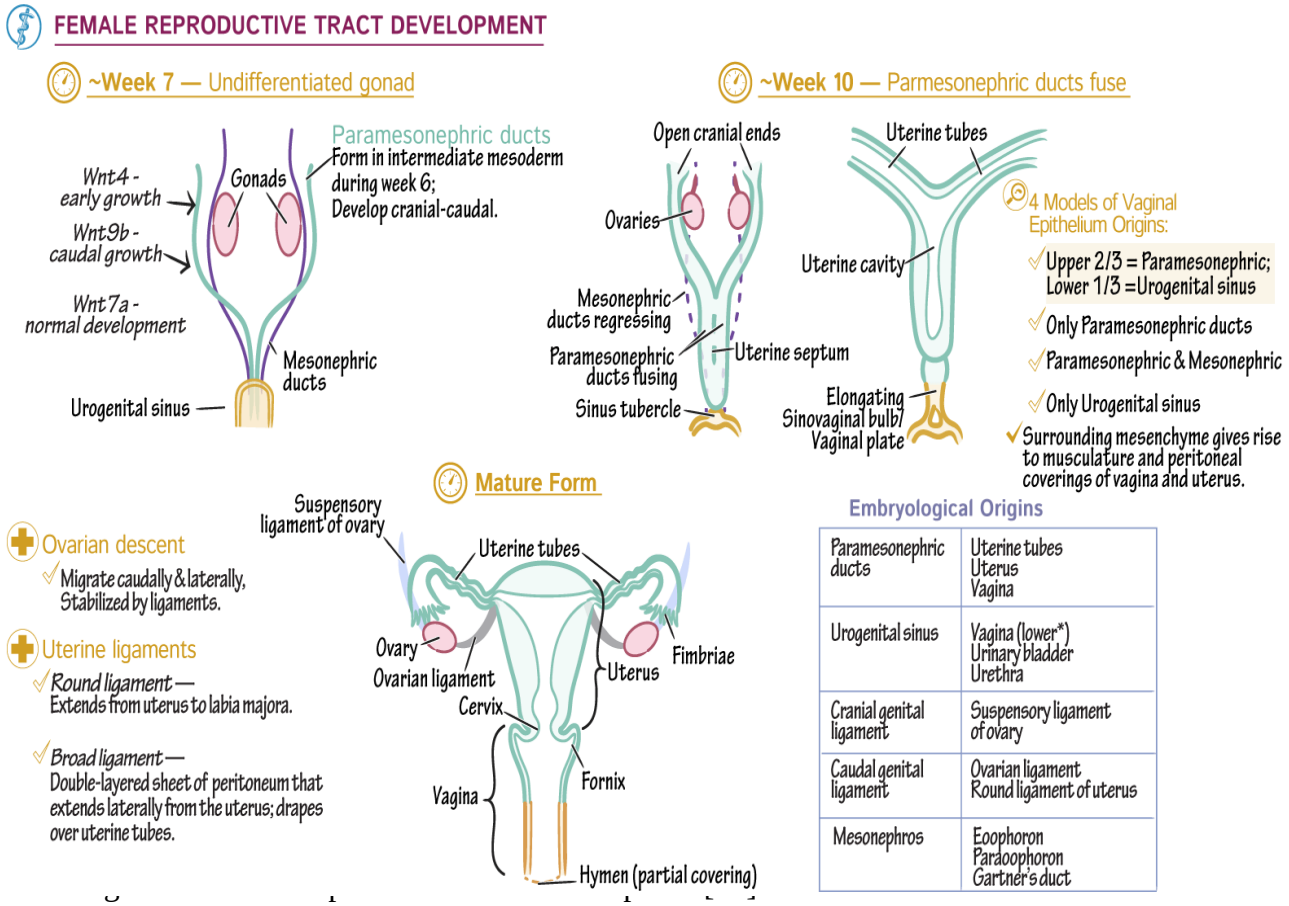
Sexuality refers to all behaviours related to the satisfaction of sexual instinct. According to WHO (2002) Sexual health is a state of physical, emotional, mental, and social well-being related to sexuality. It cannot be reduced to the absence of disease, dysfunction, or infirmity. Sexual health requires a positive and respectful approach to sexuality and sexual relationships, and the opportunity to have pleasurable and safe experiences, free from coercion, discrimination, and violence. To achieve and guarantee sexual health for all, it is necessary to protect everyone's sexual rights.

II.2. ANATOMY AND PHYSIOLOGY OF THE FEMALE GENITAL ORGANS

II.2.1. EMBRYOLOGY[49,50]

Human embryos initially develop a common set of genital structures. A pair of primordial gonads, the genital ridges, appear in both males and females during the sixth week of embryonic life. Two associated ducts develop, the Müllerian and Wolffian ducts, while presumptive external genitalia appear as folds of cloacal tissue. The fate of these undifferentiated internal and external structures depends upon the genetic sex of the embryo.

In individuals with an XX sex chromosome constitution, SRY (sex-determining region of the Y chromosome) is absent, and the genital ridges differentiate as ovaries rather than testes. Furthermore, in the absence of AMH (anti-Müllerian Hormone) and testosterone, the ducts follow alternative developmental paths. In the absence of AMH, the Müllerian ducts are free to differentiate into the Fallopian tubes, uterus, and upper portion of the vagina. In the absence of testosterone, the Wolffian ducts regress. The external genitalia of female embryos differentiate into clitoris and labia.



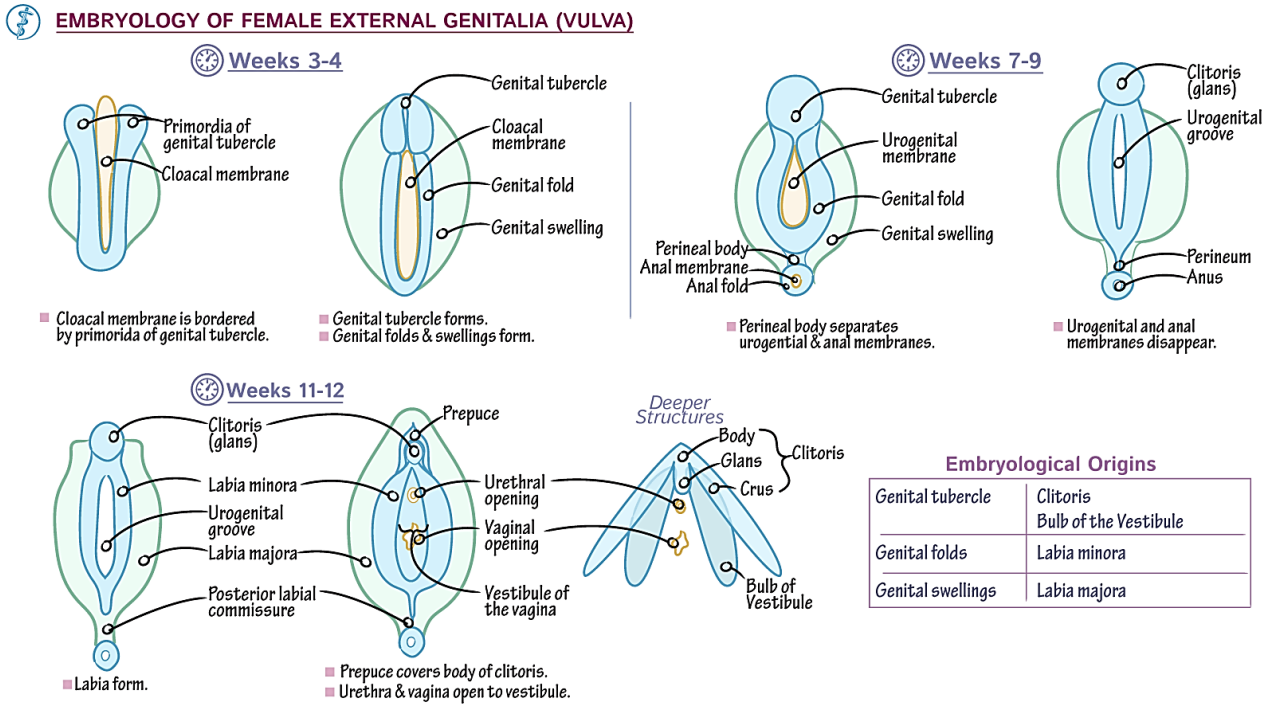


Figure 9: Embryology of female external genitalia[51]

II.2.2. ANATOMY OF FEMALE GENITALIA[52]

The female genital tract is divided into the external genitalia and the internal genitalia. The external genitalia (or vulva) consist of the outlying structures mons pubis, labia majora, labia minora, clitoris, vestibule, hymen, Bartholin's glands, external urethra meatus, and Skene's gland. The internal genital tract, including the female reproductive system, consists of the vagina, the uterus, the two fallopian tubes, and the two ovaries.

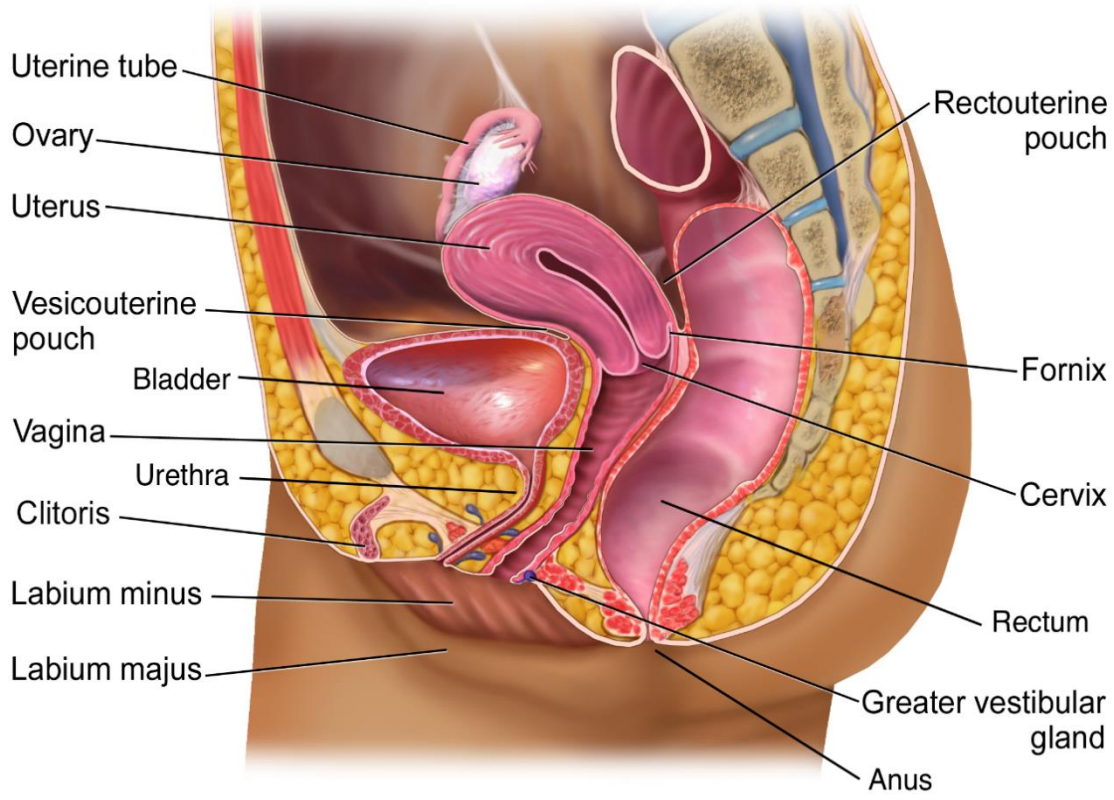


Figure 10: Female genital organs (sagittal section)[52]

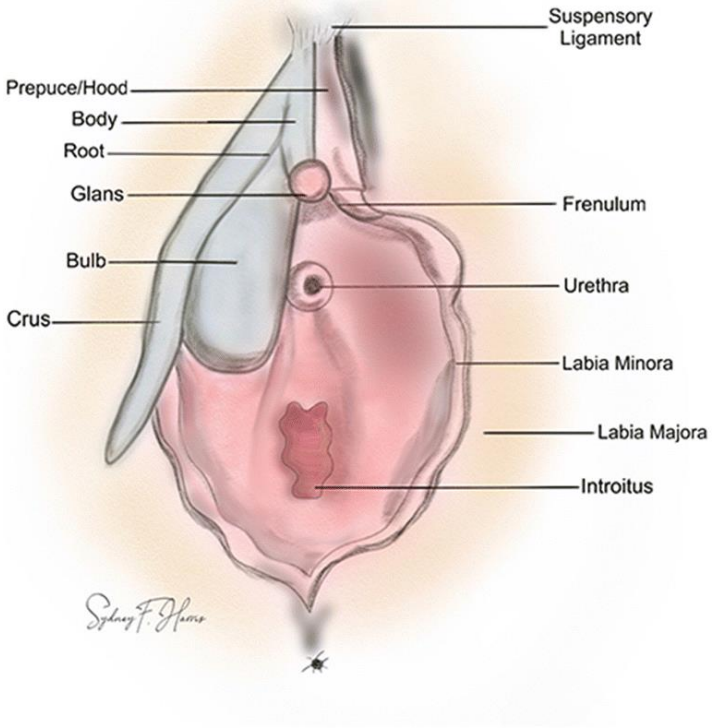


Figure 11: Anatomy of the clitoris and vulva (Illustrator: Sydney F Harris)[53]

Table VIII: Key facts about the female reproductive organs[54]

KEY FACTS ABOUT THE FEMALE REPRODUCTIVE ORGANS	
Internal genitalia	Vagina, uterus, ovaries, uterine tubes
External genitalia	Mons pubis, labia majora, labia minora, clitoris, vestibule, vestibular bulb, vestibular glands
Blood supply	**Internal genitalia:** uterine artery, ovarian artery, vagina artery, internal iliac artery **External genitalia:** internal pudendal artery, external pudendal artery
Innervation	**Internal genitalia:** thoracolumbar nerves, lesser splanchnic nerves, hypogastric nerve (sympathetic), pelvic splanchnic nerves, vagus nerve (parasympathetic) **External genitalia:** ilioinguinal nerve, genitofemoral nerve, pudendal nerve, posterior cutaneous nerve of the thigh (sensory), uterovaginal nerve plexus (parasympathetic)
Lymphatics	**Internal genitalia:** para-aortic, iliac (internal and external), superficial inguinal, lumbar, and sacral lymph nodes **External genitalia:** superficial and deep inguinal lymph nodes, internal iliac lymph nodes

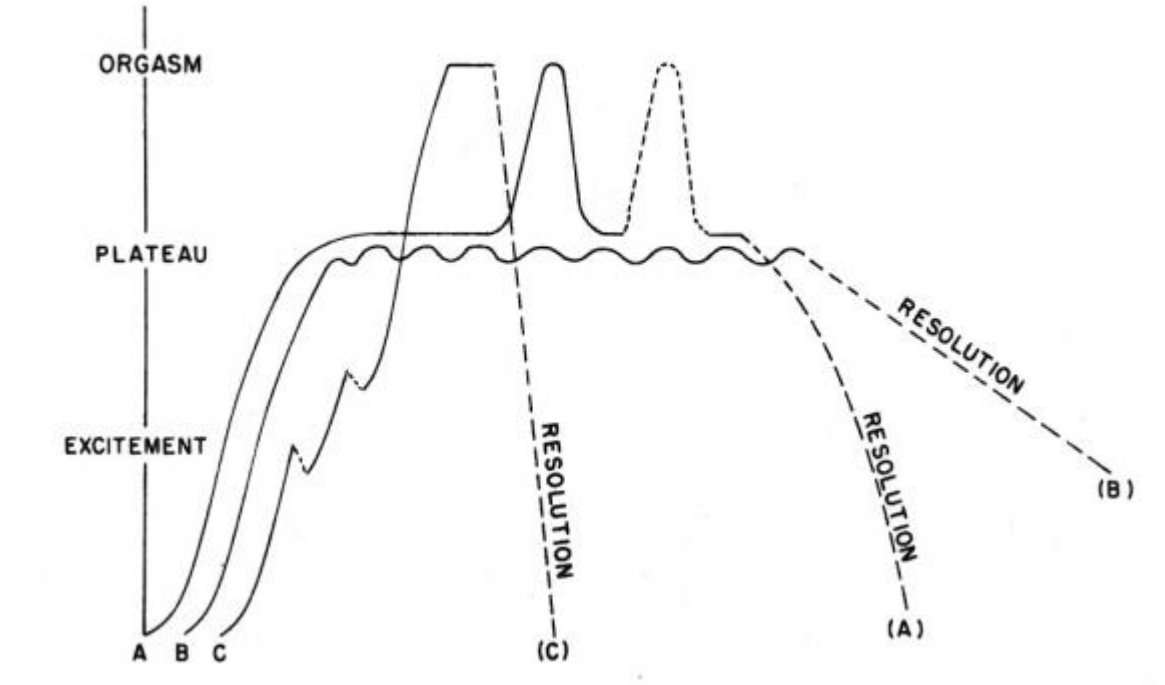
II.2.3. PHYSIOLOGY OF THE FEMALE GENITALIA[53,55,56]

The female reproductive system is responsible for the production of gametes (called eggs or ova), certain sex hormones responsible for puberty, and the maintenance of pregnancy up to childbirth. A woman's reproductive years are between menarche (first menstrual cycle) and menopause (cessation of menstruation for 12 consecutive months). During this period, eggs are cyclically released from the ovary with the potential to be fertilised by male gametes (sperm). This cyclical release of eggs is a normal part of the menstrual cycle.

All the female genital organs play a role in sexual arousal and are all uniquely designed and positioned for optimization of sexual stimulation and enhancement of arousal and pleasure.

II.3. "NORMAL" SEXUALITY

“Normal” sexuality is difficult to define (absence of complaints or demonstrated satisfaction), both in terms of physiology and practice. Sexual practices are constantly evolving. Sexuality depends on several interrelated factors: first and foremost, genetic sex, gender identity (the sex to which a person feels deeply aligned), sexual orientation and sexual response. Sexual response is defined as a sequence of physiological and emotional events involving sexual desire, central and peripheral arousal, and genital responses. There was little physiological research on women before the 2000s. Sexual activity' refers to any activity that results in stimulation or pleasure (the presence of a partner is not required). Sexual life' refers to physical and emotional sexual activity with a partner. The first major publications were those of Alfred Kinsey in 1948 and 1953, with epidemiological findings on male and female sexual behaviour and a description of the physical and psychological responses to sex[57]. In 1968, William Masters, a gynaecologist, and Virginia Johnson, a psychologist, published an anatomophysiological study of human sexual response, based on clinical observation of behaviour and recording of anatomical and physiological changes during sexual intercourse[30]. They described a female sexual response in four phases, identical to those of men: arousal, plateau, orgasm, and resolution (see Figure10).



Curve A: Normal sexual response; Curve B: Anorgasmia; Curve C: Early orgasm

Figure 12: Female sexual response according to Masters and Johnson, 1966 [58]

Later, Hélène Singer Kaplan[59] insisted on desire as the main actor in the female sexual response and proposed three phases, now commonly used in sexual medicine: desire, arousal and orgasm. More recently, Rosemary Basson proposed that these three phases of the female sexual response (see Figure 11) should be organized not in a linear fashion, but in a circular fashion to take into account the multiple interactions, particularly neurohormonal interactions, in the female sexual response cycle[60].

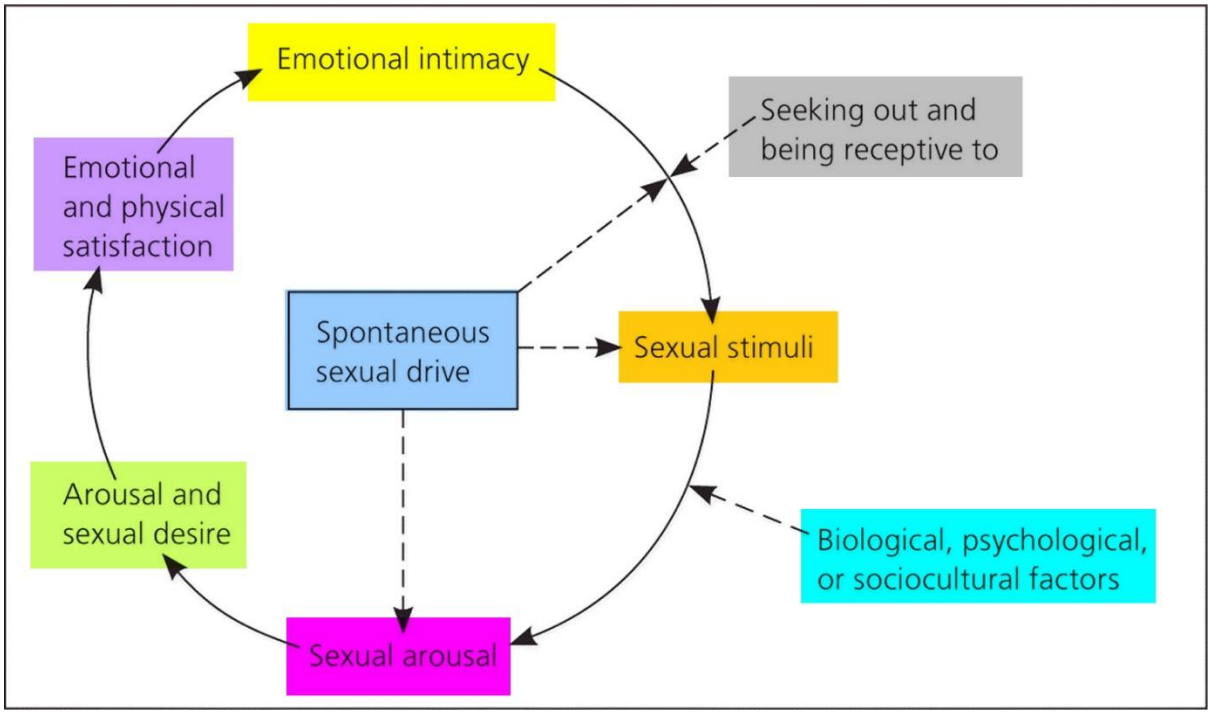


Figure 13: Circular representation of the different phases of the female sexual response during a 'potentially' sexual encounter, after R. Basson. [61]

Desire may or may not be initially present; it is potentiated by arousal from sexual stimuli. In the DSM-IV-TR (Diagnostic and Statistical Manual of mental health disorder, 4th edition, American Psychiatric Association), the sexual response cycle in women and men is described in only 4 phases (a mixture of several of the above works): desire, arousal, orgasm, resolution.

II.3.1. THE FEMALE SEXUAL RESPONSE CYCLE

- **Desire**

Sexual desire is a psychobiological drive that is fed by two sources: exogenous sensory and endogenous, corresponding to sexual fantasies and ideas. It precedes and triggers sexual arousal and drives the subject to implement strategies leading to sexual behaviour. The first phase of desire corresponds to "spontaneous" or "innate" desire, which develops under the influence of so-called "sexual" hormones in the hypothalamus. At this level, oestrogen, progesterone and androgen receptors control mood and modulate sexual response. Reactive" desire, on the other hand, is secondary to physical arousal. Rosemary Basson illustrates these two parts of sexual desire in her diagram of the female sexual response cycle (see Figure 8). In her view, this circular model would reflect the experience of most women today by considering the psychological factors influencing sexual response that were not included in the Masters and Johnson and Kaplan models. A woman's sexual motivation is more complex than simply the

presence or absence of desire. To initiate a sexual relationship, a woman needs to increase her emotional closeness to her partner, to increase her sense of well-being. She needs to feel attractive, feminine, valued, loved and/or desired, and not feel anxious or guilty about the irregularity of sexual relations in her relationship.

Masculine desire is mainly acquisitive and primary, focusing on the end goal, i.e. sexual intercourse, according to a relatively simple mechanism of need and reward. Feminine desire, on the other hand, is mostly indirect and secondary, feeding on the relationship and tenderness in a complex emotional network of mirrors: it's a kind of desire for the other's desire. Sexual desire is generated by external stimuli (sensory modalities) and psychological stimuli (context, fantasies, memories, etc.). These create a feeling of need or a desire to share sexual activity with the object of desire to obtain satisfaction. This state of mental sexual activity is influenced by the woman's psychological state at the time, but also by hormonal secretions (which act by stimulating or inhibiting the various stimuli).

- **Arousal**

This phase consists of psycho-physiological changes that may be accompanied by a subjective feeling of pleasure. On the one hand, there is a mental arousal of biological origin due to the secretion of androgens, and a psychic arousal corresponding to the need for intimacy, affection, love, etc., on the other. This so-called central arousal depends on erotic stimulation and activates peripheral and genital arousal, which can then reinforce the central arousal. On the other hand, there are somatic reactions at the peripheral level: erection of the nipples, salivation, vasodilation of the skin and sweating. Then, at the genital level, vaginal vasodilation leads to genital vasocongestion, resulting in transudation lubrication, clitoral intumescence and increased genital sensitivity. At the vulval level, the labia majora widen and the labia minora increase in volume and colour.

- **The plateau**

After this initial phase of arousal, there is a plateau phase, as described by Masters and Johnson, which corresponds to the maintenance of a high and stable level of arousal for a more or less long period of time, usually leading to orgasm. This phase varies in duration and involves maintaining arousal. This plateau phase can be prolonged in women and can sometimes last beyond orgasm, giving rise to the possibility of multiple orgasms. Anorgasmia is often secondary to too long a plateau. Premature orgasm is secondary to a plateau that is too short.

- **Orgasm**

Orgasm is a complex neuropsycho-physiological process that usually marks the climax of the sexual response. It follows the arousal phase in a continuum of physiological and psychological changes during sexual activity. Orgasm occurs after manual, labial or coital sexual stimulation

of the vagina, clitoris, pelvic area or breasts. The feeling of intense pleasure associated with orgasm is produced in the activated areas of the brain. Orgasm begins a few seconds before the eight to ten jerky, involuntary muscle contractions of the vagina and the muscles of the genital and anal regions. Locally, the clitoris is completely retracted, the vaginal opening is maximal and the labia minora are bright red. Peripherally, there is tachycardia, increased blood pressure, tachypnoea, hyper sudation, and sometimes skin manifestations such as macula-papule on the chest, back and buttocks, as well as changes in the breasts with an increase in breast volume and turgidity of the nipples.

- **Resolution**

This is one of the 4 Masters and Johnson phases and is characterized by a relaxation of the muscles and a reduction in perineal vasodilation. It is characterized by a feeling of mental and physical relaxation, muscle relaxation and a general sense of well-being.

II.4. SEXUAL DYSFUNCTION

According to DSM-IV-TR (Diagnostic and Statistical Manual of mental health disorder, 4th edition, American Psychiatric Association, 1994, revised 2000), sexual dysfunctions are characterized by a disorder of sexual desire and psychophysiological changes that affect the course of sexual response. They are the cause of marked subjective distress and interpersonal difficulties (criterion B in DSM IV-TR). Sexual dysfunctions include sexual desire disorders, sexual arousal disorders, orgasmic disorders, and sexual pain disorders. The DSM-V exists in the USA (Diagnostic and Statistical Manual of mental health disorder, 5th edition, American Psychiatric Association, 2013) but has not yet been translated into French. We have therefore chosen to use the DSM IV-TR version. Sexual dysfunctions are disorders that make it impossible to have satisfying sexual relations. more general pathologies), toxic (drugs, medicines), psychological (stress, depression, anxiety), relational (conjugopathy). These disorders may be primary (always present) or secondary (arising after satisfactory sexual functioning). There are very few epidemiological data on the prevalence of the various sexual dysfunctions, and they are extremely variable. This probably reflects differences in the methods of assessment, the definitions used and the characteristics of the population samples. A study presented in 2010 at the annual meeting of the American College of Obstetricians and Gynaecologists (ACOG) suggested that up to one in 10 women suffer from reduced sexual desire. In 2002, the Global Study of Sexual Attitudes and Behaviour (GSSAB) surveyed 27 500 women and men aged 40-80 years in 29 countries (including France) about sexual dysfunction (80). Patients were asked if they had experienced sexual problems for more than 2 months in

the previous year. This study confirms the high prevalence of these sexual problems: 48,5 % worldwide, 44,8 % in Southern Europe (France, Italy, Spain and Israel). Buvat [59], also using the GSSAB, found the following in the French general population: lack of desire in 21 % of cases, lack of pleasure in 18 %, anorgasmia in 15,8 % and lubrication difficulties in 14 %. Finally, in the survey on sexuality in France carried out by Nathalie Banjos and Michel Bozo [62], 11,7 % of women stated that they had often experienced sexual difficulties in the past year. If we consider difficulties that occur "sometimes", 40 % of women are affected. 31,4 % of women reported dyspareunia in the last 12 months (2 % often, 14,3 % sometimes and 15,1 % rarely).

Table IX: Phases of sexual response cycle and associated sexual dysfunction[63]

PHASES	CHARACTERISTICS	DYSFUNCTION
Desire	Reflects person's motivations, drives and personality; characterised by sexual fantasies and desire to have sex	Hypoactive sexual desire disorder; sexual aversion disorder (male or female)
Excitement	Subjective sense of sexual pleasure and accompanying physiological responses (sexual flush, erection by vasocongestion, tightening and lifting of scrotal sac, increase size of testes)	Female sexual arousal disorder Male erectile disorder; dyspareunia
Orgasm	Peaking of sexual pleasure, release of sexual tension and rhythmic contraction of perineal muscles and pelvic reproductive	Orgasmic disorder (male and female); premature ejaculation
Resolution	A sense of general relaxation, wellbeing and muscle relaxation	Post coital dysphoria, post coital headache

II.4.1. DISORDERS OF SEXUAL AROUSAL[62]

The essential feature of sexual arousal disorder in women is the inability to achieve or maintain adequate sexual responsiveness (lubrication, engorgement of genital tissues) until the sexual act is completed (criterion A according to DSM-IV-TR). A disorder of desire often leads to a disorder of arousal. An arousal disorder is defined as the failure to progress from one phase to the next according to the Masters and Johnson cycle.

There are different clinical forms of sexual arousal disorder:

- **Genital arousal disorder**

Psychic arousal is present, but the genital response is deficient and may be manifested by decreased vaginal vasodilation, vaginal dryness, decreased local sensation, and reduced or absent vulvar changes.

- **Generalized arousal disorder**

The woman is neither mentally nor physically aroused.

- **Psychic arousal disorder**

There is no subjective arousal, but the genital physiological response to an erotic stimulus is appropriate. The absence of subjective arousal may be related to the discomfort that accompanies the awareness of genital arousal, or it may be related to the absence of the pleasure and satisfaction that should accompany genital arousal.

II.4.2. ORGASMIC DISORDER

The essential feature of orgasmic disorder in women is repeated or persistent absence or delay of orgasm after a period of "normal" sexual arousal (adequate in intensity and duration) (criterion A according to DSM IV-TR). In women, there is great variability in the type and intensity of stimulation required to achieve orgasm. However, most of these women experience pleasure, even if it does not necessarily lead to orgasm. The diagnosis of orgasmic disorder in women must be based on the clinician's judgement that the woman's orgasmic capacity is lower than it should be given her age, sexual experience and the adequacy of the sexual stimulation received.

II.4.3. PAINFUL SEXUAL DISORDER: DYSPAREUNIA (AND VAGINISMUS)

Dyspareunia is genital (perineal, pelvic, or abdominal) pain associated with coitus, during vaginal penetration (criterion A according to DSM IV-TR). Dyspareunia refers to any pain experienced during sexual intercourse, whether before, during or after coitus. It can be real pain or burning, itching or irritation. Symptoms can range from mild discomfort to acute pain. They are often accompanied by changes in arousal, with vaginal dryness and reduced desire. There are three types of dyspareunia: intromission or superficial dyspareunia, presence dyspareunia and deep dyspareunia. Deep dyspareunia is often associated with organic pelvic pathology, including endometriosis.

II.5. SEXUAL HEALTH AND BREAST CANCER

Sexual health can be affected at any time during or after breast cancer treatment. Approximately 70 % of breast cancer survivors report some form of sexual dysfunction, and 45 % specifically report sexual pain [19,26]. Despite this reported prevalence of sexual difficulties, adequate

restoration of sexual health remains an unmet need. Cancer and its treatments affect specific aspects of sexual functioning and intimacy [13]. A review of research on breast cancer and sexuality from 1998 to 2010 documented a range of physical changes in women's sexuality following breast cancer, including disturbances in sexual functioning, as well as disturbances in sexual arousal, lubrication, orgasm, sexual desire and sexual pleasure, resulting from chemotherapy, chemically induced menopause, tamoxifen and breast cancer surgery. Women's intrapsychic experience of changes in sexuality includes fear of loss of fertility, negative body image, feelings of sexual unattractiveness, loss of femininity, and changes in the sense of sexual self [14]. The effects of such changes can persist for many years after successful treatment and can be associated with serious physical and emotional side effects[13] as shown in figure 14 below.

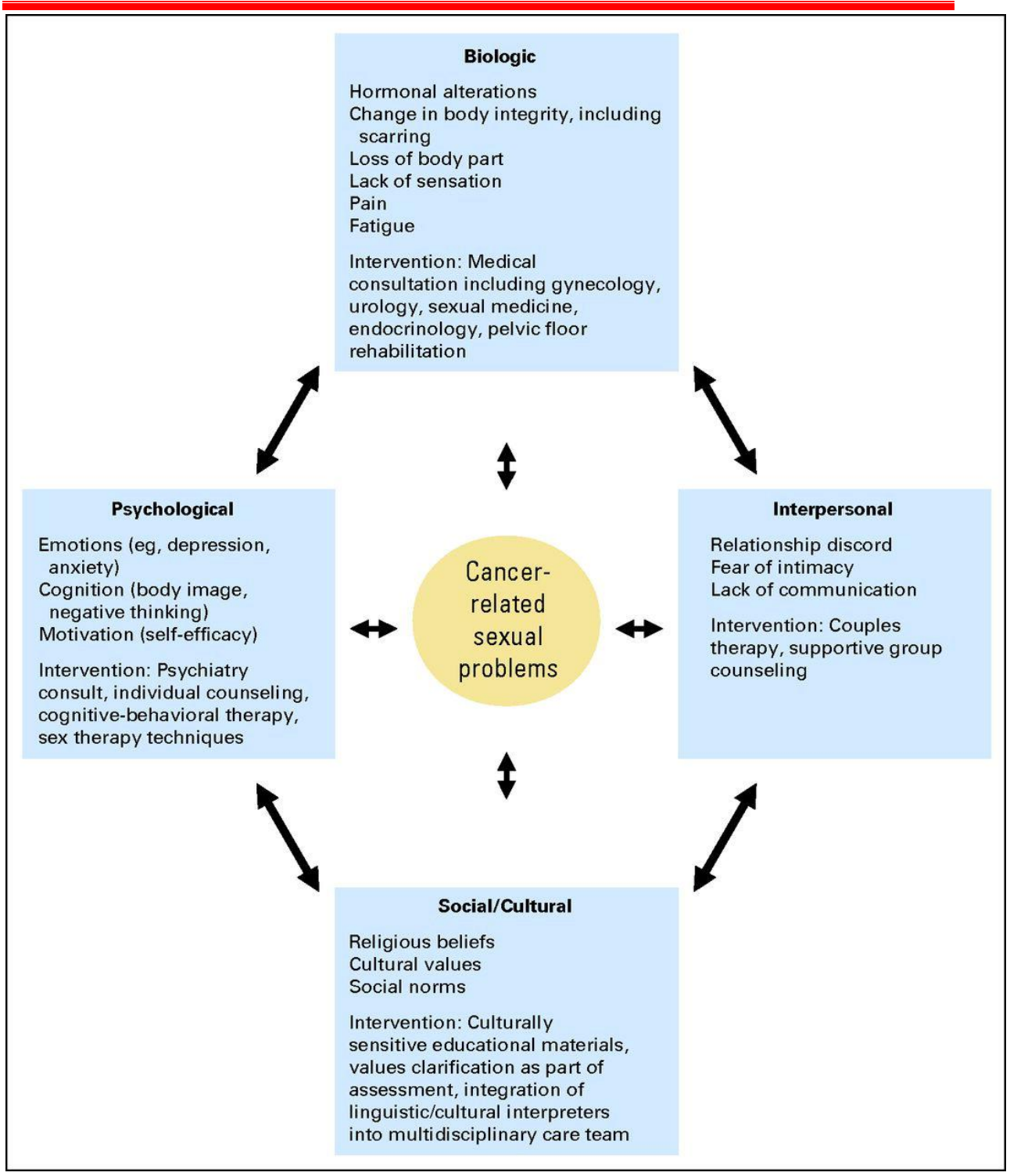


Figure 14 : Cancer related sexual problems[27]

II.6. EFFECTS OF BREAST CANCER TREATMENT ON SEXUAL FUNCTION[8–10,26]

Treatment-related sexual side effects are one of the most common and distressing aspects of cancer therapy. Surgical treatments, systemic therapies, and radiotherapy can all lead to sexual

health problems. Patients who have received multimodal breast cancer treatments are at high risk of experiencing problems with sexual function.

II.6.1. SURGICAL TREATMENT

Alteration of breast anatomy by lumpectomy or mastectomy can have a negative impact on sexual self-image, self-esteem, and confidence, affecting sexual intimacy and overall sexual well-being. Many surgery-related changes can be long-lasting and disfiguring, such as loss of breast volume, asymmetry, fat necrosis, and occasionally seroma, which can develop after lumpectomy. Removal of the breasts and nipples can not only be disfiguring but can also reduce breast sensation and arousal. Occasionally, nerve injury can cause hyperesthesia or dysesthesia of the chest wall, further interfering with potentially pleasurable sexual sensations. This type of surgery appears to affect sexual health.

Women who had a lumpectomy reported significantly greater satisfaction with breast appearance and more pleasurable breast stroking than women who had a mastectomy with reconstruction ($p = 0,002$ and $p = 0,01$, respectively). Aerts et al reviewed the type of breast surgery and its effect on sexual function and found that women who underwent breast-conserving surgery had better sexual adjustment and reported less impairment of sexual desire, arousal, and orgasm than women who underwent mastectomy.

Nipple-sparing mastectomy has been associated with better psychosocial and sexual well-being than skin-sparing mastectomy followed by nipple reconstruction. Breast reconstruction with nipple-areolar reconstruction is associated with improved scores on the BREAST-Q psychosocial and sexual well-being scales ($p < 0,002$ and $p < 0,001$, respectively), and this improvement did not change over time. Other surgical aspects of node-positive breast cancer, such as axillary lymph node removal, can lead to lymphedema of the chest wall, axilla, and arm and may affect sexuality. In a small study by Mulkoglu et al. comparing women who underwent mastectomy and had similar emotional scores with and without lymphedema after breast cancer treatment, women with lymphedema had poorer sexual function and quality of life.

Some premenopausal patients with hormone receptor-positive breast cancer may require prophylactic bilateral salpingo-oophorectomy and possibly long-term endocrine therapy to improve outcomes. This treatment may lead to premature surgical menopause, which is a major risk factor for sexual dysfunction.

II.6.2. CHEMOTHERAPY

Taxanes, platinum agents and anthracyclines are chemotherapeutic agents routinely used in the treatment of breast cancer. Chemotherapy in young, premenopausal breast cancer patients can cause abrupt and often permanent premature menopause, with significant effects on sexual desire. Two distinct endpoints of decline in sexual desire in women with breast cancer have been identified: after breast cancer diagnosis and after the first cycle of chemotherapy.

Chemotherapy-induced ovarian failure can lead to genital problems with loss of vaginal lubrication and elasticity, resulting in dyspareunia and a decrease in libido. Fatigue, pain and insomnia associated with chemotherapy can also affect sexual desire. Some chemotherapeutic agents cause both central and peripheral neuropathy, leading to loss of sensation, abnormal genital sensation, tingling, numbness, and anorgasmia. Some chemotherapeutic agents affect motor and autonomic nerves, leading to bowel and bladder incontinence, which can make women afraid of sexual activity. Many chemotherapeutic agents cause alopecia, which can further affect a patient's physical and sexual body image.

II.6.3. RADIOTHERAPY

Radiation therapy for breast cancer can reduce locoregional and metastatic disease and improve survival, but it is associated with acute and chronic toxicities. Acute toxic effects may include fatigue, esophagitis, breast oedema, induration, dermatitis, and subsequent hyperpigmentation of the skin over the breast. Chronic toxic effects may include radiation pneumonitis, lymphoedema, hypothyroidism and cardiac toxicity. In addition, radiotherapy can affect the aesthetic outcome of reconstructive surgery. All these toxic effects can adversely affect sexual function.

II.6.4. ADJUVANT ENDOCRINE THERAPY

Approximately one third of women diagnosed with breast cancer are premenopausal, and overall, 75 % of breast cancers are oestrogen receptor positive [5]. Treatment of hormone receptor-positive breast cancer typically involves the use of endocrine therapy to prevent breast cancer recurrence and improve overall survival. Endocrine therapy includes selective oestrogen receptor blockers (SERMs), such as tamoxifen, and aromatase inhibitors (AIs). Tamoxifen can be used as adjuvant endocrine therapy in both premenopausal and postmenopausal women. AIs block the production of oestrogen, causing a hypoestrogenic state, and can be used in premenopausal patients receiving concurrent ovarian suppression with the gonadotropin-releasing hormone agonist leuprolide (Lupron), in premenopausal patients undergoing bilateral salpingo-oophorectomy, and in postmenopausal patients. Ovarian suppression results in an

abrupt loss of ovarian function, leading to GSM with vaginal dryness and loss of elasticity; this condition often results in sexual pain, decreased arousal, loss of desire and poor sexual satisfaction.

Unlike chemotherapy, which is given for a short time, adjuvant endocrine therapy is given for a long time, usually 5 to 10 years. SERMs can cause hot flushes, endometrial cancer and polyps, and AIs can cause osteopenia, arthralgias, hot flushes and fatigue. SERMs and AIs can cause vulvovaginal changes leading to dyspareunia and low libido. In a trial comparing these two classes of drugs, women receiving tamoxifen were less likely to report sexual concerns than women receiving AIs ($p = 0,05$) [57]. Significantly more women on AIs reported vaginal dryness and dyspareunia [57]. In another prospective observational study, hypoactive sexual desire disorder (HSDD) was more common in sexually active current AI users (66,7 %; 95 % CI, 49,4-83,9) than in current non-users (43,6 %; 95% CI, 37,0-50,2; $p = 0,02$) [58]. Women who experience adverse effects from one form of endocrine therapy may be switched to another drug in the same class or a different class to manage the adverse effects, as indicated.

II.6.5. IMMUNOTHERAPY

Immune checkpoint blockade has been shown to help patients with triple-negative breast cancer, resulting in longer event-free survival compared to chemotherapy alone. This treatment is still in the early stages of development. At present, the longer-term effects of immunotherapy on breast cancer survivors and its impact on sexual health are unknown and require further research. Immunotherapy has been used to treat other cancers and is known to cause significant toxicities. Common side effects include colitis, pneumonitis, hepatitis and nephritis. Immunotherapy can also lead to endocrinopathies such as diabetes mellitus, hypoparathyroidism, hypothyroidism, and even adrenal insufficiency. Healthcare professionals caring for breast cancer survivors need to be aware of these adverse effects. In addition, these effects may affect sexual health through the presence of fatigue, poor quality of life, and various endocrinopathies. More research is needed in this area.

Table X: Mechanisms Through Which Breast Cancer Treatments Can Influence Sexual Function.[64]

Type of Treatment	Mechanism of Sexual Dysfunction
Cancer surgery	Body image concerns Loss of sensation of nipple, breast, and/or chest Lymphedema
Chemotherapy	Premature menopause GSM with sexual pain Alopecia leading to body image concerns Anxiety related to cancer diagnosis Treatment-related weight gain, fatigue, and neuropathy Pelvic floor problems
Radiation treatment	Painful dermatitis Early/premature menopause GSM Loss of nipple sensation
Endocrine therapy	Premature/early menopause GSM Sexual pain due to hormonal insufficiency Treatment-related myalgias, fatigue, weight gain, and vasomotor symptoms with sleep disruption

Abbreviation: GSM, genitourinary syndrome of menopause.

II.7. ASSESSING SEXUAL HEALTH IN BREAST CANCER SURVIVORS

There are challenges in discussing sexual health problems with breast cancer survivors. Most cancer care professionals are not well versed in the effects of cancer therapies on their patients' sexual health and do not feel comfortable discussing this topic with patients. Despite this, research consistently shows that patients consider sexual health to be an important aspect of their health and prefer their healthcare professionals to initiate discussions about sexual health problems and possible treatment options. In a US survey of 500 adults, 71% reported that they believed their doctor would dismiss sexual concerns if they brought them up. Similarly, less than 50% of oncologists surveyed in another study reported that they routinely asked questions to assess patients' sexual health concerns, suggesting that communication about sexual health is a major challenge in the oncology setting.

It is of concern that sexual problems, if left untreated, are associated with reduced quality of life, depression, interpersonal conflict, and often medication non-adherence. Early identification of sexual difficulties followed by intervention leads to better sexual health outcomes and improved quality of life. This evidence makes it critical for HCPs to inform patients about safe and effective treatments for sexual difficulties.

The American Cancer Society and the American Society of Clinical Oncology, in their joint Breast Cancer Survivorship Care Guideline, and the National Comprehensive Cancer Network recommend regular assessment of body image and sexual function in breast cancer survivors. There are several validated questionnaires to assess women's sexual health. Some commonly used questionnaires are the Female Sexual Function Index (FSFI), the Sexual Activity Questionnaire and the Decreased Sexual Desire Screener. The FSFI is widely used as a measure of female sexual function in the field of sexual medicine and for cancer survivors and is considered the criterion standard. It is a 19-item patient-reported outcome measure that assesses female sexual function in 6 separate domains: sexual desire, arousal, lubrication, orgasm, satisfaction, and pain. A woman with a total FSFI score of less than 26.55 is diagnosed with female sexual dysfunction.

II.8. MULTIDISCIPLINARY APPROACH FOR IMPROVING SEXUAL HEALTH AFTER BREAST CANCER TREATMENT

Female sexual health is complex, and managing sexual difficulties in women needs a multidisciplinary team approach. Because sexual problems in breast cancer survivors are multifactorial, the initial step is to promptly identify the contributing factors for sexual problems. Then, the treatment approach includes the management of vaginal dryness and sexual pain with vaginal lubricants, massagers, moisturizers, local hormone therapy when not contraindicated, and referral to a pelvic floor physical therapist. Management of mood disorders, sexual self-image concerns, and relationship issues may need a referral to a sex therapist. Many patients will see substantial improvement with these measures, but patients who need additional intervention can be considered for medication management. Medications should be individualized based on the patient’s clinical presentation. For example, patients with depression can be treated with bupropion, which has minimal sexual adverse effects.

II.9. RELEVANT PUBLICATIONS

Mean age and prevalence of sexual dysfunction in women with breast cancer

Table XI: Mean age and prevalence of sexual dysfunction in women with breast cancer [65]

Author, yr (Ref)	Country	Design	Sample size	Mean age of women (yr)	Cancer type	FSD prevalence (%)
Faten *et al.*, 2018 (15)	Tunisia	Cross-sectional	100	42,6 ± 6,9	Breast	75
Gass *et al.*, 2017 (17)	USA	Cross-sectional	186	58,7	Breast	42
Paiva *et al.*, 2016 (18)	Brazil	Cross-sectional	153	51,9 ± 9,2	Breast	63
Boquiren *et al.*, 2015 (19)	Canada	Cross-sectional	127	49,0 ± 7,9	Breast	82,5
Raggio *et al.*, 2014 (20)	USA	Cross-sectional	83	56,2	Breast	76,5
Schover *et al.*, 2014 (21)	USA	Cross-sectional	129	63,9	Breast	92
Safarinejad *et al.*, 2013 (22)	Iran	Cross-sectional	186	37,7	Breast	52,5
Harirchi *et al.*, 2012 (24)	Iran	Prospective	216	44,3	Breast	84
Boehmer *et al.*, 2014 (25)	USA	Case-control	85	51,6	Breast	52,5

FSD: Female sexual dysfunction

CHAPTER III: METHODOLOGY

CHAPTER III: METHODOLOGY

III.1. TYPE OF STUDY

This was a descriptive cross-sectional study.

III.2. STUDY SETTING

The study was conducted at the Oncology Departments of the Yaoundé Gynaeco-Obstetric and Paediatric Hospital and the Yaoundé General Hospital.

III.3. JUSTIFICATION OF THE STUDY SITE

The Yaoundé Gynaeco-Obstetric and Paediatric Hospital (HGOPY) and the Yaoundé General Hospital (HGY) are the principal referral centres in the management of breast cancer in Yaoundé.

III.4. STUDY PERIOD AND DURATION

The study took place over 5 months during which we interviewed women managed for breast cancer. The study period was from January 2024 to May 2024.

III.5. TARGET POPULATION

All women diagnosed with breast cancer and their partners.

-Study population:

All women who had been diagnosed with breast cancer, in a stable relationship followed up in HGY or HGOPY, and their partners who agreed to take part in the study.

III.6. SELECTION CRITERIA:

III.6.1. Inclusion criteria:

- Women Diagnosed with breast cancer over the past 5 years
- Sexually active women
- Women in a heterosexual relationship
- Women whose Partners consented to take part in the study

III.6.2. Exclusion criteria:

- Patients with established/existent comorbidities
- Patients who refuse to participate in the study
- Partners with a pre-existing sexual dysfunction
- Patients and partners with an underlying psychiatric disorder

III.7. SAMPLING

Our sample was recruited from women with breast cancer who met the inclusion criteria and had consented to participate in the study.

To ensure that our sample size was sufficient for the various statistical analyses, the minimum sample size was calculated using the LORENTZ formula[66].

$N = z^2 \times p (1-p) / d2$

or

N = sample size

z = confidence level according to the reduced centered normal distribution (for a 95 % confidence level, z = 1,96)

p = proportion of the population with the characteristic

d = tolerable error (actual proportion to within 5%, standard value of 0.05)

-Numerical application:

In our study, p = 0,75 (95% CI) based on a study conducted by Faten et al. (2018) in Tunisia [65,67] :

N= [1,96 x 1,96 x 0,75(1-0,75)] / 0,05 x 0,05 = 289

III.8. PROCEDURES

III.8.1. Administrative procedures

Before starting our study, we obtained ethical approval from the Faculty of Medicine and Biomedical Sciences of the University of Yaoundé I and administrative authorization from the hospitals involved in our study.

III.8.2. Recruitment of study population

We selected our participants from women with breast cancer followed up in HGY and HGOPY who met the inclusion criteria. The women and their partners were interviewed in person to complete the pre-designed questionnaire in a room, on the phone, and using an electronic questionnaire where their consent and privacy was maintained. Complementary information on diagnosis and management was collected from the patient's medical file.

The structure and design of these questionnaires were derived from questionnaires used in previous studies[17,68,69] and we assessed themes such as demographic factors, sexual function, and their experience and satisfaction with current sexual health care (Annexe A).

We used the Female Sexual Function Index (FSFI) scale constructed by Rosen et al[70] to correctly assess female sexual function and response. This validated sexual function index[71]

uses 19 questions to assess female sexual function and response over the past 4 weeks. These 19 items explore 6 domains: sexual desire, sexual arousal, vaginal lubrication, orgasm, sexual satisfaction, and pain during intercourse (dyspareunia). Each item is scored from 0 to 5 or 1 to 5. A score of 0 indicates that the respondent reports no sexual activity. The score for each domain is obtained by multiplying each item by an appropriate factor. The maximum score is 6 for all domains assessed. The total score of the questionnaire therefore varies between a minimum of 2 and a maximum of 36. For a score ≤ 26,55, sexual function is considered unsatisfactory[71].

Table XII: Method for the calculation of the Female Sexual Function Index or FSFI [based on Rosen et al].[70]

Domaine	**Items**	**Score range**	**Factor**	**Min score**	**Max score**
Desire	1,2	1-5	0,6	1,2	6
Arousal	3,4,5,6	0-5	0,3	0	6
Lubrification	7,8,9,10	0-5	0,3	0	6
Orgasm	11,12,13	0-5	0,4	0	6
Satisfaction	14, 15, 16	0-5	0,4	0	6
Pain	17, 18, 19	0-5	0,4	0	6
Score range	-	-	-	1,2	36

III.8.4. Sampling process

In this study, after all ethical procedures were completed, we identified files/patient records of women who fit the criteria at both hospitals and identified them by a unique identification code. These were logged into Excel, and simple random sampling was used to select 500 participants. If while contacting a participant she/he was unreachable or declined to participate in the study, the next participant on the list was contacted for the interview.

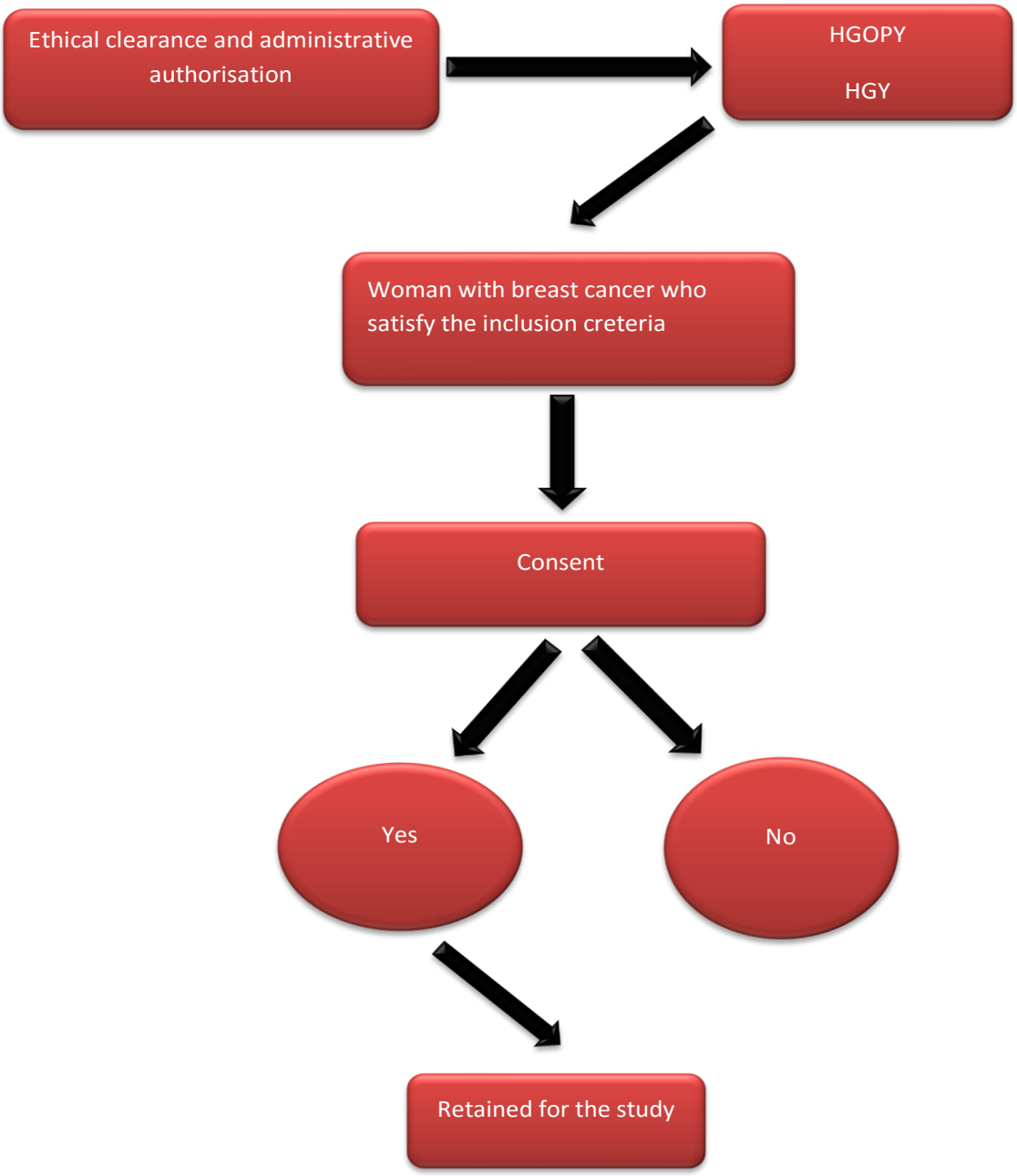


Figure 15: Sampling process

III.9. DATA ANALYSIS

The data collected were entered into a database created using Epi Info version 7.6.2.0. Statistical analyses were carried out using SPSS (Statistical Package for the Social Sciences) version 26.0. Parameters of central tendency (mean, mode, median) and dispersion (standard deviation, interquartile range) were used to describe continuous variables. Categorical variables were described as percentages, proportions and/or frequencies. T-test, ANOVA, logistic regression and chi-square models were used to assess the association between independent variables and female sexual function as the dependent variable, with 95 % confidence intervals. A p-value less than 0,05 was considered statistically significant.

ANALYSES OF VARIABLES

Analyses of objective 1: To calculate the frequency of sexual dysfunction in women with breast cancer.

- The numerator was the number of breast cancer patients with a FSFI ≤ 26,55 and the denominator was the total number of women with breast cancer who participated in the study.

Analyses of objective 2: To determine the effect of different treatment protocols on couples' sex lives.

- T test, ANOVA, logistic regression and Chi-square models were used to assess the association between independent variables and female sexual function as the dependent variable. Odds ratios were calculated using a contingency table with a 95 % confidence interval. Any difference was considered statistically significant if $p < 0,05$.

Analyses of objective 3: To evaluate the partner's sexual perspective on breast cancer and its treatment.

- Qualitative variables were expressed as frequencies and percentages

Analyses of objective 4: To investigate the accessibility of information regarding the impact of breast cancer diagnosis and management on the couple's sexuality.

- Qualitative variables were expressed as frequencies and percentages

III.10. STUDY LIMITATIONS

- We did not consider sexual function before the diagnosis of breast cancer.
- Homosexual couples were not considered in our study.
- Recall bias
- The study was restricted to two hospitals in the Urban zone of Cameroon. There may be challenges in generalizing this study to the whole Cameroonian population.

- Social desirability bias

III.11. ETHICAL CONSIDERATIONS

Applications for ethical clearance were submitted to the Institutional Ethics and Research Committee of the FMBS and the Institutional Ethics and Research Committee on Human Health of the Yaoundé Gynaeco-Obstetric and Paediatric Hospital. This study was conducted in strict compliance with the basic principles of medical research, which are as follows:

- The principle of research interest and benefit: Each patient and partner will receive counselling on sexuality. There will be no out-of-pocket costs for patients.
- The principle of harmlessness: this will be respected in that the interview will be conducted according to each patient's availability to limit inaccurate answers. In addition, patients will not be subjected to any physical intervention during the study.
- The principle of confidentiality: We will obtain and document verbal and/or written consent from patients prior to recruitment. Data will be used for research purposes only. A code will be assigned to each patient on the data sheet to ensure anonymity.
- The principle of justice: this will consist in respecting the freedom to participate or not to participate in the study, without any prejudice in case of refusal.

III.12. MATERIALS

-Data sheet

- Didactic materials (A4 format, pens, pencils, erasers)

-Computer

-Printer

-USB memory stick

-Computer software: Epi Info version 7.6.2.0; IBM SPSS statistics 26.0; Microsoft Word and Excel 2013.

II.13. COMMUNICATION OF RESULTS

The results of our research will be accessible at several levels:

- The Yaoundé Gynaeco-Obstetric and Paediatric Hospital (HGOPY) and the Yaoundé General Hospital (HGY) where recruitment took place.
- At the library and publication site of the Faculty of Medicine and Biomedical Sciences of the University of Yaoundé I: 'Health Sciences and Disease'.
- Presentation at the SOGOC (Society of Gynaecologists and Obstetricians of Cameroon) and at various upcoming congresses.
- Submitted to scientific journals for publication.

CHAPTER IV: RESULTS

IV.1 DESCRIPTION OF PARTICIPANTS

A total of 500 couples were recruited for the study. Of these, 423 met the inclusion criteria and 116 did not give informed consent. A total of 307 couples were retained for the study. These couples were distributed as follows 203 in HGY (i.e. 66,1 %), 104 in HGOPY (i.e. 33,9 %).

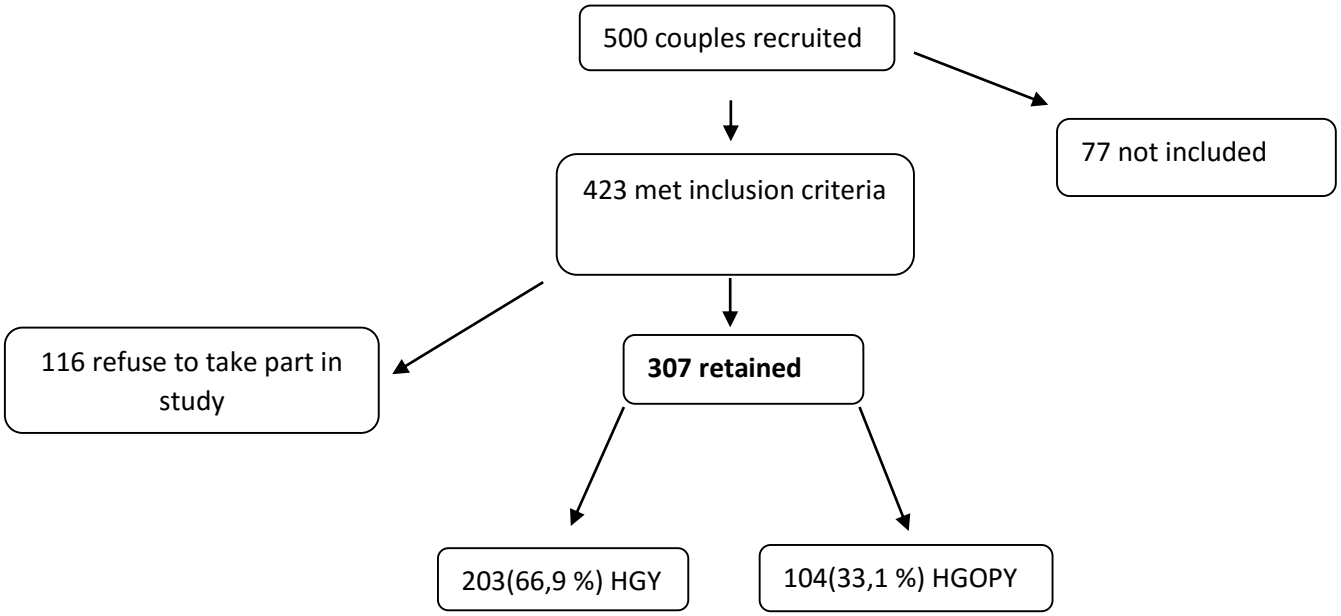


Figure 16: Recruitment tree of participants

IV.2 SOCIO-DEMOGRAPHIC CHARACTERISTICS

IV.2.1. PATIENTS SOCIO-DEMOGRAPHIC PROFILE

The mean age of the patients in our study was 45,2±13 years, with extremes ranging from 18 to 59 years and a median of 45 years. The most common religious denominations were Catholic (61,6 %) and Muslim (28 %). Most patients were married (66, 4 %) and were from the Centre (31,9 %) and West (24,4 %) regions. Most had a secondary (40,7 %) or tertiary (39.1%) level of education. The majority (73,6 %) had an income-generating activity, 41 % were self-employed and 75,3 % had a monthly income of less than 200 000 CFA francs.

Table XIII: Distribution of sociodemographic characteristics of the study participants

Age distribution (years)		
Mean±sd	45,2±13years	
	Frequency	Percentage (%)
<40	79	25,7
40-49	119	38,8
50-60	109	35,5
Distribution by region of origin		
	Frequency	Percent (%)
Centre	98	31,9
East	7	2,3
Far north	7	2,3
Littoral	28	9,1
North	16	5,2
Northwest	25	8,1
South	15	4,9
Southwest	36	11,7
West	75	24,4
Distribution by marital status		
	Frequency	Percent (%)
Single	91	29,6
Married	204	66,4
Divorced	3	1,0
Widow	4	1,3
Cohabitation	5	1,6
Distribution by religion		
	Frequency	Percent (%)
Catholic	189	61,6
Muslim	86	28,0
Protestant	18	5,9
Others	14	4,6

Table XIV: Distribution of sociodemographic characteristics of the study participants

Distribution by educational level		
	Frequency	Percent (%)
None	5	1,6
Primary	57	18,6
Secondary	125	40,7
Tertiary	120	39,1
Distribution by employment status		
	Frequency	Percent (%)
Unemployed	78	25,4
Self-employed	126	41,0
Employed	100	32,6
Retired	3	1,0
Distribution by monthly income (F CFA)		
	Frequency	Percent (%)
<100000	103	33,6
100000-200000	128	41,7
>200000	76	24,8

IV.2.2. PARTNERS SOCIO-DEMOGRAPHIC PROFILE

Our study found that the mean age of the partners was 53,01±14 years, with extremes ranging from 22 to 68 years and a median of 54 years. Catholics are the most represented religious denomination with 68,1 %, followed by Muslims with 26,1 %. Most partners are from the Centre (31,9 %) and West (24,4 %) regions, and the majority have a secondary (61, 6%) or tertiary (30,3 %) level of education. More than 91,2% were engaged in an income-generating activity, 69,4 % were self-employed, and 53,1 % had a monthly income of less than 200 000 CFA francs. The average duration of the relationship was 16,44±10,56 years.

Table XVa: Distribution of partners sociodemographic characteristics

Age distribution		
Mean±sd	53,01±14years	
	Frequency	Percent (%)
<30	3	1,0
30-39	14	4,6
40-49	76	24,8
50-59	117	38,1
≥60	97	31,6
Distribution by region of origin		
	Frequency	Percent (%)
Adamawa	2	0,7
Centre	129	42,0
East	1	0,3
Far north	4	1,4
Littoral	20	6,5
North	17	5,5
Northwest	22	7,2
South	7	2,3
Southwest	33	10,7
West	72	23,5
Distribution by religion		
	Frequency	Percent (%)
Catholic	209	68,1
Muslim	80	26,1
Protestant	17	5,5
Others	1	0,3
	Frequency	Percent (%)
None	1	0,3
Primary	24	7,8
Secondary	189	61,6
Tertiary	93	30,3

Table XVIb: Distribution of partners sociodemographic characteristics

Distribution by employment status		
	Frequency	Percent (%)
Unemployed	4	1,3
Self-employed	213	69,4
Employed	67	21,8
Retired	23	7,5
Distribution by monthly income		
	Frequency	Percent (%)
<100000	4	1,3
100000-200000	159	51,8
>200000	144	46,9
Distribution of duration of relationship		
Mean ±SD	16,54±10,56	
	Frequency	Percent (%)
0-5	85	27,7
6-10	29	9,4
11-20	71	23,1
21-30	89	29,0
>30	33	10,7

IV.3. PATIENTS MEDICAL HISTORY

In our study, the mean parity was 2,76±1,96, the mean age at menarche was 14,29±1,22 years, the mean body mass index was 25,42±2,55 and 24,1 % were menopausal.

A family history of breast cancer was documented in 36,5 % of patients, 79,8 % had breastfed, 33,2 % had used hormonal contraceptives, of which 81,4 % had used hormonal contraceptives for 5 years or more.

Table XVIIa: Patients medical history

Number of children		
Mean ±SD	2,76±1,96	
	Frequency	Percent (%)
None	47	15,3
1-2	106	34,5
3-4	123	40,1
>5	31	10,1
Age of last child		
Mean ±SD	9 ±7,1years	
	Frequency	Percent (%)
No child	48	15,6
<3	8	2,6
3-5	56	18,2
>5	195	63,5
History of breast feeding		
	Frequency	Percent (%)
No	62	20,2
Yes	245	79,8
BMI		
Mean ±SD	25,42±2,55	
	Frequency	Percent (%)
Normal	134	43,6
Overweight	154	50,2
Obese	19	6,2
Menarche		
Mean ±SD	14,29±1,22	
	Frequency	Percent (%)
<14	75	24,4
≥14	232	75,6

Table XVIIIb: Patients medical history

Menopause		
	Frequency	Percent (%)
No	233	75,9
Yes	74	24,1
Use of hormonal contraception		
	Frequency	Percent (%)
Yes	102	33,2
- 0-4	19	6,2
- 5-9	78	25,4
- 10 and above	5	1,6
- Total	102	33,2
No	205	66,8
Family history of breast cancer		
	Frequency	Percent (%)
No	195	63,5
Yes	112	36,5

IV.4. PATIENTS CLINICAL FEATURES

The mean duration of breast cancer after diagnosis was 2,69±2,13 years; stage III (49,8 %) and stage II (25,7 %) are the most common clinical stages; breast tumours were predominantly invasive ductal carcinoma in 87,3 %, SBR grade II in 64,8 %, and 51,4 % were hormone receptor positive.

Table XIX: Patients clinical features

Duration of breast cancer after diagnosis		
Mean ±SD	2,69±2,13years	
	Frequency	Percent (%)
≤1	156	50,8
2-4	77	25,1
≥5	74	24,1
Clinical stage of breast cancer when diagnosed		
	Frequency	Percent (%)
Stage I	10	3,3
Stage II	79	25,7
Stage III	153	49,8
Stage IV	65	21,2
Histological type		
	Frequency	Percent (%)
Invasive ductal carcinoma	268	87,3
Invasive lobular carcinoma	36	11,7
Sarcoma	3	1,0
SBR grading		
	Frequency	Percent (%)
1	45	14,7
2	199	64,8
3	63	20,5
Molecular classification		
	Frequency	Percent (%)
Lumina a	113	36,8
Lumina b	28	9,1
Lumina b, her+	17	5,5
Her+	40	13,0
Tripple negative	43	14,0
Not available	66	21,5

IV.5. TREATMENT MODALITIES

In our study, 31,6 % of patients underwent radical mastectomy, 3,6 % conservative surgery, 87,6 % chemotherapy, 26,1 % hormone therapy and 23,1 % radiotherapy.

Table XX: Treatment modalities

Conservative surgery		
	Frequency	Percent (%)
No	296	96,4
Yes	11	3,6
Radical mastectomy		
	Frequency	Percent (%)
No	210	68,4
Yes	97	31,6
Previous chemotherapy		
	Frequency	Percent (%)
No	132	43,0
Yes	175	57,0
Total	307	100,0
Current chemotherapy		
	Frequency	Percent (%)
No	123	40,1
Yes	184	59,9
Previous hormone therapy		
	Frequency	Percent (%)
No	297	96,7
Yes	10	3,3
Current hormone therapy		
	Frequency	Percent (%)
No	230	74,9
Yes	77	25,1
Total	307	100,0
Previous radiotherapy		
	Frequency	Percent (%)
No	242	78,8
Yes	65	21,2
Current radiotherapy		
	Frequency	Percent (%)
No	301	98,0
Yes	6	2,0

IV.6. FEMALE SEXUAL FUNCTION

The results showed that the women's total sexual function score was 23,25±4,33. Of the 307 women who participated in this study, 222 women (72,3 %) had sexual dysfunction, while 85 women (27,7 %) had no sexual dysfunction. Dyspareunia, sexual desire and arousal have the lowest mean scores among the domains related to sexual function.

Table XXI : Patients sexual function

FEMALE SEXUAL FUNCTION INDEX		
	Frequency	Percent (%)
≤26,55	222	72,3
>26,55	85	27,7
Variables	**MEAN ± SD**	
Score of total sexual function	23,25 ± 4,33	
Domains of sexual function	**MEAN ± SD**	
Sexual desire	3,41±0,72	
Arousal	3,47±0,91	
Lubrication	4,53±1,42	
Orgasm	4,52±1,03	
Satisfaction	4,97±1,04	
Pain	2,35±1,21	

IV.6.1. FACTORS ASSOCIATED WITH FEMALE SEXUAL FUNCTION

In our study we observed a negative association between female sexual function index and; clinical stage at diagnosis, SBR grade, current chemotherapy, current hormone therapy, partner's level of distress on a scale of 0-10 regarding sexual complaints. And a positive association with conservative surgery and frequency of sexual intercourse. With p-values less than 0,05. (Table XIX)

Table XXII: Factors associated with female sexual function index

Variables	**B**	**R^2**	**F**	**P-value**	**95%ci**
Patients					
Age	-	-	-	0,132	-
Educational level	-	-	-	0,614	-
Employment status	-	-	-	0,511	-
Patients' monthly income	-	-	-	0,266	-
Number of children				0,284	
Age of last child	-	-	-	0,608	-
Menarche	0,114	0,013	4,0	<0,046	0,01-0,085
Menopause	-	-	-	0,981	-
BMI	-	-	-	0,108	-
Clinical staging	-0,64	0,412	214,0	**<0,0001**	0,325-0,425
SBR grading	-0,222	0,049	15,783	**<0,0001**	
Conservative surgery	0275	0,074	24,560	**<0,0001**	0,395-0,917
Radical mastectomy	-	-	-	0,968	-
Current chemotherapy	-0,489	0,240	97,065	**<0,0001**	0,357-0,537
Current hormone therapy	-0,168	0,03	8,2802	**<0,0043**	0,283-0,53
Radiotherapy	-	-	-	0,842	-
Partners					
Age	-	-	-	0,472	-
Educational level	-	-	-	0,829	-
Monthly income	-	-	-	0,248	-
Duration of relationship	-	-	-	0,437	-
Frequency of sexual intercourse	0,779	0,608	472,238	**<0,0001**	0,321-0,384
Level of distress on scale of 0-10	-0,819	0,672	623,554	**<0,0001**	0,117-0,37

To investigate the factors influencing sexual dysfunction, a multiple logistic regression model was used to analyse the data. The results of this model showed significant differences between certain variables (clinical stage at diagnosis, SBR grade, conservative surgery, current chemotherapy, current hormone therapy, partner's level of distress on a scale of 0-10 regarding sexual complaints, and frequency of intercourse) and sexual dysfunction, as shown in the Table XX.

Table XXIII: Factors associated with female sexual dysfunction (logistic regression)

VARIABLES	ODDS RATIO	95%	C.I.	P-VALUE
Patients				
Menarche	1,2292	1,0019	1,5082	0,0479
Clinical Staging	0,0464	0,0240	0,0895	0,0000
SBR GRADING	0,4135	0,2618	0,6532	0,0002
Conservative surgery (Yes/No)	29,3398	3,7072	232,1994	0,0014
Current Hormone therapy (Yes/No)	2,1971	1,2701	3,8008	0,0049
Current Chemotherapy (Yes/No)	0,0907	0,0497	0,1656	0,0000
Partners				
Frequency of sexual intercourse	56,2339	20,7980	152,0460	0,0000
Level of distress on a scale of 0-10	0,2789	0,2069	0,3759	0,0000

Chi-square of independence was performed to examine the relations between female sexual dysfunction and certain categorical variables in our study. significant results are reported in table.

Table XXIV. Factors associated with female sexual dysfunction (Chi square analysis)

VARIABLES	X^2	df	p value
Patients (n=307)			
Clinical staging	165,207	3	0,000
Sbr grading	15,186	2	0,001
Conservative surgery (Yes/No)	22,776	1	0,000
Current Hormone therapy (Yes/No)	8,114	1	0,004
Current chemotherapy (yes/no)	73,534	1	0,000
Partners (n=307)			
Frequency of sexual intercourse	223,558	3	0,000
Level of difficulty in coping with changes in sexuality	228,179	3	0,000

IV.7. PARTNERS PERSPECTIVE

A large proportion of partners (63,2 %) in our study reported a decrease in the quality of their relationship when the breast cancer diagnosis was confirmed; 84,7 % had moderate to severe concerns about their partner's health, which persisted in 57,3 % of partners even after the start of breast cancer treatment. We found that 68,1 % of partners had sexual intercourse less than three times a month and 67,1 % had new complaints about intimacy and sexuality. When asked to rate the level of distress caused by these complaints on a scale of 0 to 10, partners reported a mean score of 4,14±2,89, with 61,6 % scoring 5 or higher. Of those who reported new complaints, 62,9 % found it difficult to cope with changes in intimacy and sexuality.

Table XXVa: Partners perspective

PARTNERS PERCEPTION		
The impact of breast cancer on the quality of the relationship with partner		
	Frequency	Percent (%)
Increased	2	0,7
Decreased	194	63,2
No change	111	36,2
Level of concern about partner's health at time of diagnosis		
	Frequency	Percent (%)
No concern	6	2,0
Mild concern	41	13,4
Moderate concern	69	22,5
Severe concern	191	62,2
Level of concern after treatment		
	Frequency	Percent (%)
Increased	1	0,3
Decreased	124	40,4
Same	176	57,3
No concern	6	2,0
Frequency of sexual intercourse		
	Frequency	Percent (%)
Less than once per month	116	37,8
1-2 times per month	93	30,3
1-2 times per week	69	22,5
3-4 times per week	29	9,4
New complaints about intimacy or sexuality		
	Frequency	Percent (%)
No	101	32,9
Yes	206	67,1

Table XXVIb: Partners perspective

Level of sexual distress on a scale of 0 to 10		
MEAN ±SD	4,17±2,89	
	Frequency	Percent (%)
<5	118	38,4
≥5	189	61,6
Degree of adjustment to sexual distress		
	Frequency	Percent (%)
No difficulties	83	27,0
A little difficult	31	10,1
Difficult	135	44,0
Very difficult	58	18,9
Impact of physical changes due to breast cancer treatment on quality of sexual life		
	Frequency	Percent (%)
Negative impact	202	65,8
No impact	94	30,6
No body change	11	3,6
Total	307	100,0
Need for professional help for sexual distress		
	Frequency	Percent (%)
Yes	261	85,0
No	46	15,0

IV.8. INFORMATION ABOUT SEXUALITY

Our study found that 71,7 % of patients felt that the diagnosis of breast cancer had a negative impact on their relationship with their partner, 81,76 % of patients reported that they had not discussed the possible effects of breast cancer treatment on sexuality, 87,3 % of patients wanted their partner to be present during this discussion, and 82,1 % would have liked to receive professional help with sexual complaints related to breast cancer and its treatment, Most male participants (93,8 %) in our study needed information about the impact of breast cancer and its treatment on intimacy and sexuality, Only 21,8 % received information, of which 70,1 % were from a health professional and 29,9 % from other sources (internet, leaflets).

Table XXVIIa: Information on sexuality

INFORMATION ON SEXUALITY		
PATIENTS RESPONSE		
The impact of breast cancer on the quality of the relationship with partner		
	Frequency	Percent (%)
Positive impact	1	0,3
Negative impact	220	71,7
No change	86	28,0
Conversations with healthcare providers about possible effects of breast cancer treatment on sexuality		
	Frequency	Percent
Yes	56	18.24
No	251	81,76
Need for partner's presence in sexuality discussions with healthcare provider		
	Frequency	Percent (%)
Yes	268	87,3
No	39	12,7
Need for professional help for sexual distress		
	Frequency	Percent (%)
Yes	252	82,1
No	55	17,9

Table XXVIIIb: Information on sexuality

PARTNERS RESPONSE		
Need for information about possible effects of breast cancer treatment on sexuality		
	Frequency	Percent (%)
Yes	288	93,8
No	19	6,2
Received information about the possible effects of breast cancer treatment on sexuality		
	Frequency	Percent (%)
Yes	67	21,8
No	240	78,2
The source of the information		
	Frequency	Percent (%)
Health professional	47	70,1
OTHERS (internet, brochure)	20	29,9
Total	67	100,0
the stage at which the information has been received		
	Frequency	Percent (%)
At time of diagnosis	4	1,3
During treatment	63	20,5
Did not receive infomation	240	78,2

CHAPTER V: DISCUSSION

The aim of our research, conducted at Yaoundé General Hospital and Yaoundé Gynaeco-Obstetrics and Paediatric Hospital, was to assess the impact of breast cancer on sexuality. This study is intended to be a pilot study in our context on the description of sexual function in breast cancer patients.

V.1. SOCIODEMOGRAPHIC CHARACTERISTICS

The ages of the women in our study ranged from 18 to 59 years, with a mean of 45,2±13 years and a median of 45 years. This result is similar to that of Zingue et al. [72] and Ngowa et al. [8] which were 45,4±13,35 years and 45,17±12,2 years respectively. In contrast, our mean age is higher than that found by Essiben et al.[73] in Yaoundé, which can be justified by the relatively small sample size (65 cases) of their study, but slightly lower than that found by Engbang et al. [74] who found 46 ± 15,9 years, Sando et al.[7] 46,08±4 years and Ndoua et al.[12] 48,27±12,44 years, which could be explained by the age limit of our inclusion criteria at 60 years. Our study also confirmed the increasing incidence of breast cancer in younger women in Cameroon, with 25,7 % (79) of patients with breast cancer under the age of 40 years, which is concurrent with the findings of Ndoua et al. (25,3 %), Zingue et al. (30 %), Essiben et al. (31 %) [7] and Ngowa et al. (31,9 %). Our study also found that 74,1 % of younger women had clinical stage III and above. The increase in the incidence of breast cancer in younger women is concerning because it is associated with a poorer prognosis, more aggressive histological features and higher recurrence rates[75]. Therefore, implementing a screening programme before the age of 40 will improve the prognosis.

Catholics 61,6 % (189) and Muslims 28 % (86) were the most common religious denomination. Patients were mostly married 66,4 % (204) and belonged to the Centre 31,9 % (98) and West 24,4 % (75) regions, similar to Zingue et al. [72]. These observations are in line with those of the Cameroon Demographic and Health Survey [76] and could be explained by the fact that Yaoundé is predominantly populated by Betis (Centre) and Bamileke (West), and these ethnic groups are strongly represented in Cameroon.

Most patients had secondary education 40,7 % (125) and 39,1 % (120) tertiary education. These results are similar to studies by Tchente et al. [6] 47,7 % and Ntatou et al. [77] 48,9 % for secondary education. Both studies were conducted in urban areas, as was our study. The majority of patients, 73,6 % (226), were engaged in some income-generating activity. Forty one percent were self-employed and 75,3 % had a monthly income of less than 200 000 CFA francs. These results are comparable to Zingue et al. with 36%, Tchente et al. with 42,5 % and Ntatou

et al. with 44,3 % of self-employed patients. Low income combined with cultural and religious beliefs are barriers to early detection of breast cancer[11].

V.2. RISK FACTORS OF BREAST CANCER

The mean parity in our study is 2,76±1,96 with extremes ranging from 0 to 11 which is slightly lower than Tchente et al. (3,19±2,3) and Essiben et al.[73] (3,9±2,1). This may reflect the increased use of family planning services over the years. Maternity is one of the protective factors against breast cancer[78], However, we observed that it was present in 84,7 % (260) of the participants in our study and that 50,2 % (154) of the women with breast cancer had a parity of 3 and above; according to Chollet-Hinton et al., the protective role of pregnancy only concerns cancers occurring after menopause[79]. moreover, 50% of breast cancers occur in women without any of the known risk factors[78]. Essiben et al. showed that nulliparity was a protective factor in Cameroon[80].

Many studies have shown that breastfeeding is a protective factor against breast cancer, as confirmed by Chollet-Hinton et al.[79]. Breastfeeding triggers hormonal changes during lactation that delay menstruation and reduce exposure to hormones such as oestrogen, which can promote the growth of breast cancer cells. In addition, it stimulates cellular differentiation and the elimination of altered breast tissue[79]. However, most of the patients in our study 79,8 % (235) had a history of breastfeeding, comparable to Essiben et al. [9,73] with 67,2 %, Ntatou et al. with 73,9 % and Zingue et al. with 85 %. This confirms the fact that the development of breast cancer is a multi-factorial process.

The mean age at menarche in our study is 14,29±1,2 years with age extremes ranging from 11-18 years, comparable to Essiben et al. [9] at 13,5±1,6 years and Ngowa et al. [11] at 13,53±4,1 years. in our study, 24,1 % of the patients had reached menopause in contrast to Zingue et al. who had 38 % and Ngowa et al. [8] who had 43,16 %, which could be explained by the inclusion criteria of less than 60 years of age used in our study compared to an upper age limit of 84 years in their studies.

Our study showed that 33,2 % (102) of the patients with breast cancer had a history of hormonal contraceptive use, of which 81,4 % had a duration of use ≥ 5 years. This result is higher than that of Ntatou et al at 27% of whom 81,4% had a duration of use ≥ 5 years and Essiben et al [9] at 17,7%. This may be due to increased use of family planning services over time. Hormonal contraception as a risk factor of breast cancer is controversial, with some reports showing no association and others showing up to a 40 % increased risk of breast cancer[81].

There was a family history of breast cancer in 36,5 % (112) of patients in our study, which is higher than the results of Essiben et al. [9] at 17,7 % and Tchente et al. at 8,8 % with a smaller sample size of 192 and 101 cases respectively. This can be explained by the rising incidence of breast cancer over the years. Family history is a comprehensive risk factor for breast cancer, resulting from both genetic inheritance and lifestyle similarities between family members[82]. Approximately 50-85 % of women with mutations in breast cancer type 1 and type 2 genes (BRCA1 and BRCA2) will develop breast cancer[83]. Hence the relevance of genetic screening of women with a first-degree relative of breast cancer, which is not yet common in our setting.

V.3. BREAST CANCER DIAGNOSIS

The clinical staging of breast cancer recorded in this study showed that stage III and II predominated with approximately 49,8 % (153) and 21,2 % (65), respectively. We also observed a pattern of predominance with stages III, II, IV and I in order of frequency. We found a similar pattern but with slightly different proportions in Ngowa et al. (stage III 55,65 %, stage II 27,14 %) [11] and Essiben et al. (stage III 66,1 %, stage II 24 %) [9]. In contrast, we found a different pattern by Ntatou et al. with stages IV, II, III and I in order of frequency. These results show that most of our patients were initially diagnosed at an advanced stage of breast cancer. According to Sando et al. , the delay in diagnosis is due to the shortcomings of a health system with very limited financial, material and human resources, and the low level of knowledge among women about breast cancer[7]. Apart from periodic mass breast health awareness campaigns and clinical breast examinations, there is no national breast cancer screening programme in Cameroon[11]. The implementation of a national routine screening programme would improve the prognosis of breast cancer patients.

The main histological type found in breast tumours is invasive ductal carcinoma 87,3 % (268), followed by invasive lobular carcinoma 11,7 % (36). Studies conducted in Yaoundé showed similar trends with slightly different proportions. Essiben et al. with a similar proportion of invasive ductal carcinoma at 88,5 %, Ndoua et al. with a slightly higher proportion at 91,6 % and slightly lower proportions with Zingue et al. and Engbang et al. at 79% and 74,38% respectively.

The histopronostic grade of SBR in this study showed the predominance of grade II with 64,8 % (199), followed by grade III with 20,5% (63). This classification was also used by Ndoua et al [12] and Essiben et al [9], but with different proportions: II 4,2 %, III 26,5 %, I 10,38 % and

II 76,6 %, III 12 %, I 11,4 % respectively. In another study, Sando et al. found a different trend, with grades II, I and III in order of frequency [7].

Immunohistochemical analysis was performed in 78,5 % (241) of the patients, which is significantly higher compared to Essiben et al.[9] with 8,3 % and Engbang et al. with 0,36 %, which can be explained by the scarcity of immunohistochemical analysis, which was only available at the Centre Pasteur du Cameroun, and accessibility, which was limited for financial reasons during the period of their studies. Hormone receptors were positive in 65,56% (158/241), similar to Essiben et al. [9] at 62,5 % and Engbang et al. at 54,5 %. Although hormone receptor-positive tumours are associated with a better prognosis, treatment with hormone therapy can have a negative impact on sexuality. Therefore, a holistic approach to breast cancer management is needed.

V.4. TREATMENT MODALITIES

With regard to treatment modalities in our study, chemotherapy topped with 87,6 % (269) with it being the first line in 40,8 % (125) of the patients comparable to Essiben et al.[9] with 84,9 % (163) first line in 43,8 % (84), Ngowa et al.[11] with 89,13 % (197) first line in 53,39 % (118), Noa et al. with 97,0 % (161) and Tchente et al. 93,1 % (94). This could be explained by the fact that initial diagnosis is usually made at an advanced stage of the disease.

Surgery accounted for 35,2 % (108) of patients, lower than the 64,7 % (143) reported by Ngowa et al.[9] and the 75 % (144) reported by Essiben et al.[9]. This may be explained by the fact that 50,8 % (156) had a duration of diagnosis of less than one year in which management modalities had not progressed to the surgical stage. Surgical management was largely dominated by radical mastectomy (RM) with 89,81 % (97/108) compared to conservative surgery (CS) with 10,18 % (11/108), comparable to Noa et al. (RM: 92,2 %, CS: 7,8 % n=166). This could be explained by the fact that initial diagnosis is usually made at an advanced stage of the disease. In addition, conservative surgery requires surgical expertise, availability and accessibility of radiotherapy and patient follow-up. Conditions that are not readily available in our context.

Hormone therapy was administered to 26,1 % (73) of the patients, which is comparable to Tchente et al. 33,1 % (n=95) and Ndoua et al. 37, 7% (n=150), but higher than Ngowa et al. [11] (19,9 %, n=221) and Essiben et al. [7] (8,5%, n=192). This could be attributed to the progression in breast cancer management in Cameroon, as immunohistochemical analysis has become more available over time.

Radiotherapy was administered to 23,1 % (71) of the patients. This value is low compared to studies by Tchente et al. (31 %, n=100) in Douala and Ndoua et al. (62 %, n=150) in Yaoundé. This could be explained by the fact that 50,8 % (156) of the patients had been diagnosed for less than a year and the treatment protocol had not yet progressed to radiotherapy.

V.5. PREVALENCE OF FEMALE SEXUAL DYSFUNCTION

The prevalence of sexual dysfunction was 72,3 % (222) in our study, which is comparable to studies by; Shandiz et al. with 67 % (n=100) with a similar mean age of 45,20±8,63 years in Iran [84], Gambardella et al. with 69 % (n=122) in Italy [85] and Ooi et al. with a prevalence of 73,4 % (n=94) in Malaysia [86]. Garg et al. found a higher value of 85,6 % in a study in India [87].

Harirchi et al. in Iran observed a significant deterioration in sexual function in patients before and after treatment at 52 % and 84 % respectively (n=216) [88]. Cobo-Cuenca et al in Spain compared sexual function before and after breast cancer with 32,1 % before and 91,2 % after breast cancer(n=512) with a similar mean age of 46,34 ± 8,276 years [89]. We did not have a control group in our study, but Halle et al. in Buea reported a prevalence of sexual dysfunction of 42 % (n=405) in the general population. So, it is safe to say that the value in our study is relevant.

V.6. FACTORS ASSOCIATED WITH FEMALE SEXUAL DYSFUNCTION

our study revealed significant associations between various factors and female sexual dysfunction. We found a negative association with clinical stage at diagnosis (X^2 (3, N=307) =167,21, p<0,0001), SBR grading (X^2 (2, N=307) =15,19, p=0,001), current chemotherapy (X^2 (1, N=307) =73,53, p<0,0001) , current hormone therapy (X^2 (1, N=307) =8,11, p=0,004), and partner's level of distress (X^2 (3, N=307) =228,18, p<0,0001), while a positive association was observed with conservative surgery (X^2 (1, N=307) =22,78, p<0,0001) and frequency of sexual intercourse (X^2 (3, N=307) =223,55, p<0,0001).

Cobo-Cuenca et al. in their study reported that women who had the most sexual dysfunction were those who received chemotherapy, radiotherapy and hormonal therapy (p < 0,001). M. Lee et al. confirmed that chemo-induced menopause was a significant risk factor for sexual dysfunction [72]. Haris et al. found a prevalence of 63,7 % (135) in breast cancer patients receiving chemotherapy [73]; these results are consistent with the findings in our study. Ooi et al.[86] found an association between sexual dysfunction and family history of breast cancer (P

= 0,040) and duration of marriage (P = 0,046), which was not present in our study, but frequency of sexual intercourse (P = 0,002) was significantly associated with sexual dysfunction in breast cancer patients, which was present in our study (p value<0,0001).

Shandiz et al. reported age as the only significantly associated factor (p-value<0,001), which was not observed in our study. We did not find an association between mastectomy and sexual dysfunction, in contrast to Cobo-Cuenca et al [71], Raggio et al [74] and Garg et al (p value<0,002) [69] who found a significant association between mastectomy and sexual dysfunction. Kuehn et al. found an association between menopause and sexual dysfunction (p < 0,0001) [75], which was not significant in our study (p value<0,981).

All cancer therapies have the potential to substantially affect sexual function, which is a serious and unresolved problem for breast cancer patients. Breast cancer treatment, which includes surgery, radiotherapy, chemotherapy, hormone therapy and immunotherapy, can cause physical sexual dysfunction, such as vaginal lubrication problems, pains, reduced nipple sensation and decreased libido as a result of treatment-induced menopause[90].

Sexuality is also strongly influenced by psychological, relational and cultural factors that are often overlooked[68]. Psychological sexual disorders, such as body image problems and physical unattractiveness, can affect sexual function regardless of treatment[91]. Sexual dysfunction has been shown to have a significant impact on the wellbeing of patients and their partners[68].

These changes in sexuality in breast cancer patients are associated with feelings of fear, uncertainty, depression, anxiety, self-blame, rejection, despair, anger and lack of sexual satisfaction[27]. On the other hand, changes in sexual function in partners have been linked to the effects of breast cancer treatment, which makes the patient less attractive (e.g., scarring, hair loss, disfigurement), to caregiver exhaustion, and to seeing the person with cancer as a patient rather than a sexual partner[92]. Attention to the patient-partner relationship is important because being in an intimate relationship with affectionate behaviour and emotional closeness is associated with better psychosocial outcomes and adjustment to the disease in both cancer patients and partners[68].

Cultural norms in our setting encourage silence about issues related to sexuality, which may discourage patients from seeking help or initiating discussions with healthcare providers[27]. There is also a lack of communication about the impact of breast cancer treatment on sexuality by healthcare providers, as shown in our study. Inadequate training, lack of time, and discomfort around the topic of sexuality all acted as barriers to communication[27]. These unresolved

sexual difficulties may be seen by patients as collateral damage of treatment. It is therefore essential that communication about possible sexual problems is included in the health care package for the comprehensive management of breast cancer.

Our study clearly shows that breast cancer has a negative impact on sexuality and its causes are multifactorial. It is therefore important for health care providers to integrate a bio-psycho-social approach to breast cancer management.

V.7. PARTNERS PERSPECTIVE

A large proportion of partners (63,2 %) in our study reported a decrease in the quality of their relationship when the breast cancer diagnosis was confirmed; 84,7 % had moderate to severe concerns about their partner's health, which persisted in 57,3 % of partners even after the start of breast cancer treatment. We found that 68,1 % of partners had sexual intercourse less than three times a month, and 67,1 % had new complaints about intimacy and sexuality. When asked to rate their level of distress on a scale of 0 to 10, partners reported a mean score of 4,14±2,89, with 61,6 % scoring 5 or higher. Of those who reported new complaints, 62,9 % found it difficult to cope with changes in intimacy and sexuality.

It is widely reported in literature that partners of breast cancer patients often experience negative changes in their relationship and sexuality[92–94]. Hawkins et al. found negative effects in 87 % and cessation or reduction in frequency of sex and intimacy in 79 % of men[95]. Nakaya et al. found that men whose partners had breast cancer had an increased risk of being hospitalised with an affective disorder (HR 1,39, CI 1,20-1,67), with a dose-response pattern to the severity of the breast cancer[96]. In our study, 85 % of partners would have liked to receive professional help with sexual complaints related to breast cancer and its treatment.

The women in our study expressed a strong desire for support from their partners. However, partners may face challenges in providing this support due to their own distress or lack of knowledge about how to be the kind of supportive person the patient needs. In addition, patients' needs tend to evolve over time, further complicating the support needed. As a result, many women feel abandoned by their partners while coping with cancer. This shows that partners play an important role in the adjustment of breast cancer patients. In line with our understanding of sexuality as a multidimensional construct, couple-based interventions may be an effective way to reduce psychological distress.

V.8. INFORMATION ABOUT INTIMACY AND SEXUALITY

Our study found that 71,7 % of patients believed that the diagnosis of breast cancer had a negative impact on their relationship with their partner, and 81,76 % of patients reported that they had not discussed possible effects of breast cancer treatment on sexuality with their healthcare provider, 87,3 % of patients wanted their partner to be present during this discussion, and 82,1 % would have liked to receive professional help with sexual complaints related to breast cancer and its management. Our results are consistent with previous literature confirming that sexuality is not routinely discussed by healthcare providers [97]. In a study by Ussher et al[98], 85 % of participants reported changes in sexual wellbeing after breast cancer, 68 % wanted information about these changes and only 41 % had received such information. However, the reported need for information found by Albers et al.[68] with 24,9 % was lower than our results. This could be explained by the fact that the study was conducted in the Netherlands, where patients had access to information through breast cancer associations, brochures (84,4 %) and the internet (35,5 %), with only 27,2 % receiving information from healthcare professionals.

Most male participants (93,8%) in our study needed information about the impact of breast cancer and its treatment on intimacy and sexuality. Only 21,8 % received information, of which 70,1 % from a health professional and 29,9 % from other sources (internet, leaflets). A study by Den Ouden et al.[15] showed that the preferred method of communication was a discussion with a professional together with the partner (51,6 %) and respondents emphasised the importance of appropriate timing of information, preferably at least shortly after starting treatment (45,1 %).

Mireskandari et al.[99] emphasised the importance of healthcare providers involving partners in discussions, stating that partners who did not receive accurate information were more distressed than partners who felt informed. Reese et al.[92] reported that a lack of communication about the topic can lead to problems with coping and conflict between couples. Partners should be involved in discussions to prepare them for possible changes in their partner's body and to provide them with effective information. this will help them to develop effective coping strategies and to better support their partner, leading to improved psychological and emotional well-being in couples.

Recognising the communication needs of patients and their partners could lead to a significant improvement in the care of patients undergoing treatment. Therefore, discussions about the impact of breast cancer and its treatment on sexuality should be an integral part of the care plan.

V.9. STUDY LIMITATIONS

This study had several limitations. Firstly, it was a cross-sectional descriptive study, the couples were not followed over time throughout the breast cancer treatment, and there was no control group to compare the data with the general population. Secondly, the study was carried out in only two hospitals, so the results cannot be generalised to the whole population. Thirdly, the sexual function of the couple before breast cancer was not assessed. Fourthly, there may be a recall bias because some information had to be reported from memory. Finally, due to our cultural environment, the topic of sexuality is perceived as sensitive and causes discomfort, which may have led to information bias.

CONCLUSION

In conclusion, the findings of this study highlight the significant impact of breast cancer on the sexuality and intimacy of the couple. The high frequency of sexual dysfunction, reported by 72,3 % of patients, underscores the need for greater attention to this aspect of care in breast cancer management. The negative association observed between clinical stage at diagnosis, SBR grading, current chemotherapy, current hormone therapy, and partner's distress level, as well as the positive association with conservative surgery and frequency of sexual intercourse, emphasizes the effects of different treatment protocols on the couples' sex lives. The study also reveals the substantial emotional strain experienced by partners, with a large proportion reporting a decrease in relationship quality, moderate to severe concerns about their partner's health, and persistent distress even after the start of treatment. Furthermore, the lack of communication regarding the potential effects of breast cancer treatment on sexuality, as indicated by the high percentage of patients who had not discussed this with their healthcare provider, underlines the need for improved support and information provision in this area. Overall, the study highlights the importance of addressing sexual dysfunction and the emotional impact of breast cancer on both patients and their partners and emphasises the need for comprehensive support services and open communication within healthcare facilities.

RECOMMENDATIONS

Based on the findings and conclusions of this study, we make the following recommendations to:

The Ministry of Public Health

- Conception and implementation of a sexual health programme targeting breast cancer survivors.

Faculty of Medicine and Biomedical Sciences/UY1

- Sexual health should be emphasised in training curriculum.

Health structures and clinicians

- Training of health professional on a holistic approach of breast cancer management.
- Sexual health should be routinely discussed alongside the potential effects of cancer treatment, to enable constructive conversations between patients and healthcare providers.
- Partners should be involved in discussions to prepare them for possible changes in sexuality due to breast cancer and its management.
- Referral to a specialist (psychologist, sexologist) should be tailored to individual needs.

Couples

- To seek help when faced with sexual dysfunction.

Further research

- Prospective study on impact of breast cancer on sexuality.

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APPENDICES

APPENDIX I: ETHICAL CLEARANCE

REPUBLIQUE DU CAMEROUN
Paix-Travail-Patrie
MINISTERE DE LA SANTE PUBLIQUE
HOPITAL GYNECO-OBSTETRIQUE ET PEDIATRIQUE DE YAOUNDE
HUMILITE – INTEGRITE – VERITE – SERVICE

REPUBLIC OF CAMEROON
Peace-Work-Fatherland
MINISTRY OF PUBLIC HEALTH
YAOUNDE GYNAECO-OBSTETRIC AND PEDIATRIC HOSPITAL
HUMILITY – INTEGRITY – TRUTH – SERVICE

COMITE INSTITUTIONNEL D'ETHIQUE DE LA RECHERCHE POUR LA SANTE HUMAINE (CIERSH)

Arrêté n° 0977 du MINSANTE du 18 avril 2012 portant création et organisation des Comités d'Ethiques de la Recherche pour la santé Humaines. (CERSH).

AUTORISATION N° 673 /CIERSH/DM/2024

CLAIRANCE ETHIQUE

Le Comité Institutionnel d'Ethique de la Recherche pour la Santé Humaine (CIERSH) a examiné le 26 mars 2024, la demande d'autorisation et le Protocole de recherche intitulé « **the impact of breast cancer on sexuality and perspective of the partner** » soumis par l'étudiant MOHAMMED AWAL SULE.

Le sujet est digne d'intérêt. Les objectifs sont bien définis. La procédure de recherche proposée ne comporte aucune méthode invasive préjudiciable aux participants. Le formulaire de consentement éclairé est présent et la confidentialité des données est préservée. Pour les raisons qui précèdent, le CIERSH de HGOPY donne son accord pour la mise en œuvre de la présente recherche.

MOHAMMED AWAL SULE devra se conformer au règlement en vigueur à HGOPY et déposer obligatoirement une copie de leurs travaux à la Direction Médicale de ladite formation sanitaire.

Yaoundé, le 08 AVR 2024

LE PRESIDENT

Prof MBU Robinson
Directeur Général
HGOPY

N°1827 ; Rue 1564 ; Ngousso ; Yaoundé 5ème
BP : 4362 Tél. : 242 05 92 94 / 222 21 21 24 33 / 222 21 24 31 Fax : 222 21 24 30
E-mail : hgopy@hotmail.com / hgopy@hgopy.cm

APPENDIX II: ADMINISTRATIVE AUTHORIZATION

REPUBLIQUE DU CAMEROUN
Paix - Travail - Patrie
MINISTERE DE LA SANTE PUBLIQUE
HOPITAL GENERAL DE YAOUNDE
DIRECTION GENERALE
BP 5408 YAOUNDÉ - CAMEROUN
TÉL : (237) 22 21 31 81 FAX : (237) 22 21 20 15

REPUBLIC OF CAMEROON
Peace - Work - Fatherland
MINISTRY OF PUBLIC HEALTH
YAOUNDE GENERAL HOSPITAL
GENERAL MANAGEMENT DEPARTMENT

N/Réf. : 351 - 24 /HGY/DG/DPM/APM-TR.

Yaoundé, le 19 AVR 2024

Le Directeur Général

A/TO

Docteur MOHAMMED AWAL SULE
Résident en 4ème année Gynécologie-Obstétrique
Tél : (237) 693 117 193 Mle : 20S1745
FMSB-YAOUNDE

Objet/subject :
V/Demande d'autorisation de recherches.

Docteur,

Faisant suite à votre courrier du 11 mars 2024 dont l'objet est porté en marge,

Nous avons l'honneur de marquer un avis favorable pour que vous effectuiez vos travaux de recherches au SERVICE GYNECOLOGIE-OBSTETRIQUE dans le cadre de votre étude dont le thème porte sur : « L'IMPACT DU CANCER DU SEIN SUR LA SEXUALITE ET LA VISION DU PARTENAIRE ».

Cette étude sera sous la supervision du Professeur KEMFANG, Gynécologue-obstétricien.

Vous observerez le règlement intérieur de l'établissement pendant la durée des recherches. Toutefois, les éventuelles publications à l'issue de ce travail devraient inclure les médecins de l'Hôpital Général de Yaoundé.

Recevez, Docteur, nos salutations distinguées. /-

HOPITAL GENERAL YAOUNDE H.G.Y Le Directeur Général Adjoint YAOUNDE GENERAL HOSPITAL

Le Directeur Général,

Prof. EYENGA Victor

Copies :
- DPM
- Chef service Gynécologie-obstétrique
- Archives/chrono.

APPENDIX III: INFORMED CONSENT

FORMULAIRE DE CONSENTEMENT ECLAIRE

Identification du projet de recherche : l'impact du cancer du sein sur la sexualité et la vision du partenaire

- Investigateur principal: MOHAMMED AWAL SULE
- Numéro d'autorisation du Comité National d'Ethique :

Je soussignée

Monsieur/Mme/Mlle……

Accepte librement et volontairement de participer à l'investigation médicale intitulée :

« L'impact du cancer du sein sur la sexualité et la vision du partenaire »

Étant entendu que l'investigateur m'a informé et a répondu à toutes mes questions, l'investigateur m'a précisé que ma participation est libre, et que mon droit de retrait de cette recherche peut se faire à tout moment, ceci sans me porter aucun préjudice.

J'accepte que les données enregistrées à l'occasion de cette recherche puissent faire l'objet d'un traitement informatisé. Je pourrais exercer mon droit de rectification et d'opposition auprès de cette même investigateur.

Fait à ……... le…. /…….. /2024

Signature de l'investigateur Signature de la participant(e)

APPENDIX IV: QUESTIONNNAIRE

Date: ---/---/---

PATIENT'S SECTION			
SECTION I: SOCIO-DEMOGRAPHICAL PROFILE			
Number	Question	Code	Response
S1Q1	Form number		
S1Q2	Hospital	HGOPY 2. HGY	
S1Q3	Age of participant		
S1Q4	Ethnicity		
S1Q5	Educational level	1.None 2. Primary 3. Secondary 4. Tertiary	
S1Q6	Marital status	1. Single 2. Married 3. Divorced 4. Widowed 5. Cohabiting	
S1Q7	Religion	1.Christian 2. Muslim 3. Others (specify): ----------	
S1Q8	Employment status	1. Unemployed 2. Self-employed 3. Employed 4. Retired	
S1Q9	Monthly income	1. < 100000 2. 100000-200000 3. >200000	
SECTION II: MEDICAL HISTORY AND BREAST CANCER MANAGEMENT			
S2Q1	Number of children		
S2Q2	Age of last childbirth		
S2Q3	History of breastfeeding (age and duration)	AGE: DURATION:	
S2Q4	Menarche		
S2Q5	Menopause	YES 2. NO	
S2Q6	Use of hormonal contraception	1.YES 2. NO. If yes, duration:	
S2Q7	Family history of breast cancer	YES 2. NO. If yes Relative:	
S2Q8	BMI(Weight(kg)/Height (m))	-------/---------	
S2Q9	Duration of diagnosis of breast cancer		
S2Q10	Grading SBR	1.I 2. II 3. III	
S2Q11	Histological type		
S2Q12	Molecular classification		
S2Q13	Stage of breast cancer when initially diagnosed	Stage I Stage II Stage III Stage IV	
S2Q14	Previous Chemotherapy	1.YES 2. NO. If yes, how long ago:	
S2Q15	Previous Radiotherapy	1.YES 2. NO. If yes, how long ago:	
S2Q16	Previous Hormonal therapy	1.YES 2. NO. If yes, how long ago:	
S2Q17	Current Chemotherapy	1.YES 2. NO. If yes, Started on:	
S2Q18	Current Radiotherapy	1.YES 2. NO. If yes, Started on:	
S2Q19	Current Hormonal therapy	1.YES 2. NO. If yes, Started on:	
S2Q20	Medical illness beside breast cancer	1.YES 2. NO. If yes, Started on:	
S2Q21	Mastectomy	1.YES 2. NO. If yes, how long ago:	
S2Q22	Conservative surgery	1.YES 2. NO. If yes, how long ago:	
SECTION III: SEXUAL FUNCTION (Female Sexual Function Index questionnaire)			
Sexual desire or interest is a feeling that includes wanting to have a sexual experience, feeling receptive to a partner's sexual initiation, and thinking or fantasizing about having sex.			
S3Q1	Over the past 4 weeks, how often did you feel sexual desire or interest?	1. Almost always or always 2. Most times (more than half the time) 3. Sometimes (about half the time)	

		4. A few times (less than half the time) 5. Almost never or never	
S3Q2	Over the past 4 weeks, how would you rate your level (degree) of sexual desire or interest?	1. Very high 2. High 3. Moderate 4. Low 5. Very low or none	
Sexual arousal is a feeling that includes both physical and mental aspects of sexual excitement. It may include feelings of warmth or tingling in the genitals, lubrication (wetness), or muscle contractions.			
S3Q3	Over the past 4 weeks, how often did you feel sexually aroused ("turned on") during sexual activity or intercourse?	0. No sexual activity 1. Almost always or always 2. Most times (more than half the time) 3. Sometimes (about half the time) 4. A few times (less than half the time) 5. Almost never or never	
S3Q4	Over the past 4 weeks, how would you rate your level of sexual arousal ("turn on") during sexual activity or intercourse?	0. No sexual activity 1. Very high 2. High 3. Moderate 4. Low 5. Very low or none	
S3Q5	Over the past 4 weeks, how confident were you about becoming sexually aroused during sexual activity or intercourse?	0. No sexual activity 1. Very high confidence 2. High confidence 3. Moderate confidence 4. Low confidence 5. Very low or no confidence	
S3Q6	Over the past 4 weeks, how often have you been satisfied with your arousal (excitement) during sexual activity or intercourse?	0. No sexual activity 1. Almost always or always 2. Most times (more than half the time) 3. Sometimes (about half the time) 4. A few times (less than half the time) 5. Almost never or never	
S3Q7	Over the past 4 weeks, how often did you become lubricated ("wet") during sexual activity or intercourse?	0. No sexual activity 1. Almost always or always 2. Most times (more than half the time) 3. Sometimes (about half the time) 4. A few times (less than half the time) 5. Almost never or never	
S3Q8	Over the past 4 weeks, how difficult was it to become lubricated ("wet") during sexual activity or intercourse?	0. No sexual activity 1. Extremely difficult or impossible 2. Very difficult 3. Difficult 4. Slightly difficult 5. Not difficult	
S3Q9	Over the past 4 weeks, how often did you maintain your lubrication ("wetness") until completion of sexual activity or intercourse?	0. No sexual activity 1. Almost always or always 2. Most times (more than half the time) 3. Sometimes (about half the time) 4. A few times (less than half the time) 5. Almost never or never	
S3Q10	Over the past 4 weeks, how difficult was it to maintain your lubrication	0. No sexual activity 1. Extremely difficult or impossible 2. Very difficult	

	("wetness") until completion of sexual activity or intercourse?	3. Difficult 4. Slightly difficult 5. Not difficult	
S3Q11	Over the past 4 weeks, when you had sexual stimulation or intercourse, how often did you reach orgasm (climax)?	0. No sexual activity 1. Almost always or always 2. Most times (more than half the time) 3. Sometimes (about half the time) 4. A few times (less than half the time) 5. Almost never or never	
S3Q12	Over the past 4 weeks, when you had sexual stimulation or intercourse, how difficult was it for you to reach orgasm (climax)?	0. No sexual activity 1. Extremely difficult or impossible 2. Very difficult 3. Difficult 4. Slightly difficult 5. Not difficult	
S3Q13	Over the past 4 weeks, how satisfied were you with your ability to reach orgasm (climax) during sexual activity or intercourse?	0. No sexual activity 1. Very satisfied 2. Moderately satisfied 3. About equally satisfied and dissatisfied 4. Moderately dissatisfied 5. Very dissatisfied	
S3Q14	Over the past 4 weeks, how satisfied have you been with the amount of emotional closeness during sexual activity between you and your partner?	0. No sexual activity 1. Very satisfied 2. Moderately satisfied 3. About equally satisfied and dissatisfied 4. Moderately dissatisfied 5. Very dissatisfied	
S3Q15	Over the past 4 weeks, how satisfied have you been with your sexual relationship with your partner?	1. Very satisfied 2. Moderately satisfied 3. About equally satisfied and dissatisfied 4. Moderately dissatisfied 5. Very dissatisfied	
S3Q16	Over the past 4 weeks, how satisfied have you been with your overall sexual life?	1. Very satisfied 2. Moderately satisfied 3. About equally satisfied and dissatisfied 4. Moderately dissatisfied 5. Very dissatisfied	
S3Q17	Over the past 4 weeks, how often did you experience discomfort or pain **during** vaginal penetration?	0. Did not attempt intercourse 1. Almost always or always 2. Most times (more than half the time) 3. Sometimes (about half the time) 4. A few times (less than half the time) 5. Almost never or never	
S3Q18	Over the past 4 weeks, how often did you experience discomfort or pain **following** vaginal penetration?	0. Did not attempt intercourse 1. Almost always or always 2. Most times (more than half the time) 3. Sometimes (about half the time) 4. A few times (less than half the time) 5. Almost never or never	
S3Q19	Over the past 4 weeks, how would you rate your level (degree) of discomfort or pain **during or following** vaginal penetration?	0. Did not attempt intercourse 1. Very high 2. High 3. Moderate 4. Low 5. Very low or none	
SECTION IV: QUESTIONS ABOUT YOUR RELATIONSHIP			

S4Q1	Did the diagnosis of breast cancer have an impact on the quality of the relationship with your partner?	1. Yes, the quality increased 2. Yes, the quality declined 3. Yes, my relationship is broken 4. No, the quality didn't change	
S4Q2	Did body changes because of the breast cancer treatment have an impact on the quality of the relationship with your partner?	1. Yes, the quality increased 2. Yes, the quality declined 3. Yes, my relationship is broken 4. No, the quality didn't change 5. No, my body didn't change	
S4Q3	Did new complaints on intimacy or sexuality have an impact on the quality of the relationship with your partner?	1. No impact 2. Negative impact 3. Positive impact 6. Inapplicable, I don't have any complaints	
S4Q4	Did you discuss possible effects of the breast cancer treatment on intimacy and sexuality with your partner?	1. Yes 2. No, but I would have liked to discuss it 3. No, no need to	
S4Q5	Is it important to you that your partner is present when discussing the subject intimacy and sexuality with a health care professional?	1. YES 2. NO	
S4Q6	Would you have liked to receive professional help with complaints on intimacy or sexuality?	1. YES 2. NO 3. Inapplicable, I don't have any complaints	
SECTION V: INFORMATION ABOUT INTIMACY AND SEXUALITY			
S5Q1	Who should, according to you, initiate the discussing about intimacy and sexuality?	1. Me 2. My partner 4. Health professional	
S5Q2	Statement: Every breast cancer patient should be offered a conversation about intimacy and sexuality before treatment.	1. Agree 2. Disagree 5. I don't know	

PARTNERS SECTION

EVALUATION OF PARTNERS PERCEPTION

SECTION I: PARTNERS PROFILE			
S1Q1	Age of Partner (years)		
S1Q2	Ethnicity		
S1Q3	Religion	1.Christain 2. Muslim 3. Others(specify): _____	
S1Q4	Educational Level	1.None 2. Primary 3. Secondary 4. Tertiary	
S1Q5	Employment status	1. Unemployed 2. Self-employed 3. Employed 4. Retired	
S1Q6	Monthly income	< 100000 2. 100000-200000 3. >200000	
S1Q7	Duration relationship(years)		
S1Q8	Partner with medical illness	YES 2. NO	
S1Q9	Frequency of sexual intercourse	Less than once per month 1–2 times per month 1–2 times per week 3–4 times per week More than 4 times per week	
SECTION II: PERCEPTION ON DIAGNOSIS AND TREATMENT			
S2Q1	To what extent were you concerned about your partner's health when you heard the diagnosis of breast cancer?	1. No concerns 2. Some concerns 3. Many concerns	

		4. Grave concerns	
S2Q2	Have your concerns changes after treatment?	1. Yes, my concerns are increased 2. Yes, my concerns are declined 3. No, my concerns didn't change 4. No, I had no concerns	
S2Q3	Did the diagnosis of breast cancer have an impact on the quality of the relationship with your partner?	1. Yes, the quality increased 2. Yes, the quality declined 3. Yes, my relationship is broken 4. No, the quality didn't change	
S2Q4	Did body changes because of the breast cancer treatment have an impact on the quality of the relationship with your partner?	1. Yes, the quality increased 2. Yes, the quality declined 3. Yes, my relationship is broken 4. No, the quality didn't change 5. No, my partner's body didn't change	
SECTION III: EXPERIENCE ABOUT INTIMACY AND SEXUALITY AFTER DISEASE			
S3Q1	Did you discuss possible effects of the breast cancer treatment on intimacy and sexuality with your partner?	1. Yes 2. No, but I would have liked to discuss it 3. No, no need to	
S3Q2	Did you experience complaints in intimacy or sexuality before the diagnosis of breast cancer?	1. YES 2. NO	
S3Q3	Did new complaints on intimacy or sexuality have an impact on the quality of the relationship with your partner?	1. No impact 2. Negative impact 3. Positive impact 4. Inapplicable, I don't have any complaints	
S3Q4	On a scale of 0 to 10, in which amount did you suffer from these complaints? 0 means no suffering, 10 means a lot of suffering	Grade: _____	
S3Q5	To what extent did you find it difficult to handle changes in intimacy and sexuality within your relationship?	1. No difficulties 2. A little difficult 3. Difficult 4. Very difficult	
SECTION IV: INFORMATION ABOUT INTIMACY AND SEXUALITY			
S4Q1	Did you need information about possible intimacy or sexuality complaints due to breast cancer and treatment?	1. YES 2. NO	
S4Q2	Did you at some point receive any information about intimacy and sexuality and possible complaints due to treatment of your partner?	1. YES 2. NO	
S4Q3	At what stage did you receive the information about intimacy and sexuality? (multiple answers possible)	1. At the same time as the diagnosis of breast cancer 2. During treatment 3. At the end of all treatments 4. Other: _____	
S4Q4	Who gave you the information about intimacy and sexuality?	1. Health professional 2. Others_____	
S4Q5	At which moment, during treatment, would you prefer to receive information about intimacy and sexuality? (multiple answers possible)	1. At the same time as the diagnosis of breast cancer 2. During treatment 3. At the end of all treatments 4. Other: _____	

SECTION V: DISCUSSION ON INTIMACY AND SEXUALITY WITH A HEALTH CARE PROFESSIONAL			
S5Q1	Is it important to you that you are present when the subject intimacy and sexuality is discussed by a health care professional?	1. YES 2. NO	
S5Q2	Would you have liked to receive professional help with complaints on intimacy or sexuality?	1. YES 2. NO 3. Inapplicable, I don't have any complaints	
SECTION VI: QUESTIONS ABOUT YOUR RELATIONSHIP			
S6Q1	How would your partner support you with possible complaints in intimacy and sexuality? (multiple answers possible)	1. By exerting as little pressure as possible on sexuality 2. To talk about sexuality 3. To reassure me when a sexual contact attempt fails 4. By not losing intimacy 5. To be involved as much as possible with my sexual complaints 6. By discovering intimacy and sexuality in another way I don't know 7. Inapplicable, I don't have any complaints 8. Other: _____	
S6Q2	How do you plan to support your partner with possible complaints in intimacy and sexuality? (multiple answers possible)	1. To talk about sexuality 2. By not losing intimacy 3. To involve my partner as much as possible by my sexual complaints 4. By discovering intimacy and sexuality in another way 5. Inapplicable, I don't have any complaints 6. I don't know 7. Other: _____	