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Theme :

A Survey on Breast Cancer Awareness Amongst Women in Annaba Region: A Prospective Study

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والحمد لله الذي وفقني وأعانني ومنحني القوة والصبر لإتمام هذا العمل.

إلى والديّ العزيزين :
إلى من كانا دائمًا مصدر الأمان والقوة، وإلى من قدّما لي الحب والدعم دون حدود.
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List of figures :

- Figure 1: structure of the breast ----------3
- Figure 2: Lymphatic drainage of the female breast: ----------6
- Figure3 : Major molecular subtypes of Breast Cancer ----------10
- Figure 4: invasive breast cancer. ---------- 12
- Figure 5: Inflammatory breast cancer ----------14
- Figure 6: Paget's disease of the breast ----------14
- Figure 7: Breast cancer staging ----------16
- Figure 8: Imaging Modalities ----------19
- Figure 9: Types of surgical treatment ----------22
- Figure 10: Breast cancer radiotherapy **----------25**
- Figure 11. Distribution of participants according to age In Annaba state34
- Figure 12: Distribution of participants according to marital status In Annaba state ----------44
- Figure 13 : Distribution of Participants According to Level of Education In Annaba state ----------45
- Figure 14: Distribution of the Study Participants According to Monthly Income In Annaba state. ----------46
- Figure 15: Distribution of the Study Participants According to Residence In Annaba state ----------47
- Figure 16: Distribution of the Study Participants According to Their Awareness of Breast Cancer Warning Signs In Annaba state --------- 48
- Figure 17: Distribution of the Study Participants According to Visiting a Doctor After Noticing a Change in the Breast In Annaba state-----49
- Figure 18: Distribution of the Study Participants According to the Time of Visiting a Doctor After Noticing a Breast Change In Annaba state--50

- Figure 19 : Distribution of the Study Participants According to Their Perception of the Age Group Most Likely to Be Diagnosed with Cancer In Annaba state ----------51
- Figure 20: Distribution of the Study Participants According to Invitation to Participate in a Breast Cancer Screening Program In Annaba state ---52
- Figure 21: Distribution of the Study Participants According to Previous Participation in a Breast Cancer Screening Program In Annaba state -53
- Figure 22. Distribution of the Study Participants According to Their Perception of Breast Cancer Risk Factors In Annaba state ----------55
- Figure 23. Distribution of Participants According to Age in EL Tarf state ----------56
- Figure 24: Distribution of Participants According to Marital Status in EL Tarf stat ----------57
- Figure 25: Distribution of Participants According to Level of Education EL Tarf State ----------58
- Figure 26. Distribution of the Study Participants According to Monthly Income In EL Tarf State ----------59
- Figure 27: Distribution of the Study Participants According to Residence In EL Tarf State ---------- 60
- Figure 28: Table 6. Distribution of the Study Participants According to Their Awareness of Breast Cancer Warning Signs In EL Tarf State ---61
- Figure 29: Distribution of the Study Participants According to Visiting a Doctor After Noticing a Change in the Breast In EL Tarf State ----- 63
- Figure 30 : Distribution of the Study Participants According to the Time of Visiting a Doctor After Noticing a Breast Change In EL Tarf State -- - ----------64

- Figure 31 : Distribution of the Study Participants According to Their Perception of the Age Group Most Likely to Be Diagnosed with Cancer In EL Tarf State ----------65
- Figure 32: Distribution of the Study Participants According to Invitation to Participate in a Breast Cancer Screening Program In EL Tarf State ---------- 66
- Figure 33: Distribution of the Study Participants According to Previous Participation in a Breast Cancer Screening Program In EL Tarf State ---------- 67
- Figure 34: Distribution of the Study Participants According to Their Perception of Breast Cancer Risk Factors In EL Tarf State.----------96

List of tables :

- Table 1. Distribution of Participants According to Age in Annaba state ---------- 43
- Table 2. Distribution of Participants According to Marital Status In Annaba state ---------- 44
- Table 3. Distribution of Participants According to Level of Education In Annaba state ---------- 45
- Table 4. Distribution of the Study Participants According to Monthly Income In Annaba state ----------46
- Table 5. Distribution of the Study Participants According to Residence In Annaba state ---------- 47
- Table 6. Distribution of the Study Participants According to Their Awareness of Breast Cancer Warning Signs In Annaba state --------- 48
- Table 7. Distribution of the Study Participants According to Visiting a Doctor After Noticing a Change in the Breast In Annaba state -------- 49
- Table 8. Distribution of the Study Participants According to the Time of Visiting a Doctor After Noticing a Breast Change In Annaba state----50
- Table 9. Distribution of the Study Participants According to Their Perception of the Age Group Most Likely to Be Diagnosed with Cancer In Annaba state ----------51
- Table 10. Distribution of the Study Participants According to Invitation to Participate in a Breast Cancer Screening Program In Annaba state ---52
- Table 11. Distribution of the Study Participants According to Previous Participation in a Breast Cancer Screening Program In Annaba state --53
- Table 12. Distribution of the Study Participants According to Their Perception of Breast Cancer Risk Factors In Annaba state --------- 54

- Table 13. Distribution of Participants According to Age in EL Tarf state ---------- 56
- Table 14. Distribution of Participants According to Marital Status in EL Tarf state ----------57
- Table 15. Distribution of Participants According to Level of Education EL Tarf State ----------58
- Table 16. Distribution of the Study Participants According to Monthly IncomeIn EL Tarf State ----------59
- Table 17. Distribution of the Study Participants According to Residence In EL Tarf State ----------60
- Table 18. Distribution of the Study Participants According to Their Awareness of Breast Cancer Warning Signs In EL Tarf State ------ 61
- Table 19. Distribution of the Study Participants According to Visiting a Doctor After Noticing a Change in the Breast In EL Tarf State --- 63
- Table 20. Distribution of the Study Participants According to the Time of Visiting a Doctor After Noticing a Breast Change In EL Tarf State - 64
- Table 21: Distribution of the Study Participants According to Their Perception of the Age Group Most Likely to Be Diagnosed with Cancer In EL Tarf State ---------- 65
- Table 22. Distribution of the Study Participants According to Invitation to Participate in a Breast Cancer Screening Program In EL Tarf State --- 66
- Table 23. Distribution of the Study Participants According to Previous Participation in a Breast Cancer Screening Program In EL Tarf State -- 67
- Table 24. Distribution of the Study Participants According to Their Perception of Breast Cancer Risk Factors In EL Tarf State ---- 68

TABLE OF CONTENTS

Thanks

List of abbreviations

List of figures

List of tables

Theory part :

I. Introduction ----------2

1.1 Background ---------- 1

1.2 Breast cancer definition ---------- 2

II. Anatomy Of The Breast ----------2

2.1 Structure Of The Breast.

2-1-1- Skin---------- 3

2-1-2- The sroma ----------3

2-1-3 -Fatty stroma---------- 3

2-1-4- Parenchyma ---------- 3

2.2 Arterial supply: ---------- 4

2.3Lymphatic drainage of the female breast: ---------- 5

III. Conceptual Framework: Deconstructing "Awareness"---------6

IV. Role of awareness and early detection of breast cancer ---------7

V. The Clinical Pathway of Breast Cancer ----------8

5-1- Pathogenesis of breast cancer. ---------- 8

5-2 -Genetic alterations---------- 8

5-3-Hormonal influences. ---------- 9

5-4-Environmental and lifestyle factors ---------- 10

VI. Types of breast cancer----------11

6-1-Non-invasive breast cancer ---------- **11**

6-2-Invasive breast cancer ---------- **12**

6-3-Medullary carcinoma: ---------- **13**

6-4-Mucinous carcinoma: ---------- **13**

6-5-Tubular carcinoma: ---------- **13**

6-6-Inflammatory breast cancer---------- **14**

6-7-Paget's disease of the breast ---------- **14**

VII. Risk Factors and Etiology ----------15

VIII. Breast cancer staging. ----------16

8-1-Tumor (T) Classification. ---------- **17**

8-2- Regional Lymph Node (N) Classification ---------- **18**

8-3-Distant Metastasis (M) Classification ---------- **18**

IX. Breast Cancer Diagnosis: A Comprehensive Overview----------18

9-1- History and physical examination. ---------- **18**

9-2-Imaging Modalities ---------- **19**

9-2-1-Mammography ---------- **20**

9-2-2- Breast Ultrasound ---------- **20**

9-2-3-Magnetic Resonance Imaging (MRI) ---------- **20**

9-2-4-Positron Emission Tomography (PET)/CT ---------- **20**

9-3- Tissue Sampling and Histopathology ---------- **20**

9-3- 1-Fine Needle Aspiration Cytology (FNAC). ---------- **20**

9-3- 2-Excisional Biopsy---------- **21**

9-3-3- Histopathology assesses. ---------- **21**

X. Treatment Strategy for Breast Cancer ----------22

10-1-Local Therapies ----------**23**

10-1-1-Surgery: ----------**24**

10-1- 2-Radiation Therapy. ----------**25**

10-2- Systemic Therapies. ----------**26**

10-2- 1- Chemotherapy . ----------26

10-2- 2-Endocrine (Hormone) Therapy: . ----------26

10-2-3-mmunotherapy. . ----------27

XI.Epidemiology ----------28

11-1- Global and Regional Studies on Breast Cancer Awareness ----------28

11-2-High-income countries (Europe & North America): synthesis of successful awareness strategies----------29

11-2-1-Organised screening with population registers and invitation systems ----29

11-2-2-Multi-channel, sustained public communication. ----------29

11-2-3-Reducing financial and logistical barriers ----------29

11-2-4- Integration with primary care and quality assurance. ----------29

11-3- Middle-income countries and North African / MENA context: comparative, critical review ----------30

11-3-1- Common regional challenges. ----------30

11-4-The Algerian evidence base — systematic-style summary and synthesis (published + grey literature, until 2025) ----------31

11-4-1-Synthesis of Algerian evidence and priority research gaps. ----------31

11 -4-2-Culturally Adapted Awareness Intervention in Algeria. ----------32

12.Mortality. ----------33

PRACTICAL PART

I. OBJECTIVES ----------35

II. PATIENTS AND METHODS ----------36

III. RESULTS ----------43

IV. DISCSSION----------70

V. CONCLUSION ----------81

Theoretical Part

1. Introduction

1.1 Background

Breast cancer incidence is high in developed regions and low but increasing in developing regions; mortality rates are less variable due to better survival in developed regions , with incidence rising globally and mortality decreasing in high-risk countries due to early detection and treatment advances.

Breast cancer is the most commonly diagnosed cancer worldwide , with over 2.3 million new cases and 685,000 deaths in 2020 , and it is expected to increase to over 3 million new cases and 1 million deaths by 2040 due to population growth and

A new analysis by the International Agency for Research on Cancer (IARC) and collaborators evaluates the latest and future burden of female breast cancer globally, with a detailed analysis in about 50 countries with high-quality population-level cancer data. Published today in *Nature Medicine*, the study finds that on average, 1 in 20 women worldwide will be diagnosed with breast cancer in their lifetime, and that if current rates continue, by 2050 there will be 3.2 million new breast cancer cases and 1.1 million breast cancer-related deaths per year.

In 2022, Africa reported an estimated 198.3 thousand new breast cancer cases and 91.3 thousand deaths , Algeria had the highest ASIR (61.9/100,000) . ASMR increased with age, surged in individuals over 70 in Africa. Chad had the earliest ASIR peak age at 40-49 years (40.3/100,000) and earliest ASMR peak age at 50-59 years (24.1/100,000). A positive correlation was observed between HDI and incidence rates. [1],[2],[3], [4],[5]

1.2 Breast cancer definition :

Cancer, in general, is characterized by the uncontrolled growth and division of cells. Genetically, it is defined as a progressive series of genetic events occurring within a single clone of cells due to alterations in a limited number of specific genes, including proto-oncogenes and tumor suppressor genes. Breast cancer is a malignant tumor that develops from the cells of the breast. It primarily refers to carcinomas arising from the ductal and lobular epithelial structures of the breast.[6],[7]

2. Anatomy Of The Breast

The breast is a specialized glandular organ composed of lobes, lobules, ducts, fibrous connective tissue, and adipose tissue. It is primarily supplied by branches of the internal thoracic, lateral thoracic, and intercostal arteries. Lymphatic drainage occurs mainly through the axillary lymph nodes, with additional drainage to the internal mammary and supraclavicular lymph nodes. Understanding the breast anatomy, vascular supply, and lymphatic drainage is essential for the diagnosis and management of breast diseases, particularly breast cancer.



Figure 1: structure of the breast:

2.1 Structure Of The Breast

The Breast includes the skin, parenchyma and stroma.

2-1-1- Skin: covers the gland and fascia.

a) Nipple

conical projection from just below the centre of the breast , Lies in the 4th intercostal space

Contains

a. Circular smooth muscle erect the nipple.

b. Longitudinal smooth muscle flatten the nipple.

- Carries the opening of lactiferous ducts (15-20 openings).

b) Areola:

- Pigmented area of skin that surrounds the base of the nipple.

- It is rich in modified sebaceous gland particularly at the outer margin.

These become enlarged during pregnancy and lactation to form raised tubercles "tubercles

of Montgomery" oily secretin, of these glands as of great importance to lubricate the nipple and areola and prevents them from cracking during lactation

-Fat is absent under the areola and nipple and both have no hair.

2-1-2- The stroma : The gland has no capsule. It has a stroma which is divided into

1) Fibrous stroma

-Forms fibrous septa known as suspensory ligaments of Cooper.

- The septa divide the gland into 15-20 lobules.

-The sepla anchor the skin and the gland to the pectoral fascia.

2-1-3 -Fatty stroma:

- Forms the main bulk of the gland , The gland is embedded into it

- It is responsible of the smooth contour of the breast.

2-1-4- Parenchyma (mammary gland):

- Consists of the glandular tissue which secretes milk.

- The glandular tissue is divided into 15-20 lobules

- Each lobule has a lactiferous duct.

The lactiferous duct dilates under the areola to form to lactiferous sinus then become narrow again to open on the summit of the nipple.

2.2 Arterial supply:

1) The medial part.

a) Perforating branches of the internal mammary artery

b) Anterior intercostal arteries from 2-6

2) The upper lateral part

Pectoral branch of the thoraco acromial artery. (branch of axillary artery).

3) The lower lateral part:

Lateral thoracic artery (branch of axillary artery).

Venous drainage :

1) The subcutaneous tissues venous circle at the base

2) The gland and stroma small veins that accompany the arteries internal mammary and posterior intercostal and axillary veins

2.3 Lymphatic drainage of the female breast:

- **axillary or lateral pathway**
  - dominant pathway (receives >75% of lymph from breasts)
  - drains all quadrants of the breast, with higher proportion of drainage from lateral quadrants, especially the upper outer quadrant
  - drains directly or via Sappey's plexus to axillary nodes
  - either runs around inferior border of pectoralis major to reach the pectoral group of lymph nodes or pass directly to the subscapular group
  - few channels from superior breast to the apical group sometimes interrupted by the infraclavicular group of lymph nodes
- **internal mammary pathway**
  - drains all quadrants of the breast, with higher proportion of drainage from medial quadrants, especially the lower inner quadrant
  - passes through the intercostal spaces and pectoralis major into parasternal/internal mammary lymph nodes
  - connections may lead across the median plane and hence to the contralateral breast
- **retromammary pathway**
  - comes from the deeper portion of the breast
  - contributes to a minor pathway relative to the others
  - drains to the subclavicular plexus.

[8],[9],[10],[11],[12],[13]

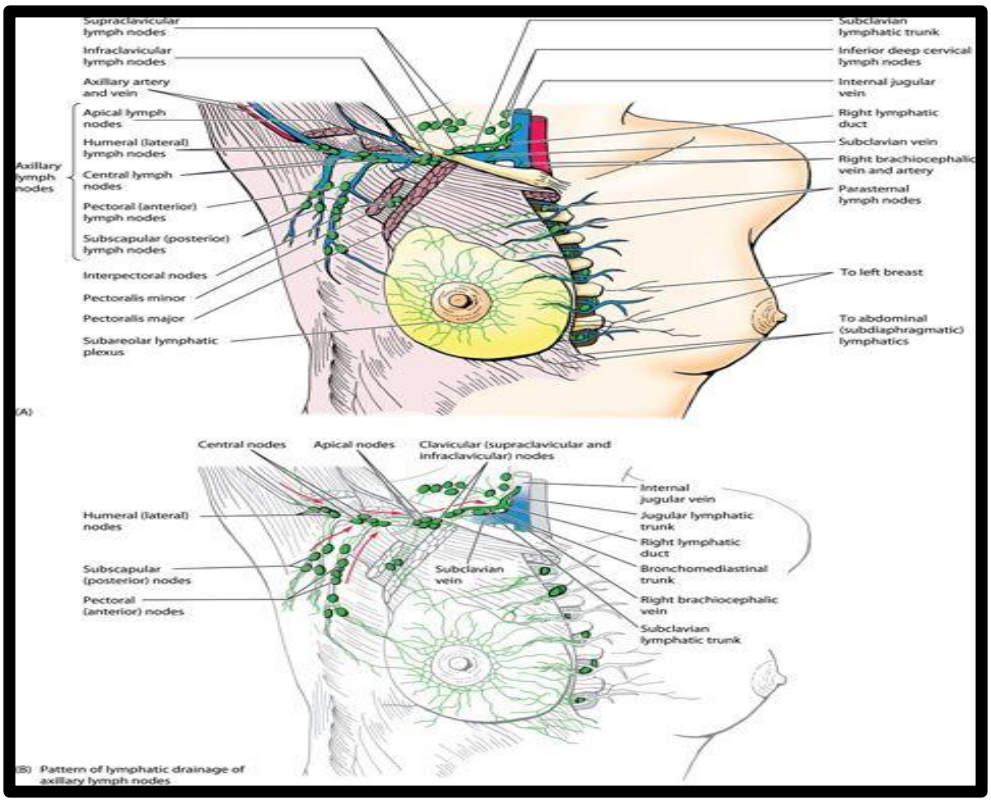


Figure 2: Lymphatic drainage of the female breast:

3. Conceptual Framework: Deconstructing "Awareness":

Breast cancer awareness is a widespread public health and social movement aimed at reducing the burden of breast cancer through education, promotion of early detection, and fundraising. At its core, it seeks to inform the public about the disease, its risk factors, and its symptoms, while strongly advocating for regular screening methods like mammograms to find cancer at its earliest, most treatable stages. Symbolized globally by the pink ribbon, this movement has been instrumental in transforming breast cancer from a taboo subject into a topic of open conversation, building a powerful sense of community and solidarity among patients, survivors, and supporters . [14],[15]

4.Role of awareness and early detection of breast cancer

Awareness and early detection play a crucial role in reducing breast cancer mortality. Public knowledge about risk factors, signs, and symptoms of breast cancer, such as lumps, nipple discharge, or skin changes, encourages women to perform regular self-breast examinations and seek clinical evaluation prompty [16] . Screening methods, including mammography, ultrasound, and clinical breast examination, enable detection of tumors at an early stage, often before they are palpable, which significantly improves prognosis and survival rates . Early detection not only allows less aggressive treatment but also reduces morbidity and mortality. Countries with organized screening programs have observed declining breast cancer mortality, whereas low- and middle-income regions often face late-stage presentations due to limited awareness and lack of screening, leading to higher mortality (World Health Organization, 2021). Health education campaigns and accessible screening programs are therefore essential to enhance early diagnosis and improve outcomes globally ,[17],[18] .

october is recognized as The Breast Cancer Awareness Month when international campaigns are organized to raise research and development funds, enable patient support groups and more importantly encourage women to know the facts about their leading cause of cancer death [19],[20] .



Initiated in 1985, the program's main objective is encouraging regular breast examination and mammography for screening of breast cancer. Studies show that the movement has been successful in promoting detection of breast cancer at earlier stages. Interestingly, it has been shown that during October, search trends for the term "breast cancer" across all Google domains significantly increased, indicating more concern and attention among the public and maybe among health professionals, as well. This success can be attributed both to the specific events during the campaign and to cumulative increases in public awareness and the following behavioral changes. The majority of breast cancer deaths occur in low-and middle-income countries, where awareness is limited and delayed admission is common.[21],[22]

5. The Clinical Pathway of Breast Cancer

5-1- Pathogenesis of breast cancer

Breast cancer develops through the accumulation of genetic and epigenetic alterations in the epithelial cells lining the terminal duct-lobular unit (TDLU) of the breast. These alterations disrupt the normal regulation of cell proliferation, apoptosis, and DNA repair, allowing abnormal cells to survive, proliferate, and gradually acquire malignant characteristics. Breast carcinogenesis is a multistep process that progresses from normal epithelium to hyperplasia, atypical hyperplasia, carcinoma in situ, and finally invasive carcinoma**.** **[**23],[24]

5-2 -Genetic alterations

The molecular pathogenesis of breast cancer involves activation of oncogenes together with inactivation of tumor suppressor genes. Amplification of the HER2 (ERBB2) oncogene occurs in approximately 15–20% of invasive breast cancers and promotes uncontrolled cell proliferation. Mutations in TP53, PIK3CA, and loss of function of BRCA1 and BRCA2 impair DNA repair mechanisms and contribute to genomic instability. **[**23],[24]

These mutations were confirmed to be experimentally associated with estrogen exposure [25]. It was recommended that deformity in the growth factors signaling can assist growth of malignant cells. Over expression of leptinin breast adipose tissue enhances proliferation of cell and cancer [26]. These are numerous growth factors signaling and other factors that interrelate between epithelial cells and stromal cells. Interruption in these might result in development of breast cancer. In cancer cells, enzyme telomerase turns away the chromosomal shortening and allows the extensive replication of cells [27]. Tumor cells get their nutrients and oxygen supply by angiogenesis [28]. Cancer cells break their boundaries and can enter into the blood, lymphatic tissues and other tissues of the body to produce a secondary tumor [29]

5-3-Hormonal influences

Estrogen plays a central role in breast carcinogenesis by stimulating proliferation of mammary epithelial cells. Prolonged exposure to endogenous or exogenous estrogens increases the number of cell divisions, thereby increasing the likelihood of DNA replication errors and mutations. Consequently, conditions such as early menarche, late menopause, nulliparity, and hormone replacement therapy are associated with an increased risk of breast cancer.

. [24],[25]

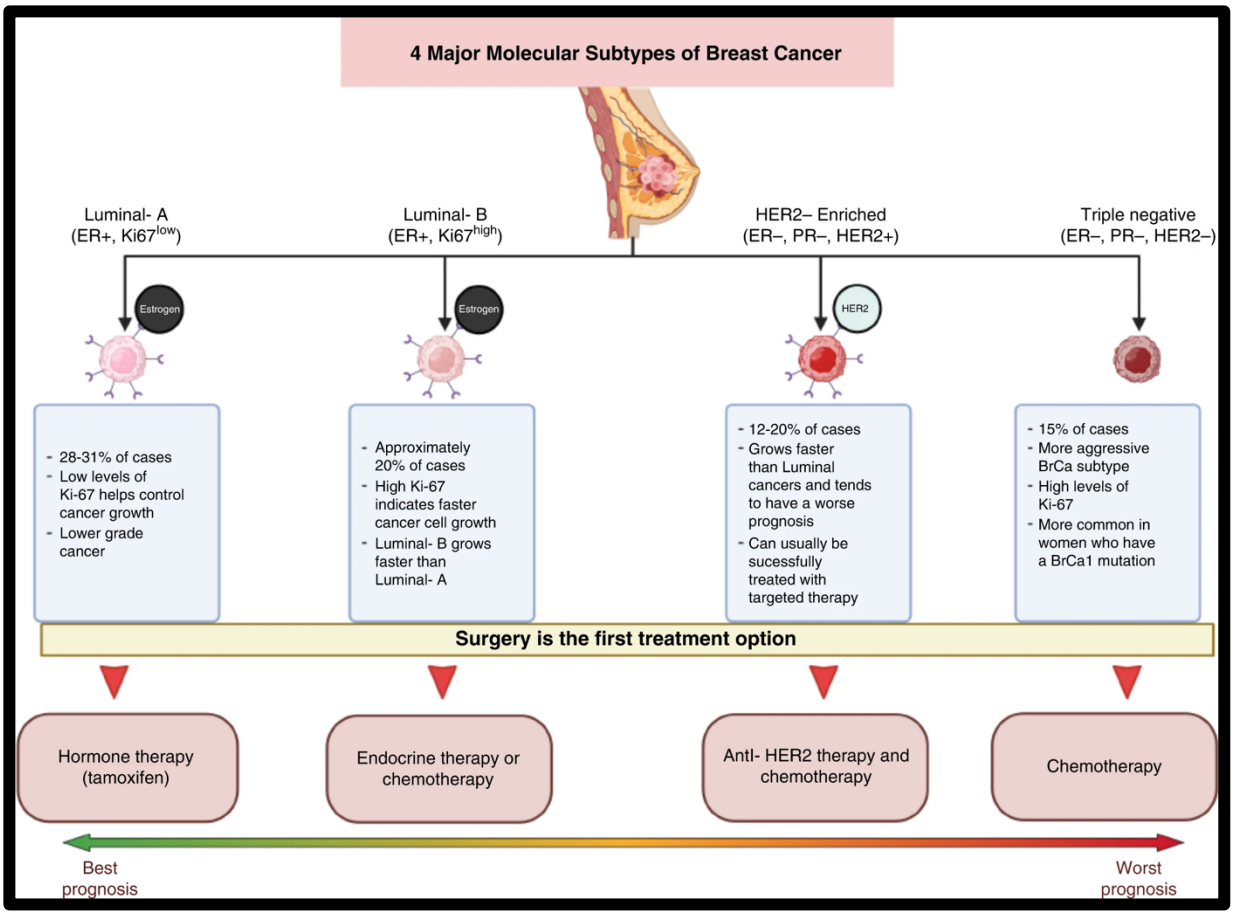


Figure3 : Major molecular subtypes of Breast Cancer

5-4-Environmental and lifestyle factors

Environmental and lifestyle factors interact with genetic susceptibility to influence breast cancer development. Exposure to ionizing radiation, obesity after menopause, alcohol consumption, and physical inactivity increase breast cancer risk through mechanisms involving hormonal imbalance, oxidative stress, chronic inflammation, and DNA damage. However, these factors generally act by promoting tumor development rather than initiating it independently. **.** [24],[23]

6. Types of breast cancer

6-1-Non-invasive breast cancer

Non-invasive breast cancer, also known as **carcinoma in situ**, is characterized by the proliferation of malignant epithelial cells that remain confined within the breast ducts or lobules without penetrating the basement membrane or invading the surrounding stromal tissue. Because the malignant cells have not acquired invasive properties, non-invasive breast cancer does not metastasize to regional lymph nodes or distant organs. Nevertheless, if left untreated, certain lesions may progress to invasive breast carcinoma over time.[36]

Non-invasive breast cancer is classified into two main pathological types: **Ductal Carcinoma in Situ (DCIS)** and **Lobular Carcinoma in Situ (LCIS)**. DCIS is the most common form and originates from the epithelial lining of the mammary ducts. It is considered a direct precursor of invasive ductal carcinoma if not appropriately treated. In contrast, LCIS arises from the lobular epithelium and is regarded primarily as a marker of increased bilateral breast cancer risk rather than an obligate precursor of invasive carcinoma. .[36],[30]
Most patients with non-invasive breast cancer are asymptomatic, and the disease is frequently detected during routine screening mammography. Radiologically, DCIS commonly presents as clusters of microcalcifications, whereas LCIS is often an incidental histopathological finding because it usually does not produce characteristic clinical or radiographic abnormalities [37] ,[30]

The prognosis of non-invasive breast cancer is generally excellent when diagnosed early. Treatment options depend on the pathological subtype, tumor size, grade, and patient-related factors. Breast-conserving surgery followed by radiotherapy is commonly recommended for DCIS, while endocrine therapy may be considered for hormone receptor-positive disease. In selected patients with LCIS, careful surveillance or risk-reducing strategies may be appropriate because LCIS primarily indicates an increased future risk of invasive breast cancer rather than representing an invasive malignancy itself. [38] ,[30]

6-2-Invasive breast cancer

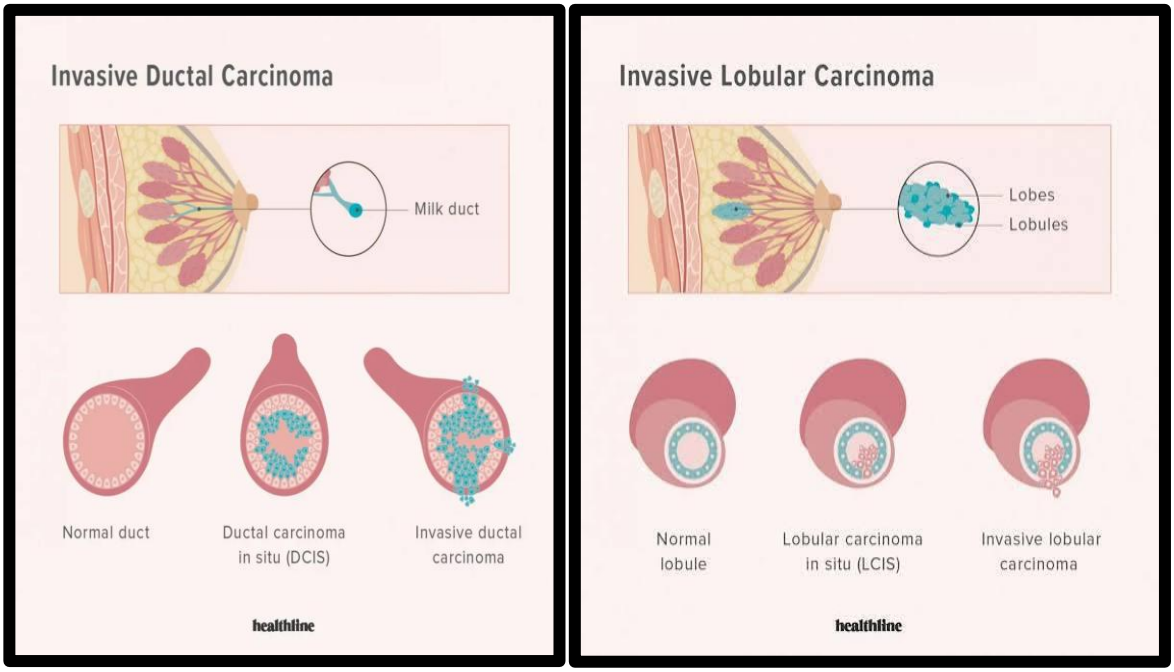


Figure 4: invasive breast cancer

invasive breast carcinoma is a malignant epithelial neoplasm characterized by the pathological breach of the basement membrane, allowing neoplastic cells to infiltrate the adjacent breast stroma with subsequent potential for lymphatic and hematogenous dissemination [39]. Histologically, Invasive Ductal Carcinoma (IDC), representing approximately 70–80% of all cases, is the most prevalent subtype [40], whereas Invasive Lobular Carcinoma (ILC) accounts for 5–15% and exhibits a distinctive single-file infiltration pattern driven by E-cadherin dysfunction [41]. The clinical behavior and therapeutic stratification of IBC are fundamentally dictated by the tumor's immunohistochemical profile, specifically the expression of Estrogen Receptor (ER), Progesterone Receptor (PR), Human Epidermal Growth Factor Receptor 2 (HER2), and the Ki-67 proliferation index, which collectively define the intrinsic molecular subtypes (Luminal A, Luminal B, HER2-enriched, and Basal-like/Triple-Negative) that guide neoadjuvant, adjuvant, and metastatic treatment algorithms [42]. Despite advancements in early detection via screening mammography, up to 20–30% of patients with localized disease may experience distant recurrence, underscoring the biological heterogeneity of

the disease [43]. This prognostic variability has led to the integration of genomic assays—such as Oncotype DX and MammaPrint—which have been validated in prospective trials to refine risk stratification and optimize chemotherapy de-escalation for node-negative, hormone-receptor-positive tumors [44],[45] .Contemporary management adopts a multidisciplinary paradigm encompassing surgery (breast-conserving therapy or mastectomy with sentinel lymph node biopsy), radiation therapy, and systemic therapies (endocrine therapy, anti-HER2 targeted agents, and cytotoxic chemotherapy) [46]. In high-risk subsets, achieving pathological complete response (pCR) following neoadjuvant systemic therapy is a well-validated surrogate endpoint strongly associated with improved event-free and overall survival, as demonstrated in the CTNeoBC pooled analysis of over 12,000 patients [47].

6-3-Medullary carcinoma:

Medullary carcinoma is an invasive breast cancer that designs a discrete margin normal tissue and medullary tissue
[48] .

6-4- Mucinous carcinoma:

It is recognized as *colloid carcinoma*, mutinous carcinoma is a uncommon breast cancer created by the mucus-forming cancer cells. Females with mutinous carcinoma usually have an improved prediction than females with additional general kinds of invasive carcinoma .. [49]

6-5-Tubular carcinoma:

tubular carcinoma is an invasive breast carcinoma composed almost entirely of well-formed tubules with low-grade cytologic features and an excellent prognosis. [50]

6-6-Inflammatory breast cancer:

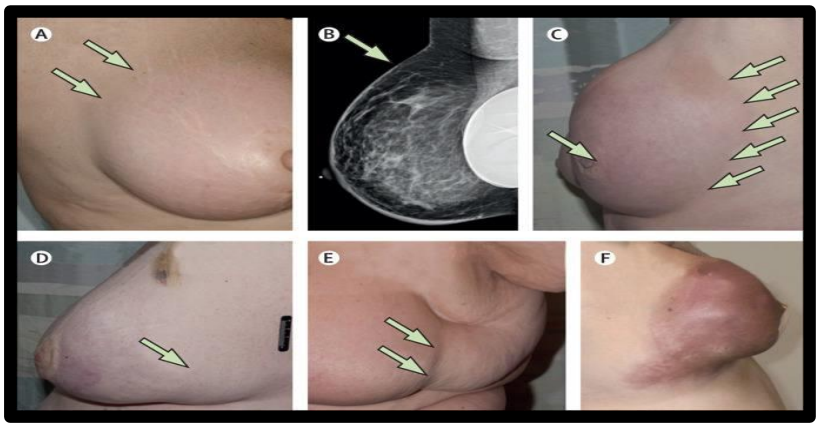


Figure 5: Inflammatory breast cancer

Inflammatory breast cancer is the form of swollen breasts (red and warm) with dimples and/or broad ridges due to cancer cells blocking lymph vessels or channels in the skin over the breast. Though inflammatory breast cancer is uncommon and is tremendously fast-growing . [51]

6-7-Paget's disease of the breast :



Figure 6: Paget's disease of the breast

paget's disease of the breast is an uncommon type of breast cancer that usually presents with visible changes involving the nipple of the breast [52]. Its symptoms include red, itchy rashes affecting the nipple, which may sometimes spread to the surrounding areolar skin. Although it resembles other skin conditions such as eczema and psoriasis, it can be differentiated because these conditions usually affect both breasts and often begin in the areola rather than

the nipple. In contrast, Paget's disease of the breast most commonly affects only one breast and typically starts in the nipple before extending to the areola.

Paget's disease accounts for approximately 1–3% of all breast cancers and can occur in both men and women. The exact pathogenesis of Paget's disease remains unclear; however, several theories have been proposed to explain its development. Warning signs include bleeding or oozing nipple discharge, nipple flattening or inversion, and the presence of a palpable breast lump. Diagnosis can be confirmed by punch biopsy of the affected nipple. The prognosis is generally favorable when the disease is confined to the nipple or the lactiferous ducts and is not associated with invasive carcinoma [53]

7. Risk Factors and Etiology

Age is one of the strongest risk factors for breast cancer, with incidence increasing markedly after the age of 50 years. Female sex is the most important demographic risk factor because breast tissue is highly responsive to hormonal stimulation, particularly estrogen and progesterone. Prolonged lifetime exposure to estrogen, including early menarche, late menopause, nulliparity, and late age at first full-term pregnancy, increases the cumulative risk of breast cancer by extending the duration of hormonal stimulation of mammary epithelial cells[30]

Reproductive factors also influence breast cancer risk. Women who experience their first full-term pregnancy at a younger age generally have a lower lifetime risk than women who delay childbirth or remain nulliparous. In addition, prolonged breastfeeding has been shown to reduce breast cancer risk by decreasing cumulative exposure to estrogen and promoting differentiation of breast epithelial cells.[31],[32],[33]

Lifestyle and environmental factors contribute significantly to breast cancer development. Obesity, particularly after menopause, increases circulating estrogen levels through aromatization in adipose tissue. Alcohol consumption, physical inactivity, ionizing radiation exposure, and unhealthy dietary patterns have also been associated with an increased risk of breast cancer. Conversely, maintaining a healthy body weight and engaging in regular physical activity are associated with a reduced risk.[34],[35]

Women with a first-degree relative affected by breast cancer have approximately twice the risk of developing the disease compared with women without a family history. The risk increases further when multiple relatives are affected, when breast cancer occurs at a young age, or when bilateral breast cancer is present. A previous personal history of breast cancer also substantially increases the risk of developing a second primary breast cancer. . [24],[23]

8. Breast cancer staging:

Breast cancer staging is a fundamental step in clinical oncology that describes the extent of cancer in the body. Accurate staging guides treatment planning, helps predict prognosis, and allows consistent communication among healthcare providers. The most widely used system is the TNM staging system developed by the American Joint Committee on Cancer (AJCC) and the Union for International Cancer Control (UICC). This system categorizes breast cancer based on: [54]

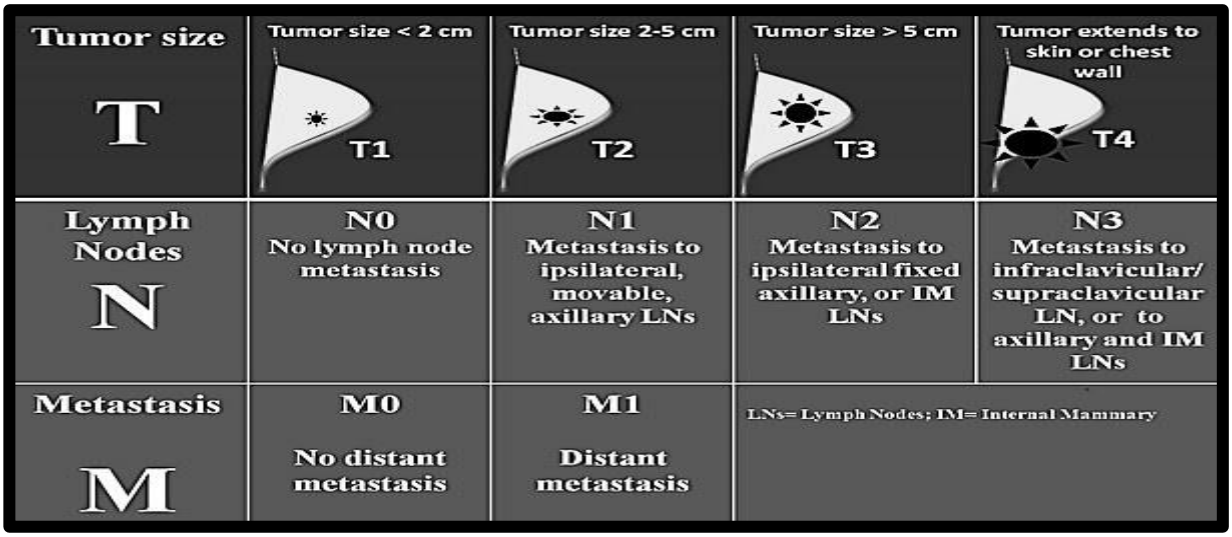


Figure 7: Breast cancer staging

a) T (Tumor size and local extension)

b) N (Regional lymph node involvement)

C) M (Presence or absence of distant metastasis)

8-1-Tumor (T) Classification

The tumor size and extent are crucial in determining the T category:

TX: Tumor cannot be assessed.

T0: No evidence of primary tumor.

Tis (Carcinoma in situ): Non-invasive cancers limited to ducts or lobules, such as ductal carcinoma in situ (DCIS) or lobular carcinoma in situ (LCIS).

T1: Tumor ≤ 2 cm in greatest dimension. Subdivided into:

T1mi: Microinvasion ≤ 1 mm.

T1a: >1 mm to ≤5 mm.

T1b: >5 mm to ≤10 mm.

T1c: >10 mm to ≤20 mm.

T2: Tumor > 2 cm but ≤ 5 cm.

T3: Tumor > 5 cm.

T4: Tumor of any size with direct extension to chest wall and/or skin. Subcategories include:

T4a: Extension to chest wall.

T4b: Ulceration or skin nodules.

T4c: Both chest wall and skin involvement.

T4d: Inflammatory carcinoma.

8-2- Regional Lymph Node (N) Classification

NX: Regional lymph nodes cannot be assessed.

N0: No regional lymph node metastasis.

N1: Metastases to movable ipsilateral level I or II axillary lymph nodes.

N2: Metastases to fixed or matted ipsilateral level I or II axillary nodes or internal mammary lymph nodes without axillary involvement.

N3: Metastases to infraclavicular (level III axillary) nodes, or to ipsilateral internal mammary and axillary nodes, or to supraclavicular nodes.

The status of lymph nodes remains one of the strongest predictors of recurrence and survival.

8-3-Distant Metastasis (M) Classification:

M0: No distant metastasis.
M1: Distant metastasis present, including spread to bones, lungs, liver, brain, or other organs.

9. Breast Cancer Diagnosis: A Comprehensive Overview:

The diagnosis of breast cancer is a multi-step process that integrates clinical evaluation, imaging studies, tissue sampling, histopathology, and molecular biomarker analysis. Early and accurate detection is essential for improving prognosis, guiding treatment decisions, and enabling personalized care. [38]

9-1- History and physical examination:

Diagnosis typically begins with a detailed patient history and physical examination,
The clinical history of patients with breast cancer is aimed at investigating cancer threat and demonstrating the occurrence or lack of manifestations indicative of breast illness [55].
It must comprise age at menarche, menopausal condition, earlier pregnancies and utilization of hormone replacement therapy after menopause or utilization of oral contraceptives.
Personal history as well as family history should be carried out in detail. Personal history

includes age at diagnosis of breast cancer, previous breast biopsies and treatment of other cancer with use of radiations. Family history includes history of ovarian cancers and breast cancer in first degree relatives. Patents should be examined for particular manifestations such as breast pain, weight loss, pain in bone, tiredness and nipple discharge [56].

Clinicians assess for :

- Palpable lumps, asymmetry, skin changes (such as dimpling or erythema), nipple retraction, or abnormal discharge.
- Risk factors including family history, especially first-degree relatives with breast cancer, genetic predisposition (e.g., BRCA1/2, TP53 mutations), hormonal exposure (endogenous estrogen, oral contraceptives, or hormone replacement therapy), reproductive history, age, and lifestyle factors.

Physical examination helps determine lesion characteristics such as size, mobility, location, and regional lymph node involvement, particularly in axillary, supraclavicular, or internal mammary chains .[57]

9-2-Imaging Modalities:

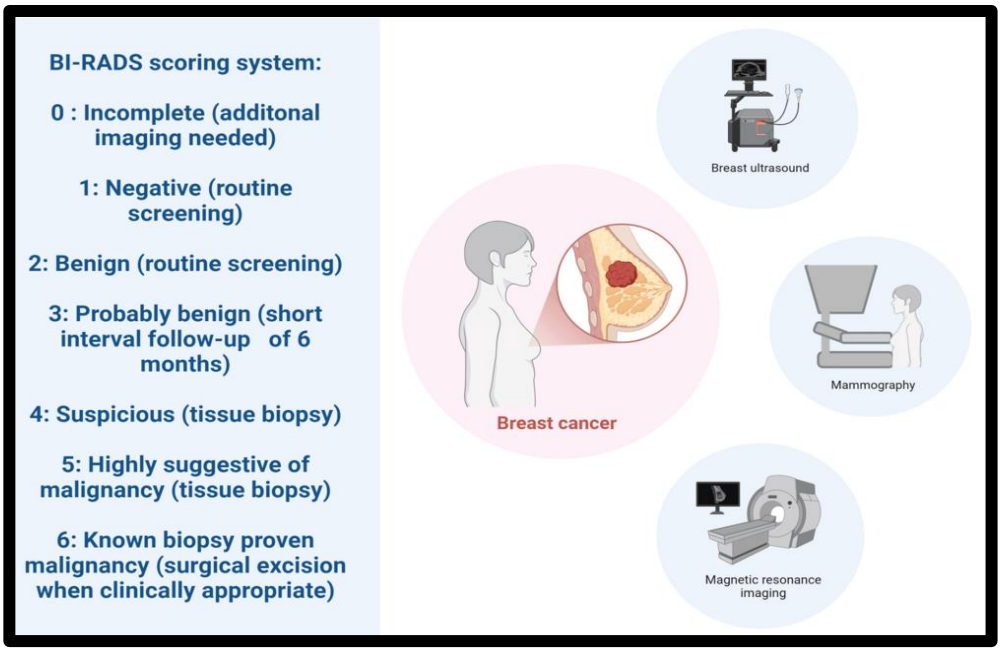


Figure 8: Imaging Modalities

Mulxtiple imaging techniques are used to detect and characterize breast lesions:

9-2-1-Mammography

- The primary screening tool, especially in women over 40.
- Detects masses, microcalcifications, and architectural distortions.

Digital mammography and digital breast tomosynthesis (3D mammography) increase sensitivity, particularly in dense breast tissue. .[58]

9-2-2- Breast Ultrasound

- Complements mammography by distinguishing cystic vs. solid lesions.

Particularly useful in younger women with dense breasts or for guiding core needle biopsies. .[59]

9-2-3-Magnetic Resonance Imaging (MRI)

- High sensitivity for detecting multifocal, multicentric, or bilateral disease.

Recommended for high-risk patients (e.g., BRCA mutation carriers) and preoperative evaluation of tumor extent. .[60]

9-2-4-Positron Emission Tomography (PET)/CT

In expressions of radiation quantity, PET/CT is also comparatively secure and utilizes positron emitting radionuclides including oxygen-15, flouoride-18 and carbon-11. The frequently utilized tracer in positron emission tomography is a radioactive type of glucose such as [18F]fluoro-2-deoxy-D-glucose. Tissues with enhanced metabolic requirements including developing cancer cells, demonstrate increased uptake of the tracer and displays on the scan. With combination of CT and PET, significant information regarding numerous situations affecting the different organs of the body is simply mapped. PET/CT is extremely perceptive and precise for predicating occult and different areas of loco-regional lymph nodal extent and/or far-away metastases not obvious by regular imaging, therefore altering staging in up to 25% of the patients. This procedure is employed for the management planning by describing spread of primary illness. It is also employed in re-staging after management ailment relapse and treatment follow up [61].

9-3- Tissue Sampling and Histopathology:

Definitive diagnosis relies on obtaining tissue for histopathological evaluation:

9-3- 1-Fine Needle Aspiration Cytology (FNAC)

- Quick, minimally invasive, and provides cytological information.
- Limited in assessing tumor architecture and invasive components. [62]

- Core Needle Biopsy (CNB)
- Standard method for tissue sampling.
- Provides sufficient material for histology, immunohistochemistry, and molecular tests.
- Often performed under ultrasound or stereotactic guidance.[62]

9-3- 2-Excisional Biopsy

If the abnormal vicinity is too minute to be biopsied by another procedure or the biopsy outcome is not apparent, a surgical biopsy is carried out. Prior to the biopsy, a guide wire may be placed into the breast to assist the medical doctor locate the abnormal tissue. Local anesthetic can be used and the physician may use MRI, ultrasound and mammogram to direct the wire into position. The biopsy is after that carried out under a general anesthetic. Little area close to breast tissue and lump are detached, alongside the wire [63,64].

9-3-3- Histopathology assesses:

Histopathological examination is the gold standard for confirming the diagnosis of breast cancer and provides essential prognostic and therapeutic information. It determines the histological subtype of the tumor (e.g., invasive ductal carcinoma, invasive lobular carcinoma, mucinous carcinoma, and medullary carcinoma), evaluates the histological grade according to the Nottingham grading system, assesses lymphovascular invasion, measures tumor size, and examines surgical margins. Histopathological analysis also serves as the basis for immunohistochemical assessment of predictive biomarkers, including estrogen receptor (ER), progesterone receptor (PR), human epidermal growth factor receptor 2 (HER2), and Ki-67, which are critical for treatment planning and prognosis. [65], [66]

3.5 Biomarkers and Molecular Analysis:

Biomarker assessment is an integral component of breast cancer diagnosis and management, providing essential prognostic and predictive information that guides personalized treatment strategies. Immunohistochemical (IHC) analysis is routinely performed on tumor tissue to determine the expression of estrogen receptor (ER), progesterone receptor (PR), and human epidermal growth factor receptor 2 (HER2). [66]

Hormone receptor-positive tumors are likely to respond to endocrine therapy, whereas HER2 overexpression or gene amplification identifies patients who may benefit from HER2-targeted therapies such as trastuzumab. In addition, the Ki-67 proliferation index is commonly used to estimate tumor proliferative activity and biological aggressiveness. [67]

Molecular testing may further identify genomic alterations, including PIK3CA and TP53 mutations, as well as circulating tumor DNA (ctDNA), which can provide prognostic information, predict therapeutic response, and facilitate disease monitoring. Germline genetic testing for susceptibility genes such as BRCA1, BRCA2, PALB2, and TP53 is recommended for selected patients with early-onset disease or a strong family history of breast cancer. Although serum tumor markers such as CA 15-3 and CA 27.29 may be useful for monitoring treatment response and detecting recurrence in patients with advanced breast cancer, they are not recommended for routine screening or primary diagnosis because of their limited sensitivity and specificity. [68]

10.Treatment Strategy for Breast Cancer

Breast cancer treatment is individualized according to the tumor stage, biological characteristics, and the patient's overall health. A multidisciplinary approach combining surgery, radiotherapy, systemic therapies, and supportive care is essential to achieve optimal outcomes, improve survival, and maintain quality of life.

10-1-Local Therapies

10-1-1-Surgery:

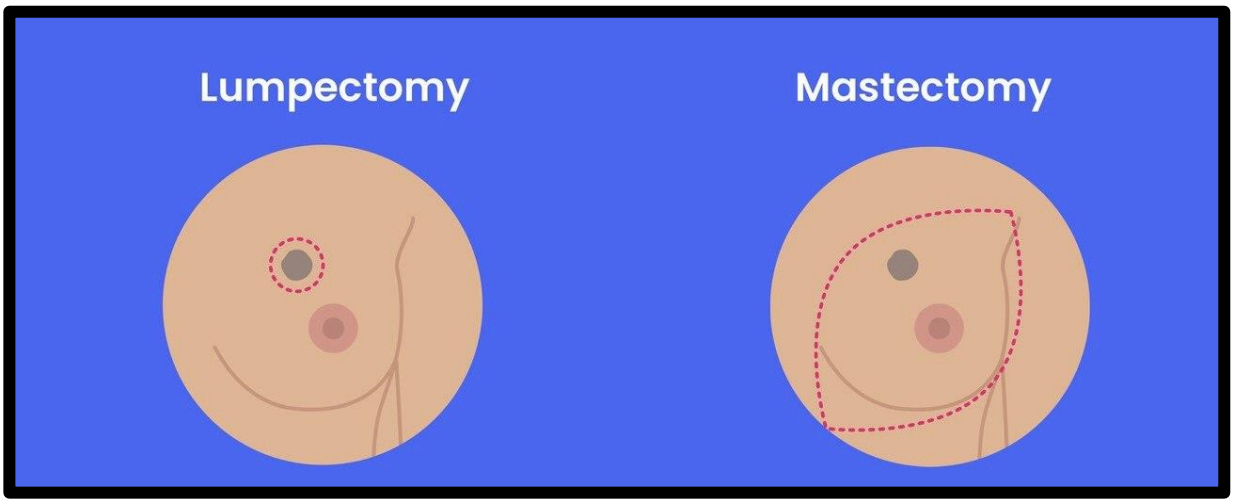


Figure 9: Types of surgical treatment

1) Lumpectomy (breast conserving surgery)

Lumpectomy, also known as breast-conserving surgery (BCS) or partial mastectomy, is a surgical procedure in which the breast tumor is removed together with a rim of surrounding healthy tissue while preserving most of the breast tissue . [69]

The primary objective is to achieve complete local tumor control with histologically negative surgical margins while maintaining an acceptable cosmetic outcome . [70] Breast-conserving surgery has become the standard treatment for many patients with early-stage breast cancer and is routinely followed by whole-breast radiotherapy . [38] Long-term randomized clinical trials have demonstrated that lumpectomy followed by radiotherapy provides overall survival rates equivalent to those of total mastectomy in appropriately selected patients . [69]

The procedure is performed under general anesthesia. The surgeon excises the tumor together with a margin of surrounding healthy breast tissue to ensure complete removal of malignant cells [70].

Sentinel lymph node biopsy is commonly performed during the same operation in clinically node-negative patients to assess axillary lymph node involvement [72].

The excised specimen is then examined histopathologically to evaluate tumor size, histological subtype, surgical margin status, and lymph node involvement [72].

The main advantage of lumpectomy is preservation of the breast, resulting in better cosmetic and psychological outcomes than total mastectomy [73]. When combined with postoperative radiotherapy, breast-conserving surgery provides survival outcomes equivalent to mastectomy while maintaining excellent local disease control [69] .Additional benefits include a shorter recovery period and reduced surgical morbidity [73].

2) Mastectomy

Mastectomy is done to decrease the risk of development of breast cancer[74].Bilateral prophylactic mastectomy decreases the chances of development of breast cancer but does not eliminate the risk of developing cancer completely [75]. Aromatase and tamoxifen decreases the risk of contra-lateral breast cancer and it is considered more effective than contra lateral prophylactic mastectomy[76]. Mastectomy is considered the most effective method of dealing with an already diffused case of breast cancer, for which a lumpectomy was not

decisive enough. Nevertheless, the loss of breast leads to feeling of asexuality and loss of self-image and consequent depression in most women [77].

3) Reconstructive surgery

Breast reconstructive surgery is an integral component of breast cancer management that aims to restore the breast contour, symmetry, and aesthetic appearance following breast-conserving surgery or mastectomy [78]. In addition to improving physical appearance, breast reconstruction has been shown to enhance self-esteem, body image, psychosocial adjustment, and overall health-related quality of life among breast cancer survivors [79]. Reconstruction may be performed either immediately following tumor resection or as a delayed procedure after the completion of adjuvant therapies, depending on oncological considerations and patient preference [80].

4) Ovarian ablation as adjuvant therapy for breast cancer

Ovarian ablation is an adjuvant endocrine treatment used primarily in **premenopausal women** with hormone receptor-positive (estrogen receptor-positive and/or progesterone receptor-positive) breast cancer [86].The treatment aims to permanently suppress ovarian estrogen production, thereby reducing the hormonal stimulation of residual breast cancer cells and decreasing the risk of disease recurrence [87]. Ovarian ablation may be achieved through bilateral oophorectomy, ovarian irradiation, or long-term ovarian function suppression using gonadotropin-releasing hormone (GnRH) agonists [88].

The addition of ovarian ablation to adjuvant endocrine therapy has been shown to improve disease-free survival, particularly in younger premenopausal women at high risk of recurrence who receive chemotherapy [89]. Ovarian suppression is commonly combined with tamoxifen or aromatase inhibitors, with the combination of ovarian suppression and an aromatase inhibitor demonstrating superior disease-free survival compared with tamoxifen alone in selected high-risk patients [90].

10-1- 2-Radiation Therapy

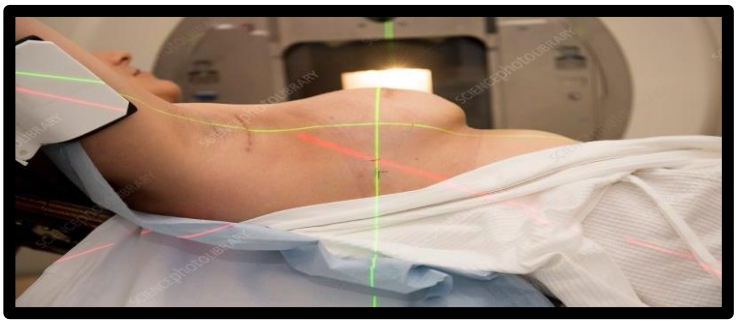


Figure 10: Breast cancer radiotherapy

Radiation therapy is a cornerstone in the multidisciplinary management of breast cancer and uses high-energy ionizing radiation to destroy residual malignant cells while minimizing damage to surrounding normal tissues [81]. It is commonly administered after breast-conserving surgery to reduce the risk of local recurrence and improve long-term disease control. In selected patients, radiotherapy is also indicated after mastectomy, particularly in those with large primary tumors or extensive lymph node involvement, to decrease locoregional recurrence and improve overall survival [38].

External beam radiation therapy (EBRT) is the most widely used radiotherapy technique for breast cancer [82]. Treatment is typically delivered to the whole breast following lumpectomy, with an additional boost dose directed to the tumor bed in patients at increased risk of local recurrence [83]. Depending on the stage of the disease and pathological findings, regional lymph node irradiation involving the axillary, supraclavicular, or internal mammary lymph nodes may also be recommended [38]. A study was conducted in India. For this study 135 women were selected, most of them had undergone mastectomy. At the time of analysis, there was no local recurrence after hypo fractioned radiation therapy and metastatic disease developed in only four patients [84]. Zhou et al reported that radiation therapy is effective in early breast cancer patients. This study was conducted on 143 women who underwent either routine or intra operative radiation therapy after breast conserving surgery. At 54 months of follow up, there was a significant local control of the tumour. High-energy rays from radiation therapy kill

cancer cells. This therapy affects only the cells that are treated. Use of radiation therapy may be done after breast cancer surgery to destroy the remaining cells in the chest area [85].

10-2- Systemic Therapies:

10-2- 1- Chemotherapy:

Chemotherapy is a systemic treatment that uses cytotoxic drugs to destroy rapidly dividing cancer cells throughout the body [91].It plays a fundamental role in the management of breast cancer and may be administered as **neoadjuvant therapy** before surgery to reduce tumor size and facilitate breast-conserving surgery or as **adjuvant therapy** after surgery to eliminate microscopic residual disease and decrease the risk of recurrence and breast cancer-related mortality [38].

In patients with metastatic breast cancer, chemotherapy is used to control disease progression, relieve symptoms, and improve survival and quality of life [88].

The choice of chemotherapeutic regimen depends on several factors, including tumor stage, molecular subtype, hormone receptor status, HER2 status, patient age, performance status, and comorbidities [38]. Commonly used agents include anthracyclines (e.g., doxorubicin and epirubicin), taxanes (e.g., paclitaxel and docetaxel), cyclophosphamide, fluorouracil, and carboplatin, which are frequently administered in combination to maximize therapeutic efficacy [93].

Clinical trials have demonstrated that adjuvant chemotherapy significantly reduces the risk of recurrence and improves overall survival, particularly in patients with high-risk early-stage breast cancer and triple-negative breast cancer [90].

Neoadjuvant chemotherapy also increases the likelihood of achieving a pathological complete response (pCR), which is associated with improved long-term outcomes, especially in HER2-positive and triple-negative breast cancer [87].

10-2- 2-Endocrine (Hormone) Therapy:

Endocrine hormone therapy represents one of the most effective systemic treatments for hormone receptor-positive breast cancer and is recommended for patients whose tumors express estrogen receptors (ER) and/or progesterone receptors (PR) [93]. Since estrogen stimulates the proliferation and survival of hormone-dependent breast cancer cells, endocrine therapy acts by either blocking estrogen receptor signaling or reducing estrogen production, thereby inhibiting tumor growth and decreasing the risk of disease recurrence [94]. This therapeutic approach is routinely used in the adjuvant setting following primary treatment and has contributed substantially to the improvement of long-term breast cancer outcomes [90]. Several endocrine agents are currently available for clinical use. **Selective estrogen receptor modulators (SERMs)**, such as tamoxifen, competitively bind to estrogen receptors and inhibit estrogen-mediated cellular proliferation [93]. **Aromatase inhibitors (AIs)**, including anastrozole, letrozole, and exemestane, suppress peripheral estrogen synthesis by inhibiting the aromatase enzyme and are considered the preferred endocrine treatment for most postmenopausal women with hormone receptor-positive breast cancer [95].

In premenopausal patients, endocrine therapy may be combined with ovarian function suppression to achieve a more profound reduction in circulating estrogen levels [96]. Extensive clinical evidence has demonstrated that endocrine therapy significantly reduces the risk of local recurrence, distant metastasis, contralateral breast cancer, and breast cancer mortality [90].The therapeutic benefit persists for many years after treatment initiation, and current evidence supports extended endocrine therapy in selected patients with a high risk of late recurrence [95].

Consequently, endocrine therapy remains a cornerstone of breast cancer management and is incorporated into all major international treatment guidelines [96]. Although endocrine therapy is generally better tolerated than chemotherapy, treatment-related adverse effects may affect patient adherence and quality of life [94]. Common adverse events include hot flashes, night sweats, vaginal dryness, sexual dysfunction, and mood changes. Tamoxifen has been associated with an increased risk of venous

thromboembolism and endometrial carcinoma, whereas aromatase inhibitors are more frequently associated with arthralgia, accelerated bone loss, osteoporosis, and an increased risk of fractures [93,95].

Therefore, long-term monitoring and individualized management are essential to optimize therapeutic outcomes and minimize treatment-related complications [96].

10-2-3-mmunotherapy:

mmunotherapy is a type of systemic treatment that enhances the body's immune system to recognize and destroy cancer cells. In breast cancer, immune checkpoint inhibitors, particularly PD-1/PD-L1 inhibitors such as pembrolizumab, have demonstrated significant clinical benefits, especially in patients with triple-negative breast cancer (TNBC) [38].

Immunotherapy is commonly administered in combination with chemotherapy in the neoadjuvant setting and may also be used in selected patients with advanced or metastatic disease based on biomarker status. This approach has been shown to improve pathological complete response rates, event-free survival, and overall clinical outcomes in appropriately selected patients [38].

11-Epidemiology

11-1- Global and Regional Studies on Breast Cancer Awareness

Breast cancer remains the single most frequently diagnosed cancer in women worldwide and the leading cause of cancer-related morbidity in many countries. Global estimates for 2022 report ≈2.1 million new breast cancer cases among women and indicate that cancer incidence overall exceeded 19.9 million cases in 2022. Early detection remains the cornerstone for reducing mortality[97].

In Algeria, national/regional registry data and the IARC GLOBOCAN fact sheet confirm that breast cancer is the leading female cancer in incidence and accounts for a large share of female cancer burden. The IARC fact sheet for Algeria (GLOBOCAN 2022 data) provides the most widely used national estimates and highlights breast cancer as the top cancer in women in Algeria [98].

11-2-High-income countries (Europe & North America): synthesis of successful awareness strategies

Analyses of national screening programmes and evaluative research from Europe and North America converge on a set of reproducible, evidence-based elements that increase early detection rates and screening uptake[99].

11-2-1-Organised screening with population registers and invitation systems: systematic, invitation-based mammography programmes (age-stratified, with recall systems) consistently produce higher uptake than opportunistic screening [100].

11-2-2-Multi-channel, sustained public communication: national campaigns that combine mass media, targeted messaging for high-risk groups, and primary-care engagement (doctors/nurses prompting screening) increase awareness and conversion to action[99].

11-2-3-Reducing financial and logistical barriers: free or low-cost screening, mobile mammography units for remote populations, and facilitated appointment scheduling remove practical barriers to attendance.[101].

11-2-4- Integration with primary care and quality assurance: linking screening invitations with primary-care reminders, and ensuring standardised diagnostic pathways improves follow-up and reduces diagnostic delay[100].

Evaluative studies show that the combination of invitation systems + primary-care endorsement + reduced cost/access barriers explains much of the success in raising early-stage detection in high-income systems.[99].

11-3- Middle-income countries and North African / MENA context: comparative, critical review

A growing body of empirical work from the MENA region (including Morocco, Tunisia, Egypt) and the Gulf (notably Saudi Arabia) shows both shared challenges and context-specific patterns.[102].

11-3-1- Common regional challenges:

• **Knowledge–practice gap (KAP):** Many KAP studies report moderate levels of awareness about breast cancer symptoms but substantially lower levels of correct knowledge about risk factors and low rates of regular self-examination or clinical/mammographic screening. Fear of diagnosis, cultural norms of modesty/shame, and fatalistic beliefs are frequent psychosocial barriers cited across studies.[103,105].

• **Systemic and access issues:** limited availability of mammography in rural and peri-urban areas, out-of-pocket costs, long wait times, and uneven distribution of specialised services reduce conversion from awareness to utilisation. .[104,106].

Country-level highlights

• **Morocco:** Recent regional papers emphasize modest improvements in awareness among younger, educated women but persistent low practice rates of BSE and low uptake of clinical/mammography screening in lower-resource provinces. Interventions that pair university-based education with community health outreach show promising short-term gains. [107,108].

• **Tunisia:** Research indicates geographic heterogeneity; urban women often show better knowledge and access than rural women. Social stigma and family responsibilities are recurrent themes delaying presentation. [109].

• **Egypt:** Large KAP surveys show moderate knowledge but low routine screening; cost, limited female clinician availability in some areas, and health-system navigation problems are barriers. Recent intervention studies showed that structured BSE training and community health worker involvement increased early presentation rates in pilot districts. [110]

• **Saudi Arabia:** National investments and awareness campaigns have improved knowledge metrics in many populations (students, clinic attendees). However, stigma, privacy concerns, and variable health-seeking behaviour still impede consistent screening uptake; targeted primary-care engagement remains effective.[105].

Jordan

Studies from Jordan indicate that women generally demonstrate moderate awareness of breast cancer and recognize the importance of early detection; however, participation in regular screening remains low.[111].

Recent national surveys reported that only a small proportion of eligible women undergo periodic mammography, while breast self-examination and clinical breast examination are also underutilized. The most commonly reported barriers include fear of receiving a cancer diagnosis, the cost of mammography, limited recommendations from healthcare providers, inadequate social support, and cultural beliefs [112].

Although the Jordan Breast Cancer Program has strengthened public awareness and expanded screening services, further efforts are needed to improve screening uptake through primary healthcare engagement, reduction of financial barriers, and targeted educational interventions.

11-4-The Algerian evidence base — systematic-style summary and synthesis (published + grey literature, until 2025):

Multiple Algerian studies (published articles, regional registry analyses, university theses and local reports) examine epidemiology, knowledge/attitudes/practices (KAP), and clinical registry trends. The most robust peer-reviewed KAP study available nationally is Lounis et al. (2023); additional regional retrospective registry papers and hospital series complement population surveys. Common empirical findings across Algerian sources are: moderate general awareness of breast cancer, limited knowledge of detailed risk factors and warning signs, low regular practice of BSE, and diagnostic delay linked to sociocultural barriers and access limitations.[113,114].

11-4-1-Synthesis of Algerian evidence and priority research gaps

1. **Convergent findings:** across peer-reviewed and grey studies, Algerian women show moderate general awareness but important deficits in detailed knowledge of risk factors and alarm signs; BSE and clinical/mammography uptake are low relative to needs; many patients present at advanced stages in hospital series. [115].

2. **Methodological limitations:** much of the KAP evidence relies on convenience or online samples (limits representativeness), single-centre registry reports, and small university thesis projects; there is a lack of large, population-based, probability-sample KAP surveys linked with diagnostic stage and registry outcomes. [113].

3. **System gaps:** incomplete national registry coverage and uneven availability of mammography and diagnostic services across governorates limit both surveillance and equitable access—this undermines the impact of awareness when it is not matched by accessible services[116]

11-4-2-Culturally Adapted Awareness Intervention in Algeria

Intervention evidence on culturally adapted breast cancer awareness programs in Algeria remains limited, as only a few published randomized or quasi-experimental trials exist, and none provide long-term follow-up to assess sustained behavioral change. Current literature shows that most efforts rely on small pilot educational interventions that reveal promising short-term improvements in knowledge but lack methodological rigor and broad applicability[104]. These pilots generally follow a structured set of culturally sensitive procedures: they begin with community engagement sessions where researchers consult local women, community leaders, and health workers to identify cultural and linguistic barriers that hinder awareness[105].

Following this, educational materials are culturally adapted, translated into Arabic and Tamazight, and designed with modest visuals to respect social norms. Delivery is carried out by trained female health educators in women-only environments such as community centers, which increases comfort and participation. The intervention sessions typically include interactive demonstrations of breast self-examination, explanations of early warning signs, clarification of myths and misconceptions, and guidance about when and where to seek clinical screening services[117].

12.Mortality

Fifth most common cause of cancer death is breast cancer. The mortality and age standardized prevalence of breast cancer is higher in the United States compared to world. In Poland, seventeen percent of disease cases occur due to cancer and 14% deaths occur due to cancerous changes. Worldwide death due to breast cancer calculated in 2004 was 519,000 [118]. In the United States alone, approximately 1,208,000 cancer cases are reported per year and that some 538,000 people die from the previous manifestation of this disease condition, representing about one fifth of the total annual deaths from all causes [119].

Practical Part

I.Objectives

The objectives of this study are:

➤ To assess women's knowledge of breast cancer, including its risk factors, warning signs, and screening methods in the Annaba region.

➤ To evaluate women's attitudes and practices regarding early detection of breast cancer, including breast self-examination (BSE), clinical breast examination (CBE), and mammography.

➤ To identify the sociodemographic factors associated with breast cancer awareness and screening practices among women in the Annaba region.

➤ To provide evidence-based recommendations to improve breast cancer awareness and promote participation in early detection and screening programs in the Annaba region.

II. PATIENTS AND METHODS:

1. Study Design and Period

The present study is a prospective, descriptive cross-sectional survey conducted among women residing in the Annaba region. Data were collected using a structured questionnaire over a one-year period, from **October 1, 2025, to September 1, 2026**.

2. Study Setting

The study was carried out in the Annaba region, Algeria. Participants were recruited from different public settings to obtain a representative sample of women from various age groups and socioeconomic backgrounds.

3. Study Population

Inclusion criteria:

Women aged 18 years and above residing in the Annaba region.

Women who voluntarily agreed to participate and provided informed consent.

Exclusion criteria:

Women younger than 18 years.

Women who declined to participate or submitted incomplete questionnaires.

4. Methodological Approach

Data were collected using a structured questionnaire designed to assess:

Sociodemographic characteristics.

Knowledge of breast cancer risk factors.

Knowledge of warning signs and symptoms.

Awareness of breast cancer screening methods, including breast self-examination (BSE), clinical breast examination (CBE), and mammography.

Attitudes and practices regarding early detection and screening.

5. Data Collection Tool

A structured, self-administered questionnaire was used as the data collection tool. The questionnaire was initially designed in **Arabic**, as it is the language most commonly understood by women in Annaba region, to ensure clear understanding and accurate responses. It was then translated into **English** for academic documentation while preserving the original meaning and content of the questions.

6. Study Limitations

This study has several limitations. First, the use of a questionnaire relies on participants' self-reported responses, which may be influenced by recall bias or social desirability bias. Second, as the study was conducted only among women in the Annaba region, the findings may not be representative of the entire female population in Algeria. Finally, the cross-sectional design assesses knowledge and awareness at a single point in time and does not allow for the establishment of causal relationships.

Study Questionnair

العمر	الحالة الاسرية	المستوى التعليمي	الدخل الاسري	الدائرة	
	☐				
18-30 ☐	عزباء	ابتدائي ☐	اقل من 5 ملاين ☐	البوني ☐	عين الباردة ☐
31-45 ☐	متزوجة ☐	متوسط ☐	اقل من 10 ملاين ☐	بورحال ☐	عنابة ☐
46-60 ☐	مطلقة ☐	ثانوي ☐	اقل من 15مليون ☐	شطايبي ☐	
61 او أكثر ☐	ارملة ☐	جامعي فما فوق ☐	أكثر من15مليون ☐	الحجار ☐	

هل يمكنك التعرف على إشارات الخطر لسرطان الثدي من هذه اللائحة			
	نعم	لا	لا اعلم
كتله او انتفاخ في ثديك	☐	☐	☐
كتله او انتفاخ تحت ابطك	☐	☐	☐
نريف او افراز من حلمتك	☐	☐	☐
سحب في حلمتك	☐	☐	☐
تغير في وضعيه حلمتك	☐	☐	☐
طفح جلدي على او حول حلمتك	☐	☐	☐
احمرار في جلد ثديك	☐	☐	☐
تغير في حجم ثديك او حلمتك	☐	☐	☐
تغير في شكل ثديك او حلمتك	☐	☐	☐
الم في احدى ثدييك او ابطك	☐	☐	☐
ظهور تجاعيد في جلد الثدي	☐	☐	☐

هل ذهبت من قبل الى طبيب بعد ملاحظتك لتغير في ثديك		
نعم	لا	لم الاحظ اي تغير
☐	☐	☐
متى تذهبين لزيارة الطبيب عند ملاحظه تغير في ثديك		
حالا	لاحقا	ابدا
☐	☐	☐

في العام القادم من سيصاب بسرطان الثدي من هذه اللائحة	
امرآه في الثلاثين من العمر	☐
امرآه في الخمسين من العمر	☐
امرآه في السبيعين من العمر	☐
امرآه في اي عمر	☐

	نعم	لا
هل تمت دعوتك يوما للكشف عن سرطان الثدي في برنامج فحص الثدي	☐	☐
هل تم عمل فحص لسرطان الثدي يوما ما في برنامج فحص الثدي	☐	☐

الى اي حد توافق على ان كل من هذه العوامل يمكن انت تزيد من فرص تطور سرطان الثدي					
	أوافق بشده	اوافق	غير متأكدة	لا أوافق	لا أوافق بشده
وجود ماضي سرطان الثدي في العائلة	☐	☐	☐	☐	☐
استخدام العلاج الهرموني البديل (HRT)	☐	☐	☐	☐	☐
شرب أكثر من وحده من الكحول يوميا	☐	☐	☐	☐	☐
كون الوزن رائدا مؤشر كتله الجسم أكثر من	☐	☐	☐	☐	☐
وجود قريب مقرب يعاني من سرطان الثدي	☐	☐	☐	☐	☐
تأجيل الانجاب الى سنوات متأخره من العمر او عدم الانجاب على الاطلاق	☐	☐	☐	☐	☐
بداية الدورة الشهرية في سن مبكر	☐	☐	☐	☐	☐
حدوث سن انقطاع الطمث في وقت متأخر	☐	☐	☐	☐	☐
ممارسه اقل من 30 دقيقه من النشاط البدني المعتدل خمس مرات في الاسبوع	☐	☐	☐	☐	☐

region		household income	educational level	marital status	age
aain albarda ☐	Alboni ☐	5 Million < ☐	Primary ☐	Single ☐	18-30 ☐
annaba ☐	borahal ☐	10million < ☐	Middle school ☐	Married ☐	31-45 ☐
shtaebee ☐		15million< ☐	Secondary ☐	Secondary ☐	46-60 ☐
alhajar ☐		15million< ☐	University and above ☐	University and above ☐	>61 ☐

Can you identify the warning signs of breast cancer from this list?			
	no	yes	I don't know
A lump or swelling in your breast	☐	☐	☐
A lump or swelling underarm	☐	☐	☐
Drip or discharge from your nipple	☐	☐	☐
Nipple retraction	☐	☐	☐
A change in the position of your nipple	☐	☐	☐
A rash on or around your nipple	☐	☐	☐
Redness of your breast skin	☐	☐	☐
A change in the size of your breast or nipple	☐	☐	☐
A change in the shape of your breast or nipple	☐	☐	☐
Pain in one of your breasts or underarm	☐	☐	☐
Breast skin wrinkling	☐	☐	☐

Have you seen a doctor after noticing any changes in your breast?		
I didn't notice any change	no	Yes
☐	☐	☐
When should you see a doctor if you notice a change in your breast?		
never	Later	Immediately
☐	☐	☐

At what age is breast cancer most common?	
Thirty years old	☐
Fifty years old	☐
\Seventy years old	☐
A woman of any age	☐

	yes	no
Have you ever been invited for breast cancer screening in a breast screening program?	☐	☐
Have you ever had a breast cancer screening in a breast screening program?	☐	☐

To what extent do you agree that each of these factors can increase the chances of developing breast cancer?					
strongly disagree.	disagree.	I'm not sure.	agree.	.strongly agree	
☐	☐	☐	☐	☐	Having a family history of breast cancer
☐	☐	☐	☐	☐	Using hormone replacement therapy (HRT)
☐	☐	☐	☐	☐	Drinking more than one alcoholic drink per day \
☐	☐	☐	☐	☐	Being overweight (body mass index over25)
☐	☐	☐	☐	☐	Having a relative suffering from breast cancer
☐	☐	☐	☐	☐	Delayed childbearing until advanced age or no childbearing at all
☐	☐	☐	☐	☐	Early onset of menstruation
☐	☐	☐	☐	☐	Late onset of menopause
☐	☐	☐	☐	☐	Engage in less than 30 minutes of physical activity five times a week

العمر	الحالة الاسرية	المستوى التعليمي	الدخل الاسري	الدائرة	
	☐				
18-30 ☐	عزباء	ابتدائي ☐	اقل من 5 ملاين ☐	االدرعان ☐	بسباس ☐
31-45 ☐	متزوجة ☐	متوسط ☐	اقل من 10 ملاين ☐	الطارف ☐	بوحجار ☐
46-60 ☐	مطلقة ☐	ثانوي ☐	اقل من 15مليون ☐	بو ثلجه ☐	القاله ☐
61 او أكثر ☐	ارملة ☐	جامعي فما فوق ☐	أكثر من15مليون ☐	بن مهيدي	☐

هل يمكنك التعرف على إشارات الخطر لسرطان الثدي من هذه اللائحة			
	نعم	لا	لا اعلم
كتله او انتفاخ في ثديك	☐	☐	☐
كتله او انتفاخ تحت ابطك	☐	☐	☐
نريف او افراز من حلمتك	☐	☐	☐
سحب في حلمتك	☐	☐	☐
تغير في وضعيه حلمتك	☐	☐	☐
طفح جلدي على او حول حلمتك	☐	☐	☐
احمرار في جلد ثديك	☐	☐	☐
تغير في حجم ثديك او حلمتك	☐	☐	☐
تغير في شكل ثديك او حلمتك	☐	☐	☐
الم في احدى ثدييك او ابطك	☐	☐	☐
ظهور تجاعيد في جلد الثدي	☐	☐	☐

هل ذهبت من قبل الى طبيب بعد ملاحظتك لتغير في ثديك		
نعم	لا	لم الاحظ اي تغير
☐	☐	☐
متى تذهبين لزيارة الطبيب عند ملاحظه تغير في ثديك		
حالا	لاحقا	ابدا
☐	☐	☐

في العام القادم من سيصاب بسرطان الثدي من هذه اللائحة	
امرآه في الثلاثين من العمر	☐
امرآه في الخمسين من العمر	☐
امرآه في السبيعين من العمر	☐
امرآه في اي عمر	☐

	نعم	لا
هل تمت دعوتك يوما للكشف عن سرطان الثدي في برنامج فحص الثدي	☐	☐
هل تم عمل فحص لسرطان الثدي يوما ما في برنامج فحص الثدي	☐	☐

الى اي حد توافق على ان كل من هذه العوامل يمكن انت تزيد من فرص تطور سرطان الثدي					
	أوافق بشده	اوافق	غير متأكدة	لا أوافق	لا أوافق بشده
وجود ماضي سرطان الثدي في العائلة	☐	☐	☐	☐	☐
استخدام العلاج الهرموني البديل (HRT)	☐	☐	☐	☐	☐
شرب أكثر من وحده من الكحول يوميا	☐	☐	☐	☐	☐
كون الوزن رائدا مؤشر كتله الجسم أكثر من	☐	☐	☐	☐	☐
وجود قريب مقرب يعاني من سرطان الثدي	☐	☐	☐	☐	☐
تأجيل الانجاب الى سنوات متأخره من العمر او عدم الانجاب على الاطلاق	☐	☐	☐	☐	☐
بداية الدورة الشهرية في سن مبكر	☐	☐	☐	☐	☐
حدوث سن انقطاع الطمث في وقت متأخر	☐	☐	☐	☐	☐
ممارسه اقل من 30 دقيقه من النشاط البدني المعتدل خمس مرات في الاسبوع	☐	☐	☐	☐	☐

region		household income	educational level	marital status	age
Ben Mhidi ☐	Deran ☐	5 Million < ☐	Primary ☐	Single ☐	18-30 ☐
Besbas ☐	Taref ☐	10million < ☐	Middle school ☐	Married ☐	31-45 ☐
Bouhadjar ☐	Kala ☐	15million< ☐	Secondary ☐	Divorced ☐	46-60 ☐
Bouteldja ☐		15million< ☐	University and above ☐	Widowed ☐	>61 ☐

Can you identify the warning signs of breast cancer from this list?			
	no	yes	I don't know
A lump or swelling in your breast	☐	☐	☐
A lump or swelling underarm	☐	☐	☐
Drip or discharge from your nipple	☐	☐	☐
Nipple retraction	☐	☐	☐
A change in the position of your nipple	☐	☐	☐
A rash on or around your nipple	☐	☐	☐
Redness of your breast skin	☐	☐	☐
A change in the size of your breast or nipple	☐	☐	☐
A change in the shape of your breast or nipple	☐	☐	☐
Pain in one of your breasts or underarm	☐	☐	☐
Breast skin wrinkling	☐	☐	☐

Have you seen a doctor after noticing any changes in your breast?		
I didn't notice any change	no	Yes
☐	☐	☐
When should you see a doctor if you notice a change in your breast?		
never	Later	Immediately
☐	☐	☐

At what age is breast cancer most common?	
Thirty years old	☐
Fifty years old	☐
Seventy years old	☐
A woman of any age	☐

	yes	no
Have you ever been invited for breast cancer screening in a breast screening program?	☐	☐
Have you ever had a breast cancer screening in a breast screening program?	☐	☐

To what extent do you agree that each of these factors can increase the chances of developing breast cancer?					
strongly disagree.	disagree.	I'm not sure.	agree.	.strongly agree	
☐	☐	☐	☐	☐	Having a family history of breast cancer
☐	☐	☐	☐	☐	Using hormone replacement therapy (HRT)
☐	☐	☐	☐	☐	Drinking more than one alcoholic drink per day
☐	☐	☐	☐	☐	Being overweight (body mass index over25)
☐	☐	☐	☐	☐	Having a relative suffering from breast cancer
☐	☐	☐	☐	☐	Delayed childbearing until advanced age or no childbearing at all
☐	☐	☐	☐	☐	Early onset of menstruation
☐	☐	☐	☐	☐	Late onset of menopause
☐	☐	☐	☐	☐	Engage in less than 30 minutes of physical activity five times a week

III. RESULTS A Survey on Breast Cancer Awareness Amongst Women in Annaba Region

A Survey on Breast Cancer Awareness Amongst Women in Annaba state

A. Sociodemographic Characteristics

A.1. Distribution of Participants According to Age

Table 1. Distribution of Participants According to Age in Annaba state (n = 500)

Age Group (years)	Number	Percentage (%)
18-30	**124**	**24.8**
31-45	**199**	**39.8**
46-60	**132**	**26.4**
>61	**45**	**9.0**
Total	**500**	**100**

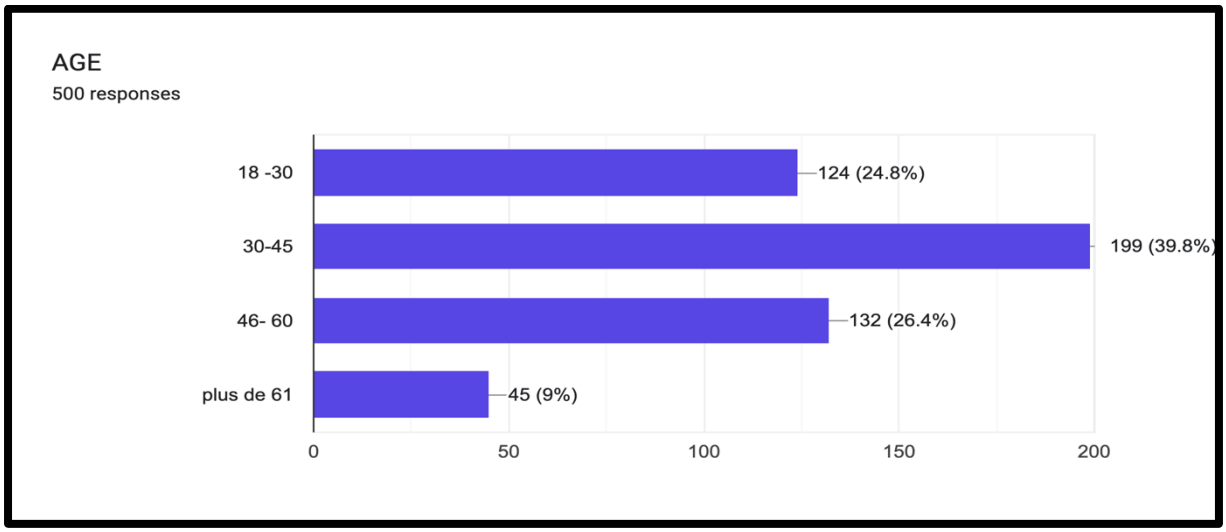


Figure 11. Distribution of participants according to age In Annaba state (n = 500).

Distribution of the study participants by age group. Among the 500 respondents, the largest proportion belonged to the **30–45 years** age group (199; 39.8%), followed by **46–60 years** (132; 26.4%), **18–30 years** (124; 24.8%), and **over 61 years** (45; 9.0%).

A.2 Distribution of Participants According to Marital status:

Table 2. Distribution of Participants According to Marital Status In Annaba state (n = 500)

Marital status	Number	Percentage (%)
Married	**315**	**63.4**
Single	**70**	**14.0**
Divorced	**63**	**12.6**
Widowed	**52**	**10.4**
Total	**500**	**100**

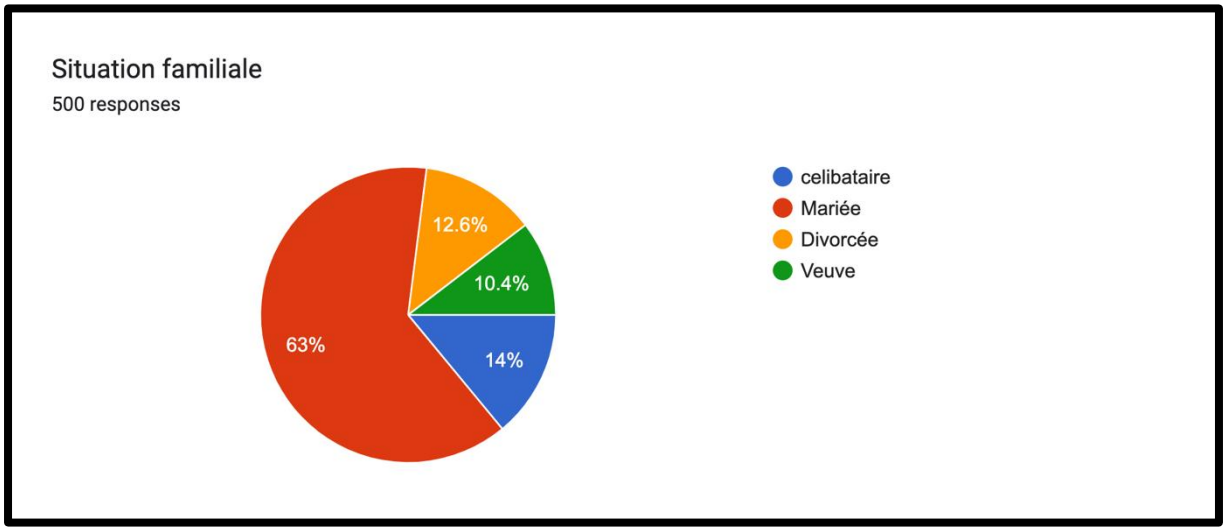


Figure 12: Distribution of participants according to marital status In Annaba state (n = 500).

Distribution of the study participants according to marital status. Among the 500 respondents, **63%** were married, representing the largest proportion of the study population. Single women accounted for **14%**, followed by divorced women (**12.6%**) and widowed women (**10.4%**)

A.3 Distribution of Participants According to Level of Education

Table 3. Distribution of Participants According to Level of Education In Annaba state (n = 500)

Level of Education	Number	Percentage (%)
Primary	66	13.2
Middle school	85	17.0
Secondary education	159	31.8
University	190	38.0
Total	500	100

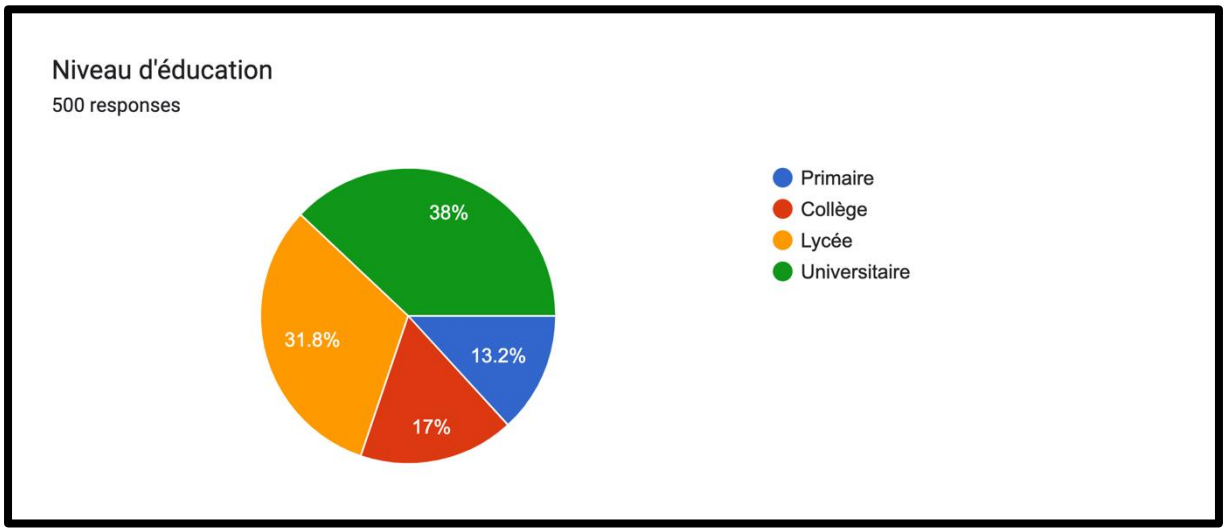


Figure 13 : Distribution of Participants According to Level of Education In Annaba state

The educational levels of the study participants were distributed as follows. The majority had a university-level education (38.0%), followed by those with secondary education (31.8%). Meanwhile, 17.0% had completed middle school, while participants with primary school education represented the smallest proportion of the study population (13.2%).

A.4 Monthly Income of the Study Participants

Table 4. Distribution of the Study Participants According to Monthly Income In Annaba state

Monthly Income	Frequency (n)	Percentage (%)
Less than 5 million centimes	243	48.6
Less than 10 million centimes	193	38.6
Less than 15 million centimes	60	12.0
More than 15 million centimes	4	.8
Total	500	100.0

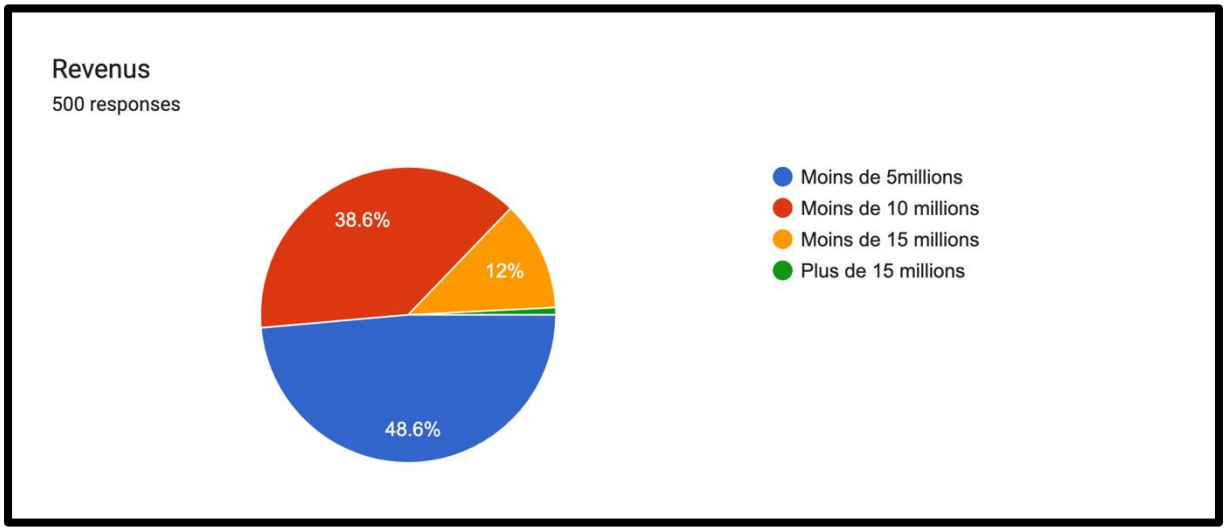


Figure 14: Distribution of the Study Participants According to Monthly Income In Annaba state

The monthly income of the study participants is illustrated below. The majority of participants reported a monthly income of less than 5 million centimes (48.6%), followed by those earning less than 10 million centimes (38.6%). A smaller proportion reported an income of less than 15 million centimes (12.0%), while only a very small percentage reported earning more than 15 million centimes.

A.5 : Residence of the Study Participants

Table 5. Distribution of the Study Participants According to Residence In Annaba state

Residence	Frequency (n)	Percentage (%)
El Bouni	77	15.4
Berrahal	56	11.2
Chetaïbi	52	10.4
El Hadjar	100	20.0
Aïn El Berda	61	12.2
Annaba	154	30.8
Total	500	100.0

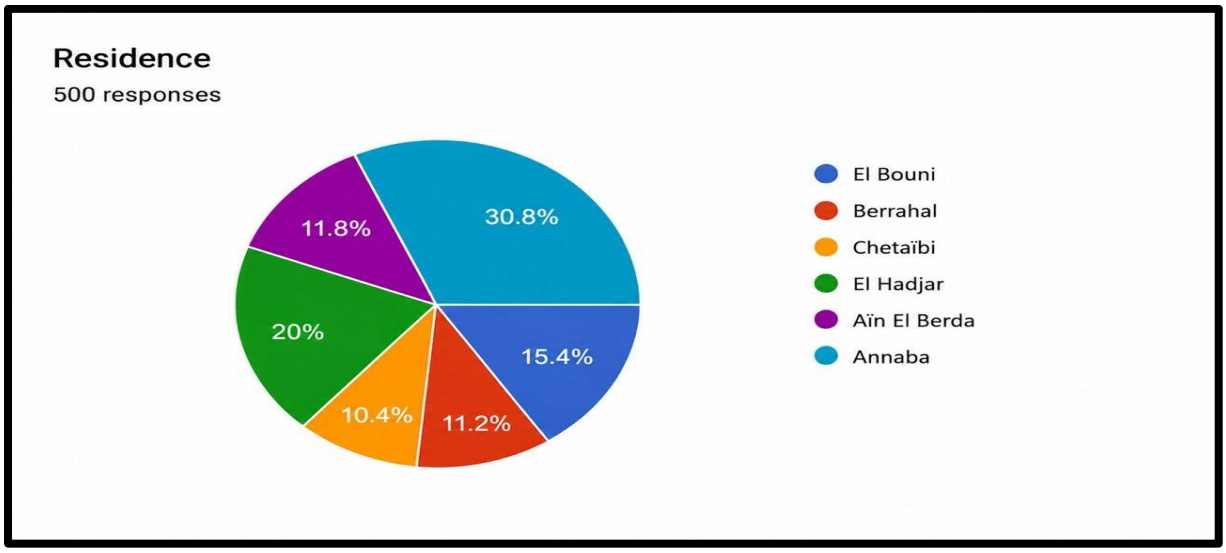


Figure 15: Distribution of the Study Participants According to Residence In Annaba state

The district of residence of the study participants is illustrated below. The highest proportion of participants resided in Annaba (30.8%), followed by El Hadjar (20.0%), El Bouni (15.4%), Aïn El Berda (12.2%), Berrahal (11.2%), and Chetaïbi (10.4%).

A.6 Knowledge of Breast Cancer Warning Signs

Table 6. Distribution of the Study Participants According to Their Awareness of Breast Cancer Warning Signs In Annaba state

Warning signe	Yes(n)	Yes(%)	NO	No(%)	I don`t know	I don`t know(%)
Lump/swelling in the Brest	449	89.8%	21	4.2%	30	6%
Lump/swelling in the armpit	421	84.2%	31	6.2%	48	9.6%
Nipple discharge or bleeding	322	64.4%	99	19.8%	79	15.8%
Retraction of the nipple	258	51.6%	121	24.2%	121	24.2%
Change in nipple position	304	60.8%	89	17.8%	107	21.4%
Skin rash on the breast	240	48%	143	28.6%	117	23.4%
Redness on the skin	254	50.8%	154	30.8%	92	18.4%
Change in breast size	341	68.2%	89	17.8%	70	14%
Change in breast shape	353	70.6%	75	15%	72	14.4%
Pain in the breast or armpit	360	72%	85	17%	55	11%
Dimpling/wrinkling of the breast skin	167	33.4%	132	26.4%	210	40.2%

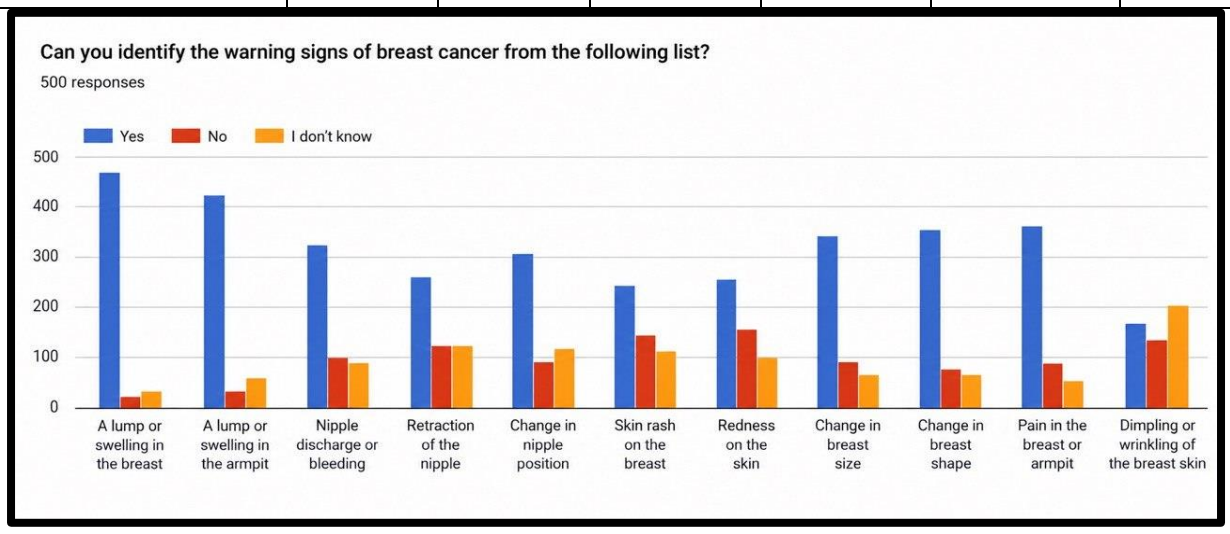


Figure 16: Distribution of the Study Participants According to Their Awareness of Breast Cancer Warning Signs In Annaba state

The figure illustrates the participants' knowledge of the warning signs of breast cancer. The majority of participants correctly identified common warning signs, particularly **a breast lump**, **an axillary lump**, and **nipple discharge or bleeding**. However, awareness of some other warning signs was lower, with a proportion of participants indicating that they did not know whether these symptoms were associated with breast cancer.

A.7 Consultation with a Physician After Noticing a Breast Change

Table 7. Distribution of the Study Participants According to Visiting a Doctor After Noticing a Change in the Breast In Annaba state

Response	**Frequency (n)**	**Percentage (%)**
Yes	159	31.8%
No	265	53.0%
I have not noticed any changes in my breast	76	15.2%
Total	500	100%

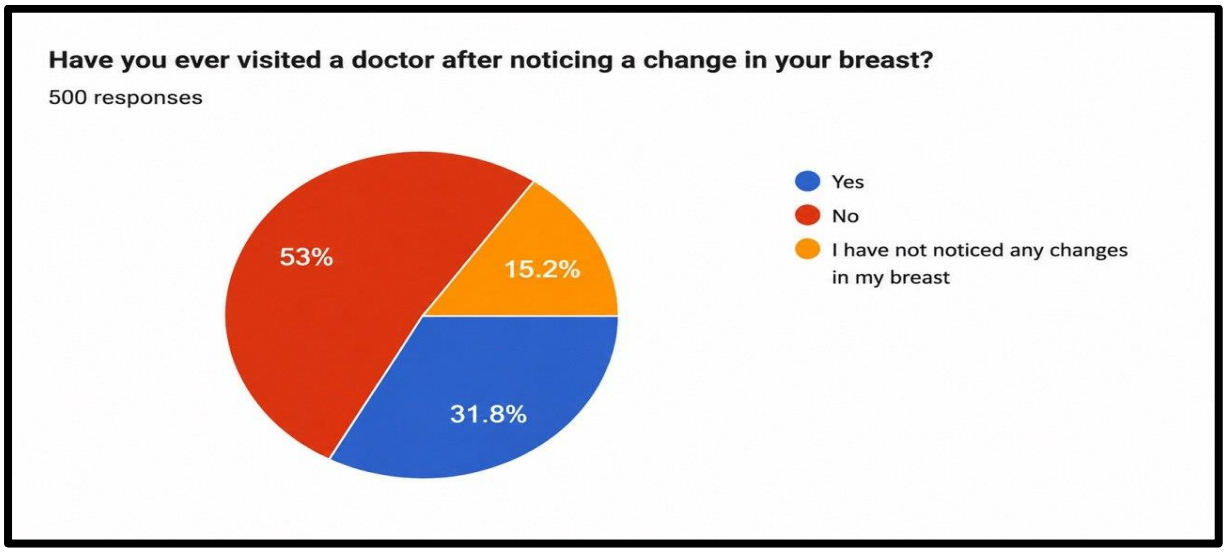


Figure 17: Distribution of the Study Participants According to Visiting a Doctor After Noticing a Change in the Breast In Annaba state

The participants' medical consultation after noticing a change in their breast is illustrated below. More than half of the participants (53.0%) reported that they did not consult a physician, whereas 31.8% indicated that they had sought medical advice. In addition, 15.2% reported that they had never noticed any changes in their breast.

A.8 Time to Visit a Physician After Noticing a Breast Change

Table 8. Distribution of the Study Participants According to the Time of Visiting a Doctor After Noticing a Breast Change In Annaba state

Time of visiting a doctor	**Frequency (n)**	**Percentage (%)**
immediately	386	77.2%
later	97	19.4%
never	17	3.4%
Total	500	100%

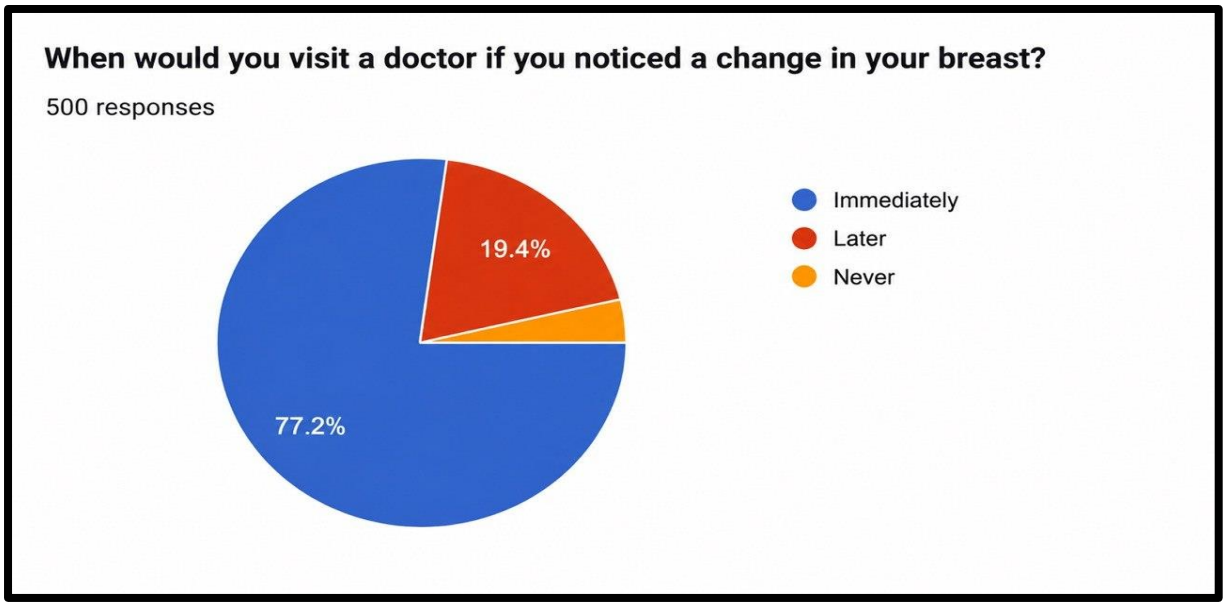


Figure 18: Distribution of the Study Participants According to the Time of Visiting a Doctor After Noticing a Breast Change In Annaba state

The timing of medical consultation after noticing a breast change among the participants is presented below. The majority of participants (77.2%) reported that they would seek medical consultation immediately, whereas 19.4% indicated that they would delay the visit. Only a very small proportion reported that they would never consult a physician.

A.9 Knowledge of the Age Group Most Likely to Develop Breast Cancer

Table 9. Distribution of the Study Participants According to Their Perception of the Age Group Most Likely to Be Diagnosed with Cancer In Annaba state

Age group	**Frequency (n)**	**Percentage (%)**
Women in their thirties	74	14.8%
Women in their fifties	146	29.2%
Women in their seventies	107	21.4%
Women of any age	173	34.6%
Total	500	100%

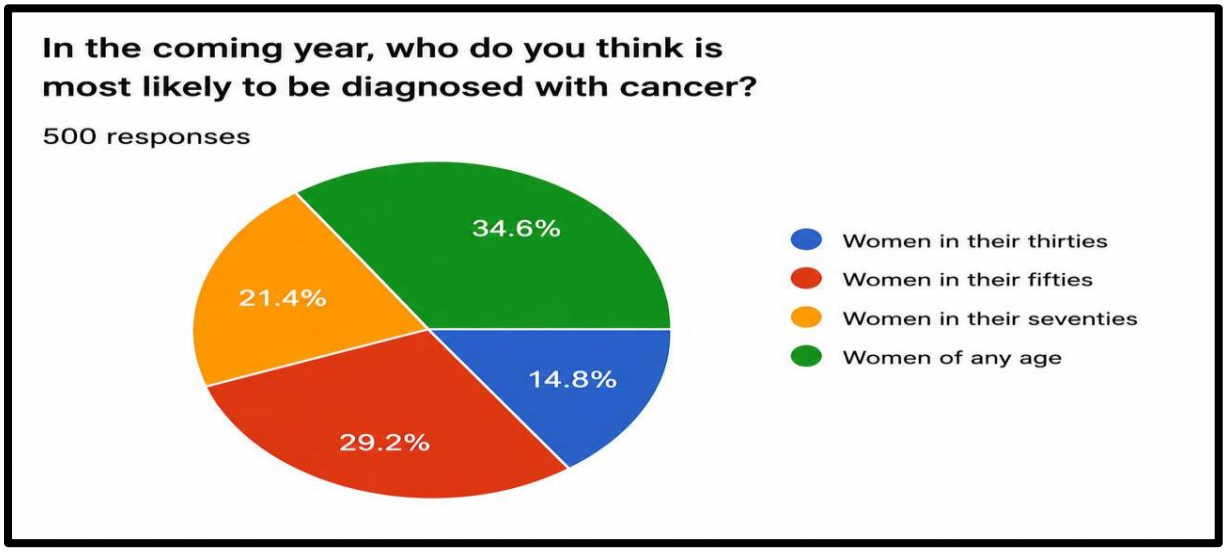


Figure 19 : Distribution of the Study Participants According to Their Perception of the Age Group Most Likely to Be Diagnosed with Cancer In Annaba state

The figure illustrates the participants' knowledge regarding the age group most likely to develop breast cancer. The largest proportion of participants (**34.6%**) indicated that **breast cancer can occur at any age**, while others believed that women aged **50 years (29.2%)**, **over 70 years (21.4%)**, or **30 years (14.8%)** were the most likely to develop the disease

A.10 Invitation to Participate in a Breast Cancer Screening Program

Table 10. Distribution of the Study Participants According to Invitation to Participate in a Breast Cancer Screening Program In Annaba state

Response	**Frequency (n)**	**Percentage (%)**
Yes	162	32.4%
No	338	67.6%
Total	500	100%

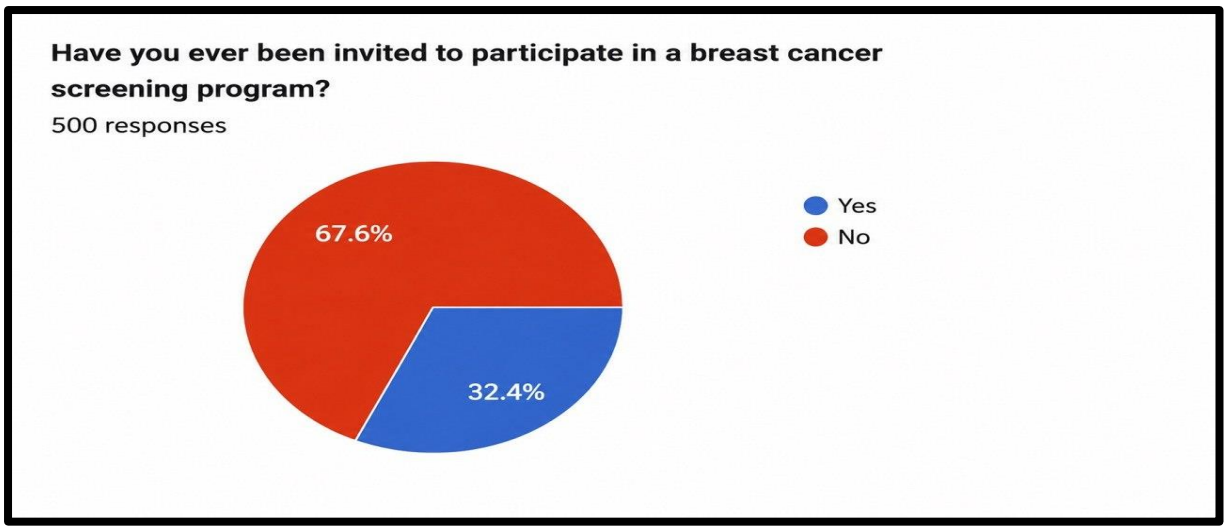


Figure 20: Distribution of the Study Participants According to Invitation to Participate in a Breast Cancer Screening Program In Annaba state

The participants' experiences regarding invitations to participate in a breast cancer screening program are presented below. The majority of participants (67.6%) reported that they had never received an invitation, whereas 32.4% indicated that they had received an invitation.

A.11 **Participation in a Breast Cancer Screening Program**

Table 11. Distribution of the Study Participants According to Previous Participation in a Breast Cancer Screening Program In Annaba state

Response	**Frequency (n)**	**Percentage (%)**
Yes	150	30%
No	350	70%
Total	500	100%

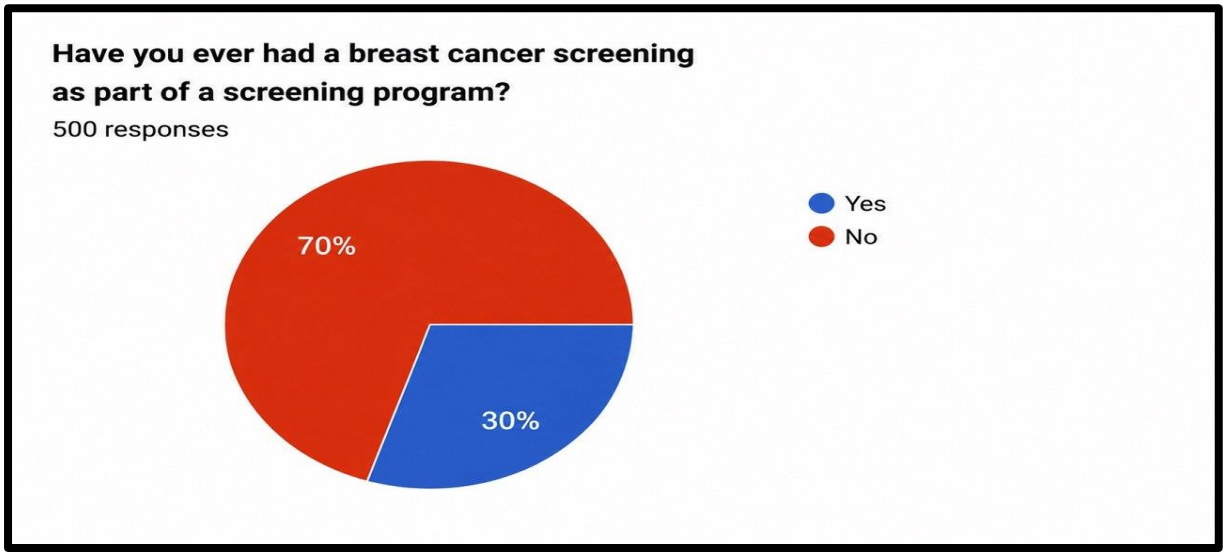


Figure 21: Distribution of the Study Participants According to Previous Participation in a Breast Cancer Screening Program In Annaba state

The participants' experiences with breast cancer screening through a screening program are presented below. The majority of participants (70.0%) reported that they had never undergone breast cancer screening, whereas 30.0% indicated that they had participated in a breast cancer screening program.

A.12 Knowledge of Breast Cancer Risk Factors

Table 12. Distribution of the Study Participants According to Their Perception of Breast Cancer Risk Factors In Annaba state

Risk factor	Strongly agree n (%)	Agree n (%)	Not sure n (%)	Disagree n (%)	Strongly Disagree n (%)
Family history of breast cancer	269 (53.8%)	120 (24%)	49 (9.8%)	50 (10.0%)	12 (2.4)
Use of hormone replacement therapy (HRT)	204 (40.8%)	182 (36.4%)	80 (16.0%)	30 (6.0%)	4 (.8)
Drinking more than one alcoholic beverage per day 165 (33.0%)	164 (32.8%)	140 (28.0%)	129 (25.8%)	60 (12.0%)	7 (1.4)
Overweight (BMI > 25)	120 (24.0%)	147 (29.4%)	124(24.8%)	98(19.6%)	11 (2.2)
Having a close relative with breast cancer	155 (31.0%)	161(32.2%)	110 (22.0%)	63 (12.6%)	11 (2.2)
Delayed childbearing or not having children	88 (17.6%)	138 (27.6%)	149 (29.8%)	113 (22.6%)	12 (2.4)
early puberty	71 (14.02%)	126 (25.2%)	182 (36.4%)	109 (21.8%)	12 (2.4)
Late menopause	50 (10.0%)	118 (23.6%)	186 (37.2%)	132 (26.4%)	14 (2.8)
Exercising less than 30 minutes, five times per week	157 (31.4%)	199 (39.8%)	74 (14.8%)	55(11.0%)	15 (3.0)

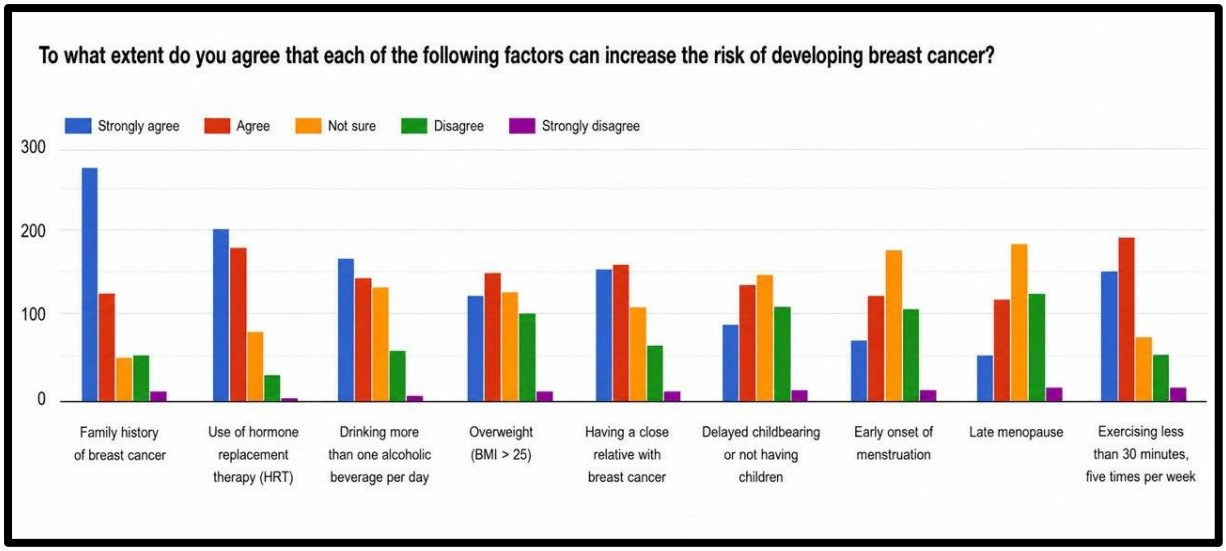


Figure 22. Distribution of the Study Participants According to Their Perception of Breast Cancer Risk Factors In Annaba state

The figure illustrates the participants' knowledge of breast cancer risk factors. The majority of participants **agreed or strongly agreed** that a **family history of breast cancer**, **hormone replacement therapy (HRT)**, **obesity**, **smoking**, **alcohol consumption**, and **increasing age** are important risk factors for breast cancer. However, responses were more variable regarding **early menarche**, **late menopause**, **physical inactivity**, **nulliparity or late first pregnancy**, and **breastfeeding**, with a considerable proportion of participants reporting uncertainty or disagreement

B: Survey on Breast Cancer Awareness Amongst Women EL Tarf state

A.1. Distribution of Participants According to Age

Table 13. Distribution of Participants According to Age in EL Tarf state (n = 500)

Age Group (years)	Number	Percentage (%)
18-30	**119**	**23.8**
31-45	**194**	**38.8**
46-60	**138**	**27.6**
>61	**49**	**9.8**
Total	**500**	**100**

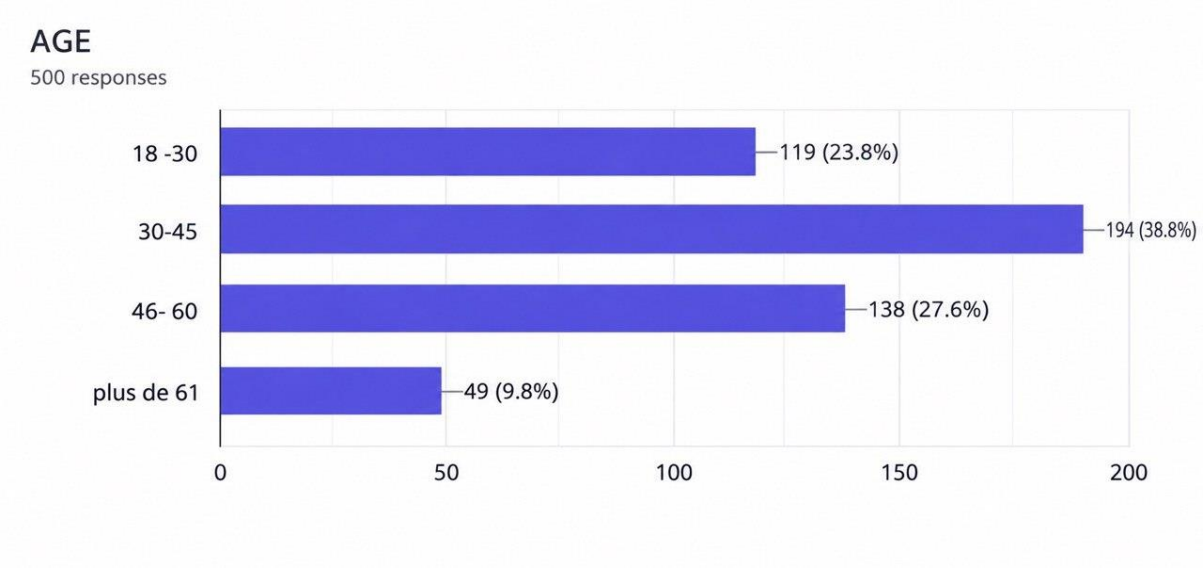


Figure 23. Distribution of Participants According to Age in EL Tarf state (n = 500)

The study included women from different age groups, with the majority (38.8%) aged between 30 and 45 years, followed by those aged 46–60 years (27.6%) and 18–30 years (23.8%). Women over 61 years represented only 10% of the participants, indicating that the survey mainly targeted middle-aged women.

B.2 Distribution of Participants According to Marital status:

Table 14. Distribution of Participants According to Marital Status in EL Tarf state (n = 500)

Marital status	Number	Percentage (%)
Married	334	66.8
Single	90	18.0
Divorced	42	8.4
Widowed	34	6.8
Total	500	100

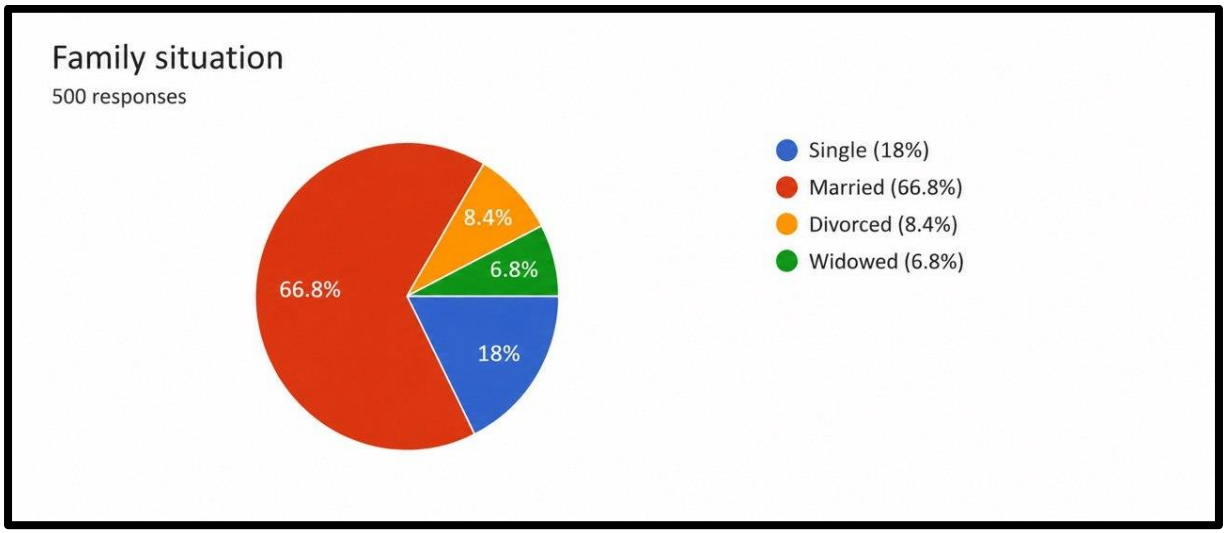


Figure 24: Distribution of Participants According to Marital Status in EL Tarf state (n = 500)

The figure illustrates the marital status distribution among the **500 participants**. The majority were **married (66.8%)**, followed by **single participants (18%)**. **Divorced participants accounted for 8.4%**, while **widowed participants represented 6.8%** of the sample. Overall, the findings indicate that the study population was predominantly married.

B.3 Distribution of Participants According to Level of Education

Table 15. Distribution of Participants According to Level of Education EL Tarf State (n = 500)

Level of Education	Number	Percentage (%)
Primary	89	17.8
Middle school	114	22.8
Secondary education	115	23.0
University	182	36.4
Total	500	100

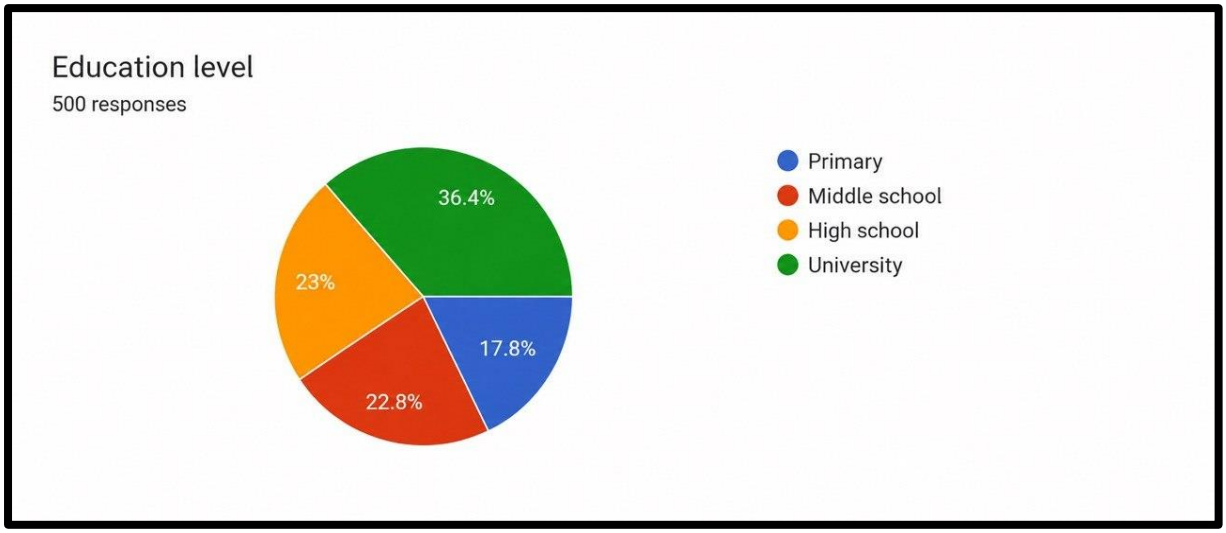


Figure 25: **Distribution of Participants According to Level of Education EL Tarf State (n = 500)**

The figure illustrates the educational level of the participants. More than one-third of the participants (**36.4%**) had a university-level education, followed by **23.0%** who had completed high school and **22.8%** who had completed middle school. Meanwhile, **17.8%** had only a primary-level education. Overall, the findings indicate that the participants had a **relatively high level of educational attainment**.

A.4 Monthly Income of the Study Participants

Table 16. Distribution of the Study Participants According to Monthly IncomeIn EL Tarf State (n = 500)

Monthly Income	Frequency (n)	Percentage (%)
Less than 5 million centimes	310	62.0
Less than 10 million centimes	159	31.8
Less than 15 million centimes	31	6.2
More than 15 million centimes	0	0
Total	500	100.0

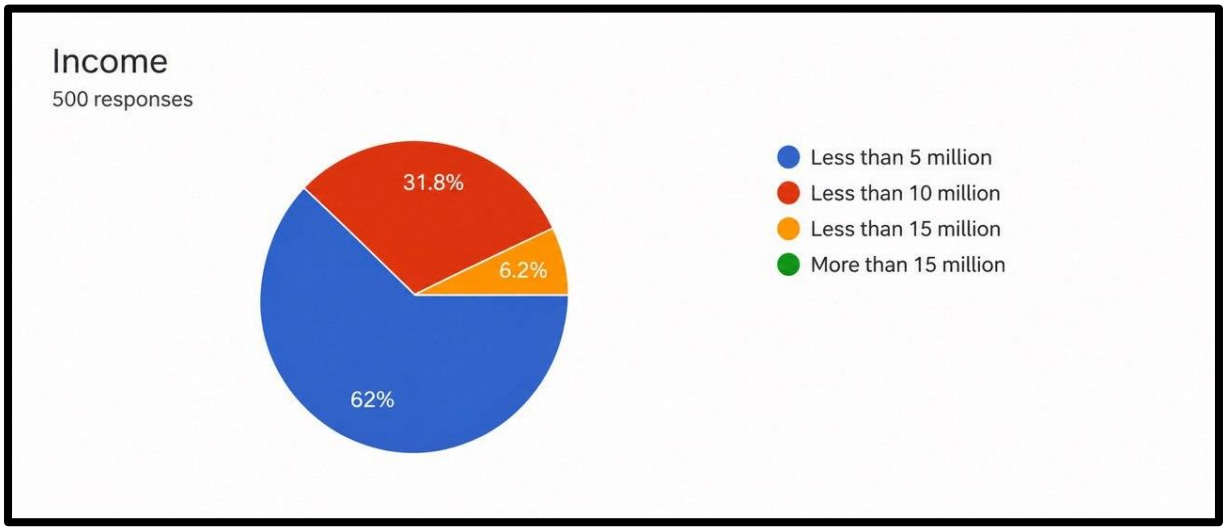


Figure 26. Distribution of the Study Participants According to Monthly Income In EL Tarf State (n = 500)

The figure illustrates the monthly income distribution among the participants. The majority of participants (62.0%) reported a monthly income of less than 5 million centimes, while 31.8% reported an income of 5 to less than 10 million centimes. Only a small proportion of participants reported higher monthly incomes. Overall, the findings indicate that the majority of participants belonged to low- to middle-income households

A.5 : Residence of the Study Participants

Table 17. Distribution of the Study Participants According to Residence In EL Tarf State

Residence	Frequency (n)	Percentage (%)
DERAN	69	13.8
TARF	89	17.8
KALA	47	9.4
BEN MHIDI	76	15.2
BESBES	173	34.6
BOUHADJAR	26	5.2
BOUTELDJA	20	4.0
Total	500	100.0

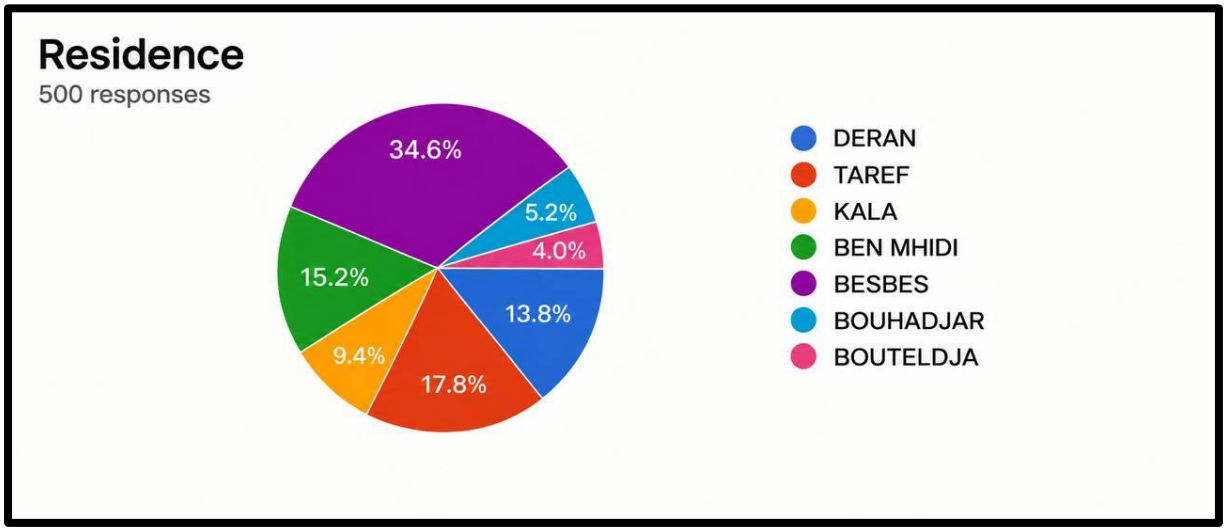


Figure 27: Distribution of the Study Participants According to Residence In EL Tarf State

The figure illustrates the distribution of participants according to their place of residence. The largest proportion of participants were from Besbes (34.6%), followed by Taref (17.8%), Ben M'Hidi (15.2%), Deran (13.8%), and El Kala (9.4%). Smaller proportions were from Bouhadjar (5.2%) and Bouteldja (4.0%). Overall, the participants were distributed across several municipalities, reflecting geographical diversity within El Tarf Province.

B.6 Knowledge of Breast Cancer Warning Signs

Table 18. Distribution of the Study Participants According to Their Awareness of Breast Cancer Warning Signs In EL Tarf State

Warning signe	Yes(n)	Yes(%)	NO	No(%)	I don`t know	I don`t know(%)
Lump/swelling in the Brest	434	86.8%	43	8.6%	23	4.6%
Lump/swelling in the armpit	395	79 %	63	12.6%	42	8.4%
Nipple discharge or bleeding	295	59.0%	109	21.8%	96	19.2%
Retraction of the nipple	199	39.8%	142	28.4%	159	31.8%
Change in nipple position	282	56.4%	115	23.0%	103	20.6%
Skin rash on the breast	259	51.8%	158	31.6%	83	16.6%
Redness on the skin	266	53.2%	155	31.0%	79	15.8%
Change in breast size	344	68.8%	101	20.2%	55	11.0%
Change in breast shape	344	68.8%	96	19.2%	60	12.0%
Pain in the breast or armpit	341	68.2%	111	22.2%	48	9.6%
Dimpling/wrinkling of the breast skin	184	36.8%	168	33.6%	148	29.6%

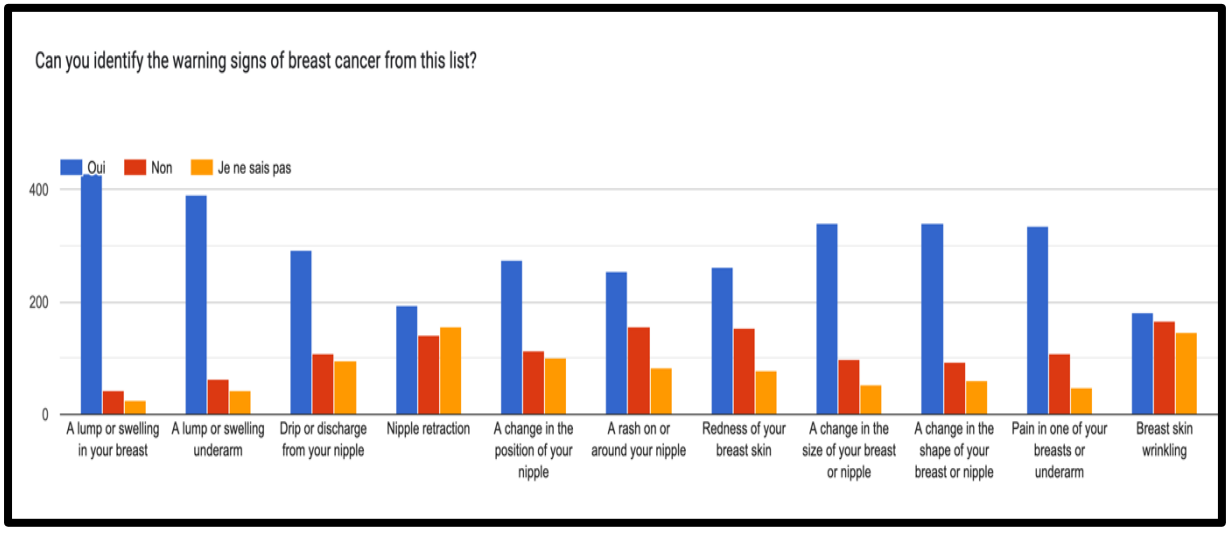


Figure 28: Table 6. Distribution of the Study Participants According to Their Awareness of Breast Cancer Warning Signs In EL Tarf State

The figure illustrates the participants' knowledge of the warning signs of breast cancer. The majority of participants correctly identified the most common warning signs, particularly a breast lump, an axillary lump, and nipple discharge or bleeding. Awareness was also relatively high regarding changes in breast shape and changes in the appearance of the breast skin. However, knowledge of breast pain as a possible warning sign was comparatively lower, with a considerable proportion of participants indicating that they did not know whether it was associated with breast cancer.

B.7 Consultation with a Physician After Noticing a Breast Change

Table 19. Distribution of the Study Participants According to Visiting a Doctor After Noticing a Change in the Breast In EL Tarf State

Response	**Frequency (n)**	**Percentage (%)**
Yes	139	27.8%
No	237	47.4%
I have not noticed any changes in my breast	124	24.8 %
Total	500	100%

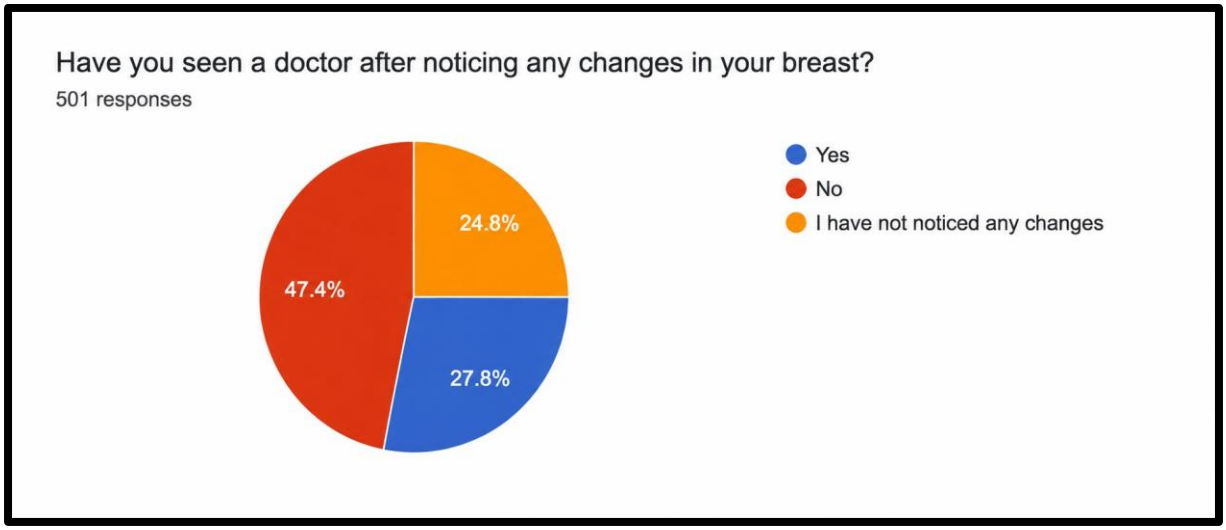


Figure 29: Distribution of the Study Participants According to Visiting a Doctor After Noticing a Change in the Breast In EL Tarf State

The figure illustrates the Distribution of the Study Participants According to Visiting a Doctor After Noticing a Change in the Breast , (47.5%) reported that they had never visited a physician after noticing breast changes, while only 27.7% sought medical advice. The remaining participants stated that they had not noticed any breast changes. This finding suggests delays in seeking medical consultation among many women.

B .8 Time to Visit a Physician After Noticing a Breast Change

Table 20. Distribution of the Study Participants According to the Time of Visiting a Doctor After Noticing a Breast Change In EL Tarf State

Time of visiting a doctor	**Frequency (n)**	**Percentage (%)**
immediately	378	75.6%
later	98	19.6%
never	24	4.8%
Total	500	100%

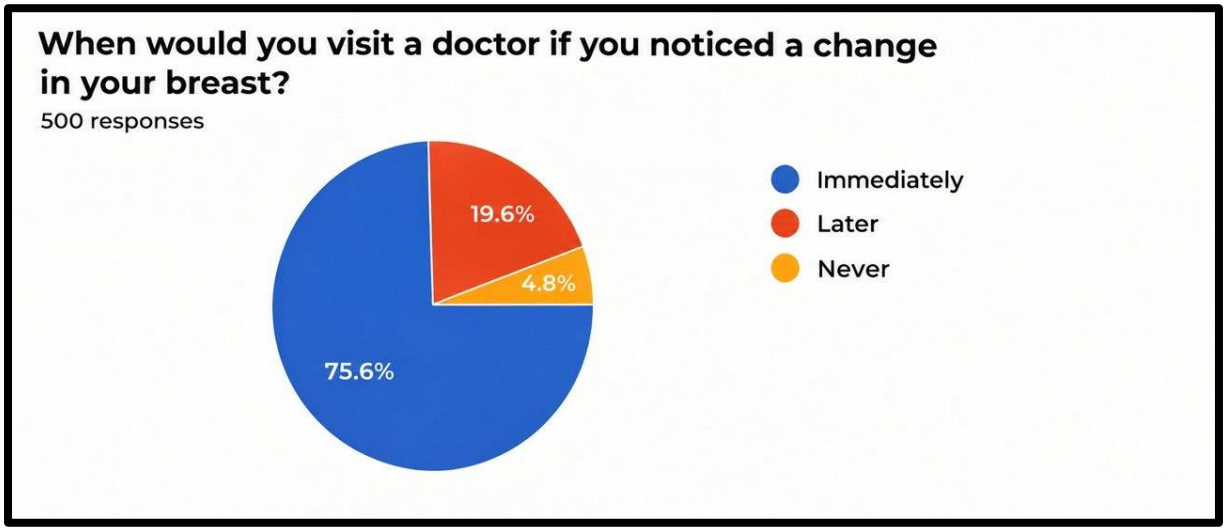


Figure 30 : Distribution of the Study Participants According to the Time of Visiting a Doctor After Noticing a Breast Change In EL Tarf State

The figure illustrates participants' willingness to seek medical attention after detecting a breast abnormality. The majority of participants (75.6%) indicated that they would visit a physician immediately, whereas 19.6% reported that they would wait until later. Only a small proportion stated that they would never seek medical attention. These findings reflect generally positive attitudes toward early medical consultation.

A.9 Knowledge of the Age Group Most Likely to Develop Breast Cancer

Table 21: Distribution of the Study Participants According to Their Perception of the Age Group Most Likely to Be Diagnosed with Cancer In EL Tarf State

Age group	**Frequency (n)**	**Percentage (%)**
Women in their thirties	55	11.0%
Women in their fifties	145	29.0 %
Women in their seventies	83	16.6%
Women of any age	217	43.4%
Total	500	100%

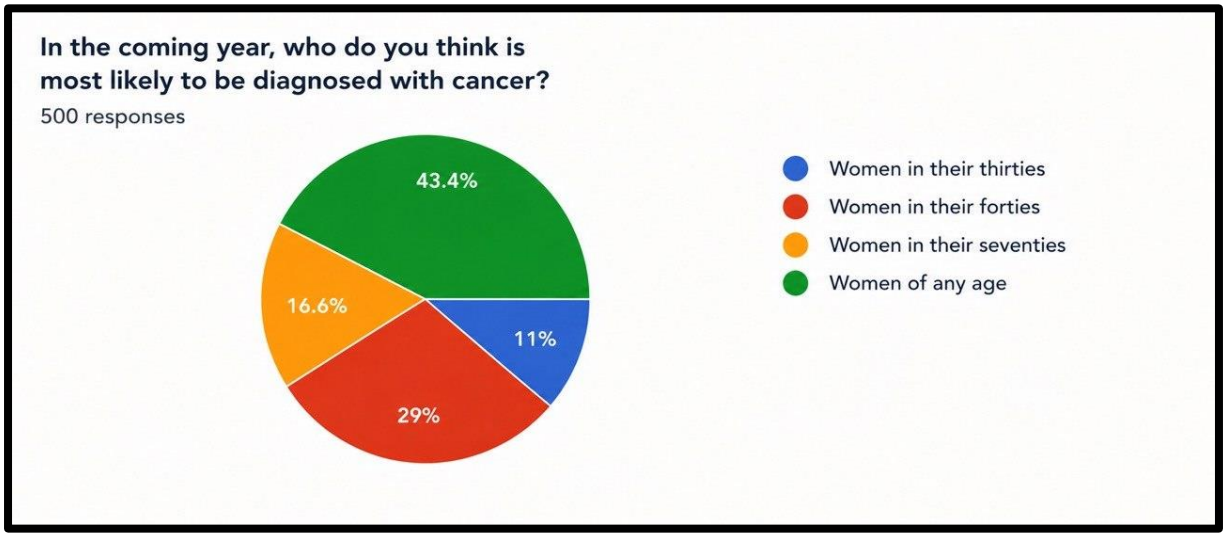


Figure 31 : Distribution of the Study Participants According to Their Perception of the Age Group Most Likely to Be Diagnosed with Cancer In EL Tarf State

The figure illustrates participants' knowledge of the age-related risk of breast cancer. The largest proportion (43.4%) believed that breast cancer can occur at any age, while 29.0% identified 50 years, 16.6% selected 70 years, and 11.0% selected 30 years. These findings indicate varying levels of awareness regarding the age-related risk of breast cancer.

B.10 Invitation to Participate in a Breast Cancer Screening Program

Table 22. Distribution of the Study Participants According to Invitation to Participate in a Breast Cancer Screening Program In EL Tarf State

Response	**Frequency (n)**	**Percentage (%)**
Yes	119	23.8%
No	381	76.2%
Total	500	100%

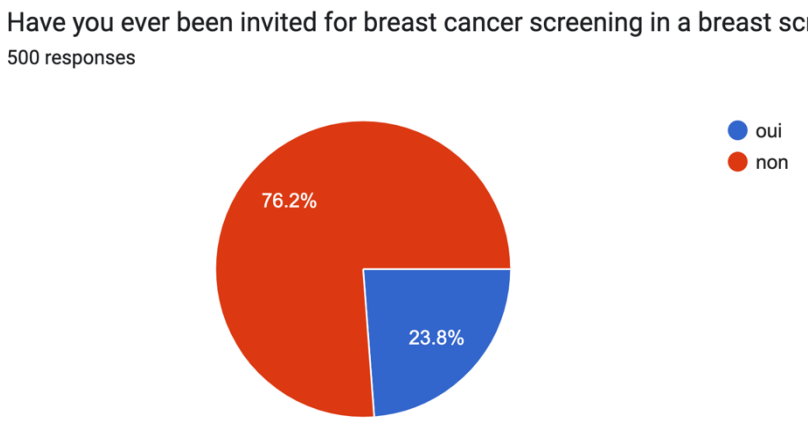


Figure 32: Distribution of the Study Participants According to Invitation to Participate in a Breast Cancer Screening Program In EL Tarf State

The figure illustrates whether participants had received an invitation to participate in a breast cancer screening program. The majority of participants (76.2%) reported that they had never been invited, whereas only 23.8% indicated that they had received an invitation. These findings suggest limited coverage of organized breast cancer screening programs among the study population.

B.11 **Participation in a Breast Cancer Screening Program**

Table 23. Distribution of the Study Participants According to Previous Participation in a Breast Cancer Screening Program In EL Tarf State

Response	**Frequency (n)**	**Percentage (%)**
Yes	104	20.8%
No	396	79.2%
Total	500	100%

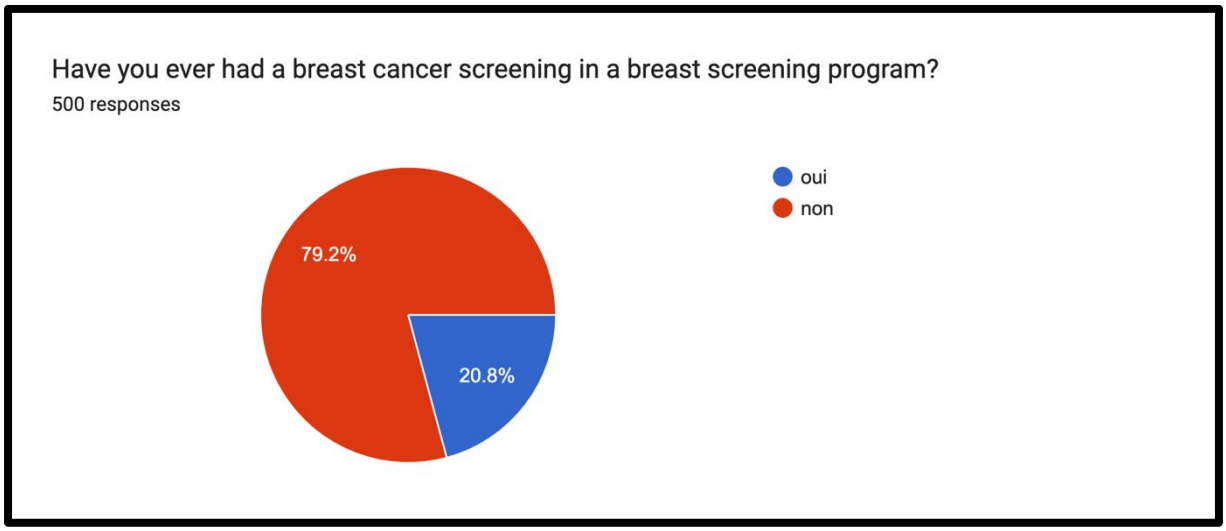


Figure 33: Distribution of the Study Participants According to Previous Participation in a Breast Cancer Screening Program In EL Tarf State

The figure illustrates whether participants had undergone breast cancer screening through an organized screening program. The majority of participants (79.2%) reported that they had never participated, whereas only 20.8% indicated that they had undergone screening. These findings suggest low utilization of organized breast cancer screening services among the study population

B.12 Knowledge of Breast Cancer Risk Factors

Table 24. Distribution of the Study Participants According to Their Perception of Breast Cancer Risk Factors In EL Tarf State

Risk factor	Strongly agree n (%)	Agree n (%)	Not sure n (%)	Disagree n (%)	Strongly Disagree n (%)
Family history of breast cancer	262 (52.4%)	114 (22.8%)	53 (10.6%)	51 (10.2%)	20 (4.0)
Use of hormone replacement therapy (HRT)	194 (38.8%)	167 (33.4%)	91 (18.2%)	33 (6.6%)	15 (3.0)
Drinking more than one alcoholic beverage per day 165 (33.0%)	161 (32.2%)	140 (28.0%)	130 (26.0%)	47 (9.4%)	22 (4.4)
Overweight (BMI > 25)	113 (22.6%)	157 (31.4%)	118 (23.6%)	91(18.2%)	21 (4.2)
Having a close relative with breast cancer	143 (28.6%)	161(32.2%)	97 (19.4%)	78 (15.6%)	21 (4.2)
Delayed childbearing or not having children	83 (16.6%)	126 (25.2%)	136 (27.2%)	126 (25.2%)	29 (5.8)
early puberty	52 (10.4%)	88 (17.6%)	175 (35.0%)	153 (30.6%)	32 (6.4)
Late menopause	47 (9.4%)	94 (18.8%)	186 (37.2%)	141 (28.2%)	32 (6.4)
Exercising less than 30 minutes, five times per week	137 (27.4%)	229(45.8%)	54 (10.8%)	52(10.4%)	28 (5.6)

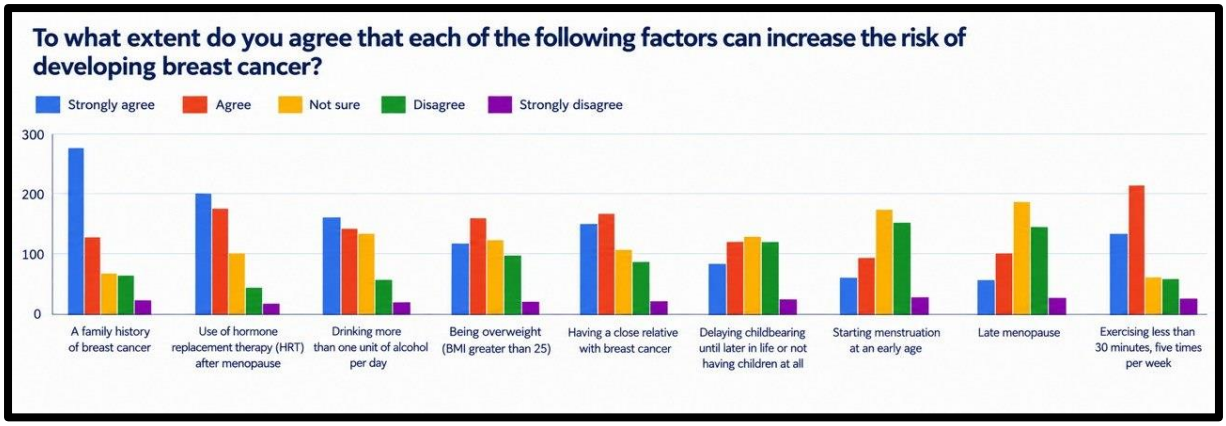


Figure 34: Distribution of the Study Participants According to Their Perception of Breast Cancer Risk Factors In EL Tarf State

The figure illustrates the participants' knowledge of the risk factors associated with breast cancer. The majority of participants correctly identified several established risk factors, particularly **having a family history of breast cancer**, **advancing age**, and **genetic predisposition**. Awareness was moderate for other risk factors, whereas misconceptions and uncertainty were observed for some items, with a proportion of participants selecting incorrect responses or indicating that they did not know. Overall, the findings suggest a generally satisfactory level of awareness regarding breast cancer risk factors, although knowledge gaps remain for certain factors.

DISCUSSION (Annaba State)

The present study was conducted among 500 women in Annaba State to assess their awareness of breast cancer, including knowledge of warning signs, risk factors, age-related susceptibility, healthcare-seeking behavior, and participation in breast cancer screening programs. The findings provide important insights into the level of breast cancer awareness among women in Annaba and highlight both strengths and persistent gaps in knowledge and preventive practices. In terms of sociodemographic characteristics, the largest proportion of participants were aged 31–45 years (39.8%), followed by those aged 46–60 years (26.4%), while women aged 18–30 years represented 24.8% and those older than 61 years accounted for only 9.0%. Regarding marital status, the majority of participants were married (63.4%). In terms of education, university graduates represented the largest group (38.0%), followed by women with secondary education (31.8%). Therefore, 69.8% of participants had at least secondary-level education, which may have contributed to the relatively good recognition of several breast cancer warning signs. The socioeconomic distribution showed that 48.6% reported a monthly income of less than 5 million centimes, while 38.6% reported an income of less than 10 million centimes. These characteristics should be considered when interpreting the findings because socioeconomic and educational circumstances may influence access to health information and preventive healthcare. Regarding knowledge of breast cancer warning signs, the present study demonstrated relatively high awareness of the most recognizable symptoms. A breast lump or swelling was the most frequently identified warning sign, recognized by 89.8% of participants, followed by an

axillary lump or swelling at 84.2%. These findings indicate that the majority of women in Annaba were familiar with the classical presentation of breast cancer. However, awareness declined for less obvious manifestations. Pain in the breast or axilla was recognized by 72.0%, change in breast shape by 70.6%, change in breast size by 68.2%, nipple discharge or bleeding by 64.4%, and change in nipple position by 60.8%. Awareness was lower for nipple retraction (51.6%), redness of the breast skin (50.8%), and skin rash (48.0%). The least recognized symptom was dimpling or wrinkling of the breast skin, reported by only 33.4% of participants, while 40.2% stated that they did not know whether this was a warning sign. This pattern indicates that participants were considerably more familiar with visible and commonly discussed breast changes, particularly breast lumps, than with less prominent changes involving the skin or nipple. A similar pattern was observed in the Djelfa study, where breast mass was recognized by 97.71% of participants, representing the most widely recognized warning sign. However, awareness of dimpling or puckering was only 44.27%, and awareness of inward traction was 50.23%. Redness and changes in nipple position were also recognized by approximately half of the participants. Thus, both Annaba and Djelfa demonstrate strong awareness of breast masses but comparatively limited recognition of subtle warning signs. Nevertheless, the percentage recognizing dimpling or wrinkling in Annaba was lower than that reported in Djelfa, suggesting a particularly important educational gap in this area. The findings can also be considered in relation to the Jordanian study [120]. The Jordanian study reported that 80.3% of participants had good overall knowledge, while 16.5% had a neutral level of knowledge and

3.1% had poor knowledge, with a mean knowledge score of 31.6 out of 36. Although the measurement approaches were not identical, the Jordanian findings suggest a more comprehensive level of breast cancer knowledge [120]. In Annaba, awareness was high for major warning signs but less consistent for less obvious manifestations. Therefore, the difference may not necessarily reflect a lack of general awareness but rather an uneven distribution of knowledge across specific aspects of breast cancer.

An important aspect of the present study is the relationship between awareness and healthcare-seeking behavior. More than half of the participants (53.0%) reported that they had not consulted a physician after noticing a change in the breast, whereas only 31.8% reported having sought medical advice. This finding is concerning because recognizing a breast abnormality does not necessarily result in appropriate medical consultation. It demonstrates a possible gap between knowledge of breast cancer symptoms and actual health-seeking 71he d71or71. This gap is particularly important in breast cancer because delays in assessment of suspicious breast changes may postpone diagnosis and treatment. Interestingly, when participants were asked about the expected timing of medical consultation, the majority reported a positive intention toward seeking care. Approximately 77.2% stated that they would visit a physician immediately after noticing a breast change, whereas 19.4% would delay consultation and only 3.4% would never consult a physician. The difference between the relatively high proportion reporting an intention to seek immediate care and the lower proportion who actually reported consulting a physician suggests that intention does not always translate into practice. This discrepancy may

be influenced by several contextual factors, including access to healthcare, fear, social factors, financial considerations, or underestimation of symptoms. However, these factors were not directly assessed in the present study and therefore should not be considered established explanations. Knowledge concerning the age at which breast cancer is most likely to occur also revealed some misconceptions. Although 34.6% of participants correctly indicated that breast cancer can occur among women of any age, 29.2% believed that women in their fifties were the most likely group, while 21.4% selected women in their seventies and 14.8% selected women in their thirties. The finding that approximately one-third of participants recognized that breast cancer can occur at any age is encouraging. Nevertheless, the responses also demonstrate that many participants associate breast cancer primarily with older age. This perception may contribute to a reduced perception of risk among younger women and may potentially discourage them from seeking medical evaluation when breast changes occur. The findings related to breast cancer screening provide another important area of concern. Only 32.4% of participants reported that they had been invited to participate in a breast cancer screening program, while 67.6% had not received an invitation. More importantly, only 30.0% reported previous participation in a breast cancer screening program, whereas 70.0% had never participated. This relatively low participation rate highlights an important gap between breast cancer awareness and preventive practice. It also suggests that improving women's knowledge should be accompanied by effective screening programs, appropriate communication strategies, and improved opportunities for women to access screening services. The findings from

Annaba can be compared with those from Djelfa , where awareness of breast cancer risk factors was generally limited. In the Djelfa study, the overall awareness of risk factors was 32.93%, despite relatively good recognition of some warning signs [121]. In the Annaba study, participants demonstrated stronger recognition of several risk factors. Family history of breast cancer was particularly well recognized, while hormone replacement therapy was also identified by a considerable proportion of participants. However, substantial uncertainty remained regarding reproductive and lifestyle-related factors, including delayed childbearing or not having children, early puberty, late menopause, and physical inactivity. This indicates that awareness of breast cancer risk factors in Annaba, although better for certain factors, is still incomplete. Family history appeared to be among the most strongly recognized risk factors in Annaba.

This finding contrasts markedly with the Djelfa study [121], in which only 7.34% of participants identified family history as a risk factor. The substantially higher awareness in Annaba may indicate better recognition of hereditary susceptibility among the women surveyed. Similarly, awareness of hormone replacement therapy was relatively high in Annaba, suggesting that participants had some knowledge of the relationship between hormonal exposure and breast cancer risk. However, the uncertainty observed for reproductive factors indicates that knowledge was not equally distributed across all categories of risk. The recognition of lifestyle-related risk factors also showed mixed results. A considerable proportion of participants agreed that physical inactivity could be associated with breast cancer, while responses regarding overweight, alcohol consumption, and reproductive

factors were more variable. This suggests that some participants may recognize general lifestyle influences but may lack a detailed understanding of the specific factors associated with breast cancer risk. Consequently, breast cancer education should address not only hereditary and hormonal risk factors but also modifiable lifestyle and reproductive factors. When the three Algerian studies are considered together, namely Annaba, El Tarf, and Djelfa [121], a relatively consistent pattern emerges. Women generally demonstrate stronger awareness of the most prominent and easily recognizable breast cancer symptoms, particularly breast lumps, while knowledge of less obvious symptoms and some risk factors remains less satisfactory. This similarity suggests that the main challenge is not simply the absence of breast cancer information, but rather the incomplete nature of that information. Awareness campaigns may successfully communicate that a breast lump can be a sign of breast cancer, but they appear to be less effective in communicating other important manifestations such as skin dimpling, nipple retraction, redness, and changes in nipple position. The comparison with Jordan further highlights the importance of comprehensive breast cancer education. The Jordanian study demonstrated a high overall level of knowledge, with 80.3% of participants classified as having good knowledge [120]. In contrast, the Algerian studies, including Annaba, show considerable variation across individual domains of awareness. However, direct comparison of overall knowledge levels should be interpreted cautiously because the studies did not necessarily use identical questionnaires, scoring systems, or participant characteristics. Therefore, differences between the studies may reflect methodological as well as

population-level differences. Overall, the findings of the present study indicate that women in Annaba possess good awareness of several major breast cancer warning signs, particularly breast and axillary lumps. Nevertheless, important knowledge gaps remain concerning subtle breast changes, certain risk factors, and age-related susceptibility. More importantly, the study demonstrates a considerable discrepancy between awareness and preventive, as reflected by the low participation in screening programs and the relatively low proportion of women who reported consulting a physician after noticing breast changes. These findings emphasize the need for breast cancer awareness programs in Annaba to adopt a more comprehensive approach. Educational interventions should emphasize the complete range of warning signs rather than focusing mainly on breast lumps. They should also strengthen knowledge of breast cancer risk factors and encourage women to seek medical evaluation promptly when any suspicious breast change occurs. In parallel, improving access to organized screening programs and increasing invitations to eligible women may help convert awareness into actual preventive .

In conclusion, the present study demonstrates that breast cancer awareness among women in Annaba is characterized by relatively good recognition of common warning signs but insufficient knowledge of less obvious symptoms and several risk factors. Compared with Djelfa [121], Annaba shows a similar pattern of strong recognition of breast masses but better awareness of certain risk factors, particularly family history. Compared with Jordan [120], the findings suggest less comprehensive awareness across different domains, although direct overall comparisons should be interpreted cautiously because

of differences in study methodology. The findings from Annaba, together with those from El Tarf and Djelfa, highlight the continuing need for targeted breast cancer education and stronger screening strategies in Algeria, with particular emphasis on transforming knowledge into timely healthcare-seeking and preventive practices.

DISCUSSION (El Tarf State)

The present cross-sectional study assessed breast cancer awareness among 500 women in El Tarf State, Algeria, focusing on knowledge of breast cancer warning signs, perceptions of risk factors, healthcare-seeking ,and participation in breast cancer screening programs. Overall, the findings demonstrate a mixed pattern of awareness. Participants showed relatively good recognition of the most prominent warning signs of breast cancer, particularly breast lumps, whereas awareness was considerably lower for less obvious manifestations such as nipple retraction and breast skin dimpling. In addition, although most participants expressed a willingness to seek medical attention promptly after noticing a breast abnormality, participation in organized breast cancer screening programs remained limited. These findings highlight an important gap between awareness, intention, and actual preventive practices. The sociodemographic characteristics of the present sample should be considered when interpreting the findings. The largest proportion of participants were aged 31–45 years (38.8%), followed by those aged 46–60 years (27.6%), while women older than 61 years represented 9.8%. More than one-third of participants had a university-level education (36.4%), and the majority were married (66.8%). These characteristics are relevant because demographic factors may influence exposure to health information and breast cancer awareness. This is supported by the Jordanian study [120], which found significant associations between

knowledge of breast cancer signs and symptoms and age, marital status, having children, number of children, education specialty, and working area. Awareness of Breast Cancer Warning Signs In the present study, the highest level of awareness was observed for breast lump or swelling, which was recognized by 86.8% of participants. Awareness was also high for axillary lump or swelling (79.0%), changes in breast size and shape (68.8% each), and breast or axillary pain (68.2%). These findings indicate that women in El Tarf are relatively familiar with the more noticeable clinical manifestations of breast cancer. However, awareness decreased substantially for less prominent signs. Only 39.8% of participants recognized nipple retraction, while 36.8% recognized dimpling or wrinkling of the breast skin. Awareness of nipple discharge or bleeding was 59.0%, and recognition of skin rash and redness was 51.8% and 53.2%, respectively. This variation suggests that breast cancer awareness in the study population is not comprehensive and is particularly limited for signs that may be less familiar or less visually obvious. The results are comparable with findings from the Algerian study conducted among 436 women in Djelfa [121], which examined breast cancer knowledge and breast self-examination practices. In that study, the overall average level of correct responses regarding breast cancer knowledge was 51.31%, while knowledge of alarming signs reached 66.47%. The most widely recognized warning sign was the presence of a breast mass, identified by 97.71% of participants. However, knowledge was considerably lower for breast dimpling or puckering (44.27%), inward traction of the breast or nipple (50.23%), breast redness (54.13%), and changes in nipple position (54.13%). A similar pattern was observed in El Tarf. Recognition of a breast lump was high (86.8%), although lower than the 97.71% reported in the Djelfa study [121].

Awareness of nipple retraction was also lower in the present study (39.8%) than the 50.23% reported previously, and awareness of breast dimpling was 36.8%

compared with 44.27%. Conversely, recognition of changes in nipple position was slightly higher in El Tarf (56.4%) than in the Djelfa study (54.13%) [121], while recognition of skin redness was very similar (53.2% versus 54.13%). The consistency of this pattern across two Algerian populations is noteworthy.

In both studies, women were substantially more likely to recognize a breast mass than less conspicuous manifestations such as nipple retraction and skin dimpling.

This is relevant to screening because perceptions of low personal risk may reduce motivation to participate in screening or seek medical evaluation when symptoms occur. Overall Comparison Between El Tarf, Djelfa [121], and Jordan [120] When the findings of the present study are considered alongside the Algerian and Jordanian studies, several important patterns emerge. First, the two Algerian studies demonstrate a consistent hierarchy of symptom recognition. Breast lumps are the most widely recognized warning sign, whereas less conspicuous manifestations such as nipple retraction and breast skin dimpling are consistently less recognized. In El Tarf, 86.8% recognized a breast lump, compared with 97.71% in the Djelfa study [121]. Recognition of nipple retraction and breast dimpling was 39.8% and 36.8%, respectively, in El Tarf, compared with 50.23% and 44.27% in the Djelfa study [121]. Second, the Jordanian study reported a relatively high overall level of awareness, with 80.3% classified as having good knowledge. However, because that study used an overall knowledge score, whereas the present study reports individual symptoms, direct numerical comparison is inappropriate. Nevertheless, the Jordanian findings reinforce the importance of examining demographic determinants of awareness, particularly because knowledge was associated with age, marital status, having children, education specialty, and working area [120]. Third, the Algerian study demonstrated that awareness of breast cancer risk factors was substantially weaker than awareness of warning signs, with

only 32.93% average correct responses for risk factors. The present El Tarf study appears to show better recognition of several risk factors, particularly family history, although the different questionnaires prevent a direct quantitative comparison. Finally, the current study adds an important dimension that cannot be assessed from symptom awareness alone: the relationship between knowledge and preventive. Despite 75.6% of women stating that they would seek medical attention immediately after noticing a breast abnormality, only 20.8% had previously participated in an organized screening program. This finding indicates that increasing knowledge alone may not be sufficient to improve early detection. Awareness programs should be accompanied by accessible screening services and clear information regarding when and where women can obtain screening and clinical evaluation. Conclusion of the Discussion Overall, the present study demonstrates that women in El Tarf have relatively good awareness of several prominent breast cancer warning signs, particularly breast lumps and axillary lumps, but important gaps remain regarding less recognizable clinical manifestations such as nipple retraction and breast skin dimpling. These findings are broadly consistent with the previous Algerian study conducted among women in Djelfa [121], in which breast masses were highly recognized but awareness of several less obvious warning signs and risk factors was considerably lower.

Compared with the Jordanian study [120], the present findings cannot be interpreted as representing a higher or lower overall level of knowledge because the two studies used different scoring methods. Nevertheless, the Jordanian research demonstrates that high awareness can coexist with specific knowledge gaps and that sociodemographic factors may significantly influence knowledge levels. The most important implication of the present study is therefore that breast cancer awareness in El Tarf should be strengthened in a targeted manner. Educational interventions should expand beyond the recognition of breast lumps

to include nipple retraction, skin dimpling, nipple changes, and other less familiar warning signs. At the same time, greater emphasis should be placed on breast cancer risk factors and on translating awareness into preventive practices. The low participation in organized screening programs observed in this study indicates that improving knowledge should be accompanied by efforts to increase women's access to and engagement with breast cancer screening services. Such a combined approach may contribute to earlier presentation, earlier diagnosis, and ultimately better breast cancer outcomes among women in El Tarf.

CONCLUSION

Breast cancer remains one of the most common cancers affecting women worldwide and represents a major public health concern, including in Algeria. Early detection plays a crucial role in improving treatment outcomes, reducing mortality, and increasing the chances of successful management. This study aimed to assess the level of knowledge and awareness of women regarding breast cancer, its risk factors, warning signs, and methods of early detection, with particular emphasis on breast self-examination, clinical examination, and screening practices. The findings indicate that the participants had a generally acceptable level of awareness regarding breast cancer and recognized some of its major risk factors and warning signs. However, an important gap was observed between general knowledge and the actual practice of preventive and early-detection measures. The use of screening services and regular breast examination remained insufficient, suggesting that awareness alone does not necessarily translate into appropriate health-seeking behavior. These findings are consistent with observations reported in previous studies conducted in Algeria and Jordan, which similarly highlighted limitations in the practical application of breast cancer prevention and early-detection measures. Differences between populations may be related to variations in educational level, access to healthcare services, socioeconomic conditions, cultural factors, and the availability of organized screening programs. Overall, the study emphasizes the need to strengthen breast cancer awareness among women in Algeria through continuous health education, community-based awareness programs, and improved access to early-detection and screening services. Promoting regular breast examination and encouraging timely medical consultation for suspicious breast changes may contribute to earlier diagnosis and better outcomes.

List of abbreviations :

- **ASIR** – Age-Standardized Incidence Rate
- **ASMR** – Age-Standardized Mortality Rate
- **HDI** – Human Development Index
- **IARC** – International Agency for Research on Cancer
- **WHO** – World Health Organization
- **BRCA1** :Breast Cancer Gene 1
- **BRCA2** :Breast Cancer Gene 2
- **BSE** :Breast Self-Examination
- **NGOs** :Non-Governmental Organizations
- **TDLU** :Terminal Duct-Lobular Unit
- **HER2 :**Human Epidermal Growth Factor Receptor 2
- **ERBB2 :**Erb-B2 Receptor Tyrosine Kinase 2
- **TP53 :**Tumor Protein p53
- **PIK3CA.** Phosphatidylinositol-4,5-Bisphosphate 3-Kinase Catalytic Subunit Alpha
- **DNA** Deoxyribonucleic Acid
- **AJCC**: American Joint Committee on Cancer
- **DCIS**: Ductal Carcinoma In Situ
- **ER**: Estrogen Receptor
- **IBC**: Invasive Breast Carcinoma
- **IDC** : Invasive Ductal Carcinoma
- **ILC** : Invasive Lobular Carcinoma
- **IHC**: Immunohistochemistry
- **Ki-67**: Ki-67 Proliferation Index
- **LN**: Lymph Node
- **pCR**: Pathological Complete Response
- **PR**: Progesterone Receptor
- **TNM**: Tumor–Node–Metastasis
- **UICC**: Union for International Cancer Control

- **MRI** – Magnetic Resonance Imaging
- **PET** – Positron Emission Tomography
- **CT** – Computed Tomography
- **PET/CT** – Positron Emission Tomography/Computed Tomography
- **^{18}F-FDG** – Fluorine-18 Fluorodeoxyglucos
- **FNAC** – Fine Needle Aspiration Cytology
- **CNB** – Core Needle Biopsy
- **TP53** – Tumor Protein p53
- **ctDNA** – Circulating Tumor DNA
- **PALB2** – Partner and Localizer of BRCA2
- **CA 15-3** – Cancer Antigen 15-3
- **CA 27.29** – Cancer Antigen 27.29
- **ctDNA** – Circulating Tumor DNA
- **BCS** = **Breast-Conserving Surgery**
- **SLNB** = **Sentinel Lymph Node Biopsy**
- **EBR:** External Beam Radiation Therapy
- **pCR:** Pathological Complete Response
- **SERMs:** Selective Estrogen Receptor Modulators
- **Ais:** Aromatase Inhibitors

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ABSTRACT

In Algeria, as well as worldwide, breast cancer remains a major public health concern and one of the most common cancers affecting women. Early detection is essential for improving prognosis, reducing complications, and increasing the chances of successful treatment. Therefore, adequate awareness of breast cancer warning signs, risk factors, and screening practices is an important component of prevention and early diagnosis. The findings of this study conducted among women in the Annaba region, including Annaba and El Tarf, showed a relatively satisfactory level of awareness regarding several major warning signs of breast cancer, particularly breast lumps, axillary swelling, and changes in breast size and shape. However, awareness of some less commonly recognized signs and risk factors remained inconsistent. Despite this relatively satisfactory level of awareness, a notable gap was identified between knowledge and preventive practices. Screening participation remained limited, and a considerable proportion of women did not seek medical consultation after noticing breast changes. This highlights the importance of translating knowledge into appropriate health-seeking behaviors and early-detection practices. These findings emphasize the need to strengthen continuous breast cancer awareness and health-education programs in the region. Particular attention should be given to promoting screening, encouraging timely medical consultation, improving recognition of warning signs, and increasing understanding of breast cancer risk factors. In conclusion, improving breast cancer awareness should be accompanied by accessible screening services and effective health-promotion strategies. Strengthening both knowledge and preventive practices may contribute to earlier detection, timely management, and ultimately better health outcomes for women in Annaba and El Tarf.

RESUME

En Algérie comme dans le monde entier, le cancer du sein demeure un problème majeur de santé publique et l'un des cancers les plus fréquents chez la femme. Le diagnostic précoce constitue un élément essentiel pour améliorer le pronostic, réduire les complications et augmenter les chances de succès du traitement. Ainsi, une connaissance adéquate des signes d'alerte, des facteurs de risque et des pratiques de dépistage représente un élément important de la prévention et du diagnostic précoce. Les résultats de cette étude menée auprès des femmes de la région d'Annaba, incluant les wilayas d'Annaba et d'El Tarf, ont montré un niveau relativement satisfaisant de sensibilisation à plusieurs signes d'alerte majeurs du cancer du sein, notamment la présence d'une masse mammaire, une tuméfaction axillaire ainsi que les modifications de la taille et de la forme du sein. Cependant, la connaissance de certains signes moins fréquemment reconnus et de certains facteurs de risque demeurait inégale. Malgré ce niveau relativement satisfaisant de sensibilisation, un écart notable a été identifié entre les connaissances et les pratiques préventives. La participation au dépistage restait limitée et une proportion importante des femmes ne consultait pas un professionnel de santé après avoir remarqué des modifications mammaires. Cela souligne l'importance de transformer les connaissances en comportements appropriés de recours aux soins et de détection précoce. Ces résultats mettent en évidence la nécessité de renforcer les programmes continus de sensibilisation et d'éducation sanitaire sur le cancer du sein dans la région. Une attention particulière devrait être accordée à la promotion du dépistage, à la consultation médicale précoce, à la reconnaissance des signes d'alerte et à l'amélioration des connaissances concernant les facteurs de risque du cancer du sein. En conclusion, l'amélioration de la sensibilisation au cancer du sein doit être accompagnée de services de dépistage accessibles et de stratégies efficaces de promotion de la santé. Le renforcement des connaissances et des pratiques préventives pourrait contribuer à une détection plus précoce, à une prise en charge rapide et, à terme, à de meilleurs résultats de santé chez les femmes des régions d'Annaba et d'El Tarf.

الملخص

في الجزائر، وكما هو الحال على المستوى العالمي، لا يزال سرطان الثدي يمثل مشكلة صحية عامة رئيسية، ويُعد من أكثر أنواع السرطان شيوعاً لدى النساء. ويُعتبر التشخيص المبكر عاملاً أساسياً في تحسين الإنذار، وتقليل المضاعفات، وزيادة فرص نجاح العلاج. لذلك، فإن امتلاك معرفة كافية بعلامات التحذير من سرطان الثدي، وعوامل الخطورة، وممارسات الكشف المبكر يمثل عنصراً مهماً في الوقاية من المرض وتشخيصه في مراحله المبكرة .أظهرت نتائج هذه الدراسة التي أجريت على النساء في منطقة عنابة، بما في ذلك ولايتي عنابة والطارف، وجود مستوى جيد نسبياً من الوعي بعدد من أهم علامات التحذير من سرطان الثدي، وخاصة وجود كتلة في الثدي، وتورم منطقة الإبط، والتغيرات في حجم وشكل الثدي. ومع ذلك، بقيت المعرفة ببعض العلامات الأقل شيوعاً وبعض عوامل الخطورة غير متجانسة . وعلى الرغم من هذا المستوى الجيد نسبياً من الوعي، فقد لوحظ وجود فجوة واضحة بين المعرفة والممارسات الوقائية. إذ ظل الإقبال على الكشف المبكر محدوداً، كما أن نسبة مهمة من النساء لم يقمن باستشارة أحد العاملين في مجال الرعاية الصحية بعد ملاحظة تغيرات في الثدي. ويبرز ذلك أهمية تحويل المعرفة إلى سلوكيات صحية مناسبة، وخاصة فيما يتعلق بطلب الرعاية الصحية والكشف المبكر .وتؤكد هذه النتائج ضرورة تعزيز برامج التوعية والتثقيف الصحي المستمرة حول سرطان الثدي في المنطقة، مع التركيز بشكل خاص على تشجيع الكشف المبكر، والاستشارة الطبية في الوقت المناسب، وتحسين القدرة على التعرف على علامات التحذير، وتعزيز المعرفة بعوامل الخطورة المرتبطة بسرطان الثدي . وفي الختام، ينبغي أن يترافق تحسين الوعي بسرطان الثدي مع توفير خدمات كشف مبكر يسهل الوصول إليها واستراتيجيات فعالة لتعزيز الصحة. ومن شأن تعزيز المعرفة والممارسات الوقائية معاً أن يساهم في الكشف المبكر عن المرض، وتسريع التكفل به، وتحقيق نتائج صحية أفضل لدى النساء في ولايتي عنابة والطارف