



**An-Najah National University**  
**Faculty of Graduate Studies**

**A CROSS-SECTIONAL STUDY OF SELF-  
REPORTED SIDE EFFECTS OF BREAST CANCER  
TREATMENT AND THE QUALITY OF LIFE IN  
PALESTINE**

**By**  
**Karin Breek**

**Supervisors**  
**Prof. Sa'ed H. Zyoud**  
**Prof. Samah W. Al-Jabi**

**This Thesis is Submitted in Partial Fulfillment of the Requirements for the Degree of  
Master of Clinical Pharmacy, Faculty of Graduate Studies, An-Najah National University,  
Nablus - Palestine.**

**2025**

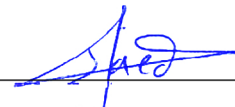
**A CROSS-SECTIONAL STUDY OF SELF-  
REPORTED SIDE EFFECTS OF BREAST CANCER  
TREATMENT AND THE QUALITY OF LIFE IN  
PALESTINE**

By  
Karin Breek

This Thesis was Defended Successfully on 16/01/2025 and approved by

Prof. Sa'ed H. Zyoud

Supervisor



Signature

Prof. Samah W. Al-Jabi

Co-Supervisor



Signature

Prof. Maher Khmour

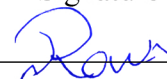
External Examiner



Signature

Prof. Rowa' Al-Ramahi

Internal Examiner



Signature

## **Dedication**

This thesis is dedicated to my beloved family, whose unwavering support and encouragement have been my foundation throughout this journey. To my parents, for their endless love, sacrifices, and belief in my dreams, and to my siblings for their constant motivation and understanding.

To my friends, who have been my pillars of strength, providing me with joy and comfort during the challenging times of this academic endeavor. Your friendship and encouragement have been invaluable.

To my educators, whose guidance, wisdom, and knowledge have shaped my academic and professional growth. I am profoundly grateful for your mentorship and the inspiration you have provided me.

To my colleagues, for the camaraderie and shared experiences that have enriched my learning and made this journey memorable. Your collaboration and support have been crucial in achieving this milestone.

Thank you all for your unwavering support and for believing in me. This achievement is as much yours as it is mine.

Karin Breek

## **Acknowledgement**

I would like to express my deepest gratitude to all those who have contributed to the completion of this thesis.

First and foremost, I am profoundly grateful to my thesis advisor, Prof. Dr. Sa'ed Zyoud, and Prof. Samah Al-Jabi for their unwavering support, invaluable guidance, and insightful feedback throughout this research journey. Their expertise and encouragement have been instrumental in shaping this work.

I extend my sincere appreciation to my committee members for their thoughtful suggestions, constructive criticism, and generous assistance.

I am deeply indebted to my family, whose unconditional love, encouragement, and sacrifices have been my greatest source of strength. To my parents, for their endless support and belief in my abilities, and to my siblings for their constant motivation and understanding.

I am also thankful to my friends, who have stood by me through thick and thin, providing me with emotional support and encouragement. Your friendship has been a source of comfort and joy during this challenging journey.

My heartfelt thanks go to my colleagues and fellow students for their camaraderie and collaborative spirit. Your support and shared experiences have made this journey enriching and memorable.

I would like to acknowledge the support of An-Najah National University and its faculty for providing the necessary resources and a conducive environment for research. Special thanks to An-Najah National University Hospital and Al-Watani Hospital for their assistance and support.

Lastly, I am grateful to all the participants of my study, without whom this research would not have been possible. Your willingness to share your experiences has been invaluable to this work.

Thank you all for your invaluable contributions to this thesis.

**Karin Breek**

## Declaration

I, the undersigned, declare that I submitted the thesis entitled:

**A CROSS-SECTIONAL STUDY OF SELF-REPORTED SIDE EFFECTS OF BREAST CANCER TREATMENT AND THE QUALITY OF LIFE IN PALESTINE**

I declare that the work provided in this thesis, unless otherwise referenced, is the researcher's own work, and has not been submitted elsewhere for any other degree or qualification.

**Student's Name:** Karin Breek

**Signature:**

كارين بريق

**Date:** 16/01/2025

## List of Contents

Dedication.....	III
Acknowledgement .....	IV
Declaration.....	V
List of Contents.....	VI
List of Tables .....	IX
List of Figures.....	X
List of Appendices .....	XI
Abstract.....	XII
Chapter One: Introduction and Theoretical Background.....	14
1.1 A brief review of the literature .....	16
1.1.1 Breast cancer .....	16
1.1.2 Mammography .....	17
1.1.3 Staging of breast cancer .....	17
1.1.4 Treatments for breast cancer .....	18
1.1.5 Side effects of breast cancer therapy .....	20
1.1.6 Breast cancer in Palestine.....	21
1.1.7 Quality of life .....	22
1.2 Problem statement .....	23
1.3 Research questions.....	24
1.4 Objectives .....	24
1.4.1 General objectives .....	24
1.4.2 Specific objectives.....	24
1.5 Importance of the study .....	25
Chapter Two: Methods .....	26
2.1 Study design.....	26
2.2 Study setting .....	26
2.3 Population.....	26
2.4 Sample size .....	26

2.5	Sampling procedure .....	27
2.5.1	Inclusion criteria.....	27
2.5.2	Exclusion criteria.....	27
2.6	Data collection and study tools.....	27
2.7	Data and statistical analysis .....	28
2.8	Ethical approval .....	28
	Chapter Three: Results.....	29
3.1	Characteristics of the participants.....	29
3.2	Treatment modalities received by the patients .....	31
3.3	Adverse effects of cancer treatment .....	31
3.3.1	Pain.....	31
3.3.2	Gastrointestinal health issues .....	32
3.3.3	Skin and hair health issues .....	33
3.3.4	Sleep and mental health issues .....	34
3.3.5	Respiratory/mouth and throat health issues.....	35
3.3.6	Hematologic health issues .....	35
3.3.7	Genitourinary health issues .....	36
3.3.8	Sensory health issues.....	37
3.3.9	General health issues .....	37
3.4	Answers of the patients to the WHOQOL-BREF questionnaire items .....	38
3.5	Scores of the different domains of the WHOQOL-BREF questionnaire .....	40
3.6	Associations between the demographic and disease characteristics of patients and their scores on the different domains of the WHOQOL-BREF questionnaire.....	40
3.7	Discussion.....	51
3.8	Interpretation and discussion of the main findings.....	51
3.8.1	Demographics and clinical characteristics .....	51
3.9	Treatment modalities and adverse effects.....	52
3.10	Patient quality of life .....	53
3.11	Predictors of quality of life.....	53

3.11.1 Impact of treatment on quality of life .....	54
3.11.2 Adverse effects and quality of life .....	54
3.12 Summary of the main findings .....	54
3.13 Limitations of the study.....	55
3.14 Conclusion.....	55
3.15 Implications for practice and recommendations .....	56
List of abbreviations .....	57
References.....	58
Appendices.....	64
الملخص.....	ب

## **List of Tables**

Table 1: Demographic and disease characteristics of the patients.....	30
Table 2: Distribution of answers of the patients to the WHOQOL-BREF questionnaire items.....	39
Table 3: Predictors of lower scores in the overall quality of life and general health scores as measured using the WHOQOL-BREF questionnaire .....	43
Table 4: Predictors of lower physical health scores .....	45
Table 5: Predictors of lower psychological health scores.....	46
Table 6: Predictors of lower social relationship scores .....	48
Table 7: Predictors of lower environment scores .....	49
Table 8: Predictors of lower overall scores .....	50

## List of Figures

Figure 1: Treatment modalities received by the patients .....	31
Figure 2: Prevalence of pain reported by the patients .....	32
Figure 3: Prevalence of gastrointestinal health issues among patients .....	33
Figure 4: Prevalence of skin and hair health issues .....	34
Figure 5: Prevalence of sleep and mental health issues .....	34
Figure 6: Prevalence of respiratory/mouth and throat health issues .....	35
Figure 7: Prevalence of hematologic health issues among patients.....	36
Figure 8: Prevalence of genitourinary health issues among patients.....	36
Figure 9: Prevalence of sensory health issues among patients .....	37
Figure 10: Prevalence of general health issues among patients.....	38

## **List of Appendices**

Appendix A: Data collection form.....	64
Appendix B: Institutional Review Board Approval .....	70
Appendix C: Scores of the patients in the different domains of the WHOQOL-BREF questionnaire.....	71
Appendix D: Association between the demographic and disease characteristics of the patients and their scores on the different domains of the WHOQOL-BREF questionnaire.....	72

# **A CROSS-SECTIONAL STUDY OF SELF-REPORTED SIDE EFFECTS OF BREAST CANCER TREATMENT AND THE QUALITY OF LIFE IN PALESTINE**

**By**

**Karin Breek**

**Supervisors**

**Dr. Sa'ed Zyoud**

**Dr. Samah Al-Jabi**

## **Abstract**

Background: Breast cancer is the most common cancer among women in terms of incidence. This study aimed to determine the side effects of breast cancer treatment reported by Palestinians with breast cancer and their quality of life.

Methods: This study was a cross-sectional questionnaire-based survey. The study was undertaken in Nablus. The data collection instrument was divided into two distinctive sections. Part (A) collected data covering sex, age at diagnosis, clinical symptoms, complications, treatment measures, and side effects of the treatments. While part (B) of the questionnaire involved the quality-of-life assessment tool, the current study employed the WHOQOL-BREF (Arabic version) as an assessment tool.

Results: A total of 258 patients with breast cancer participated in this study. In addition to breast cancer, 207 (80.2%) patients had one or more comorbid conditions. Of the patients, 153 (59.3%) were diagnosed less than 3 years ago. With respect to disease stage, 147 (57%) patients were in Stage I, 51 (19.8%) patients were in Stage II, 54 (20.9%) patients were in Stage III, and 6 (2.3%) patients were in Stage IV. Among the patients, 207 (80.2%) received chemotherapy, 159 (61.6%) underwent lumpectomy, 156 (60.5%) received radiotherapy, and 102 (39.5%) underwent mastectomy. When screened for the adverse effects of breast cancer treatments, the patients reported adverse effects and health issues that were categorized as follows: pain, gastrointestinal, skin and hair, health issues; pain, sleep and mental health, and respiratory/mouth and throat, hematologic, genitourinary, sensory, and general health issues. Multiple linear

regression showed that the overall scores were negatively associated with having comorbidities, having advanced-stage breast cancer, receiving mastectomy, and experiencing headaches, vomiting, depression, anxiety, mood swings, mouth and throat sores (mucositis), fever, and insomnia.

**Conclusions:** The findings of this study highlighted the heavy burden of disease and therapy-related adverse effects on the quality of life of patients with breast cancer who received treatment in Palestine. A multidisciplinary holistic care plan for breast cancer patients who integrates physical and mental health support is urgently needed to improve the quality of life of these patients.

**Keywords:** Breast cancer, Women's health, Treatment, Adverse effects, Quality of life

## **Chapter One**

### **Introduction and Theoretical Background**

Breast cancer is the most common cancer among women in terms of incidence (Bray et al., 2018). Early detection is still linked to a better prognosis, leading to a greater emphasis on timely and enhanced screening measures. More data on the incidence and death of almost all malignancies, including breast cancer, are currently available. The incidence of cancer and the number of cancer-related fatalities are quickly increasing (Porter, 2009).

Although several causes are being studied to explain these patterns and the disparities in breast cancer incidence rates between groups, there is still no consensus. BRCA1 and BRCA2 mutations have been studied for a long time and are known to be risk factors for breast cancer (Winters, Martin, Murphy, & Shokar, 2017). Changes in menstruation (early menarche age and delayed menopause), reproduction (late age at first birth), hormonal and alcohol consumption, and obesity are risk factors. On the other hand, both breastfeeding and increased physical activity are preventive factors against breast cancer. Individuals traveling from low-incidence locations to high-incidence locations eventually report a high incidence, indicating that environmental, nutritional, and other variables play a role in breast cancer risk (Ziegler et al., 1993).

Breast cancer is the most common cancer in the United States and worldwide. It is ranked second in the United States but first internationally in terms of deaths. The prognosis is clearly the best when a breast cancer diagnosis is made early. A personalized approach to cancer screening has recently been discussed in the era of personalized medicine in an attempt to improve breast cancer diagnosis and early detection for better prognosis (Narod, 2018); however, there are challenges associated with personalized approaches when dealing with large populations.

Although progress has been made in the early identification of breast cancer, which has resulted in better therapy and a better prognosis, late-stage diagnosis remains a problem, and more has to be done for these people.

Cytoreductive surgery, radiation therapy, targeted endocrine/molecular therapy, and chemotherapy are therapeutic techniques used to treat breast cancer (Geay, 2013).

Because of the heterogeneity of the disease, the treatment strategy necessitates justified therapy in each instance on the basis of the characterization and stage of the disease. Traditional locoregional treatment techniques include radical mastectomy and modified radical mastectomy, which were later phased out in favor of breast-conserving surgery with breast radiotherapy. Neoadjuvant (preoperative) chemotherapy for locally advanced and operable breast cancer has undergone significant advancements, with significant implications for locoregional care. For the poor-prognosis group, systemic chemotherapy at the time of distant metastasis recurrence substantially increased disease-free survival and overall survival (Aebi et al., 2012).

Cancer is becoming a growing public health problem for Palestinians in the West Bank and Gaza. It is the second leading cause of death in the United States. In the West Bank, 2189 new cases were recorded in 2013. (51% females, 49% males). Breast cancer is the most prevalent cancer among women in the West Bank and Gaza, whereas lung cancer is the most common disease among males. Leukemia is the most common cancer among children under the age of 15. Cancer is usually discovered in its later stages; at least 60% of cancer cases are discovered in Stages III or IV. The late diagnosis was exacerbated by culture, limited finances, and a lack of access to medical services. (Ministry of Health, 2019). In terms of diagnosis and treatment, four hospitals in the West Bank and three in Gaza provide cancer care, whereas one facility in the West Bank specializes in providing diagnostic services for breast and gynecological malignancies. Most referrals are made to Israeli, Jordanian, and Egyptian hospitals; however, referrals to Jordan and Egypt are steadily declining. Isotope scans such as PET-CT are not accessible from the West Bank or Gaza. Thus, all patients are sent to Israeli hospitals. Cancer care in Palestinian hospitals is increasing with time; however, palliative care, targeted therapy, bone marrow transplantation, and tailored therapy remain inadequate. A shortage of specialist physicians and medications, chemotherapy, and radiation treatment availability must be addressed (Abu Farha, Khatib, Salameh, & Zyoud, 2017; Kharroubi & Abu Seir, 2016).

Maintaining or regaining a high quality of life (QoL) and the capacity to perform daily duties successfully after cancer therapy are important. During the previous decade, the quality of life of breast cancer patients improved (Schmidt, Wiskemann, & Steindorf, 2018). Physical exercise and psychological therapies were beneficial in enhancing the

quality of life in this cohort. However, the care of symptoms such as pain and lymphedema and concerns such as anxiety, sexual function, particularly in young patients, and future prospects are all themes that should be explored further. Furthermore, according to this overview, methodological challenges in evaluating the quality of life of breast cancer patients have substantially improved, but there is still a long way to go in understanding what matters most to patients (Mokhatri-Hesari & Montazeri, 2020; Finck, Barradas, Zenger, & Hinz, 2018). This is why this study aimed to investigate this population in Palestine and determine their quality of life.

## **1.1 A brief review of the literature**

This research objective, strategy, and methodological approach were established on the basis of a thorough understanding and revision of the available literature. This section examines published research and published data directly related to the study objectives. This section covers breast cancer, breast cancer therapy, breast cancer in Palestine, and overall quality of life.

### **1.1.1 Breast cancer**

Among women worldwide, breast cancer is the most prevalent form of cancer, and a significant proportion (70–80%) of patients with early-stage, nonmetastatic disease may achieve a complete cure. Advanced breast cancer with distant organ metastases is now incurable with existing treatments. Breast cancer is a complex disease at the molecular level characterized by the activation of human epidermal growth factor receptor 2 (HER2, encoded by ERBB2), the activation of hormone receptors (estrogen receptor and progesterone receptor), and the presence of BRCA mutations, which are the most prevalent molecular characteristics. The choice of treatment options is contingent upon the specific molecular subtype. Among women, breast cancer is the most prevalent form of cancer and ranks as the second highest cause of death connected to cancer. The literature indicates that prior and ongoing research has substantially improved the clinical outcomes of patients with breast cancer (Fahad Ullah, 2019; Harbeck et al., 2019; Waks & Winer, 2019).

### **1.1.2 Mammography**

Currently, mammography is the most commonly used breast cancer screening tool. Because this survey is reasonably straightforward, economical, safe, and inexpensive, all of the women to whom it is advised may participate. Mammography is a procedure that involves taking numerous X-ray images of the mammary glands (breasts). Mammography is carried out in a dedicated room with mammography equipment. It is an X-ray machine with a different shape. Therefore, undressing from the waist up prior to mammography is necessary. Each breast was photographed separately. The procedure might take up to 20 minutes (Fahad Ullah, 2019).

### **1.1.3 Staging of breast cancer**

The characteristics of breast cancer, such as its dimensions and the presence of hormone receptors, determine the stage of the illness. The cancer stage assists clinicians in assessing patient prognosis, optimal treatment choices, and the feasibility of clinical trials.

The process of evaluating breast cancer involves the examination of tissue samples taken following a biopsy via histologic analysis. When seen under a microscope, tumor grade provides information about the abnormal appearance of tumor cells and tissue. The TNM classification is used for the purpose of staging tumors, taking into account factors such as tumor size, lymph node involvement, and the presence of metastasis. Since clinical examination and imaging methods are not very effective in detecting nodal involvement, staging is best performed after surgery, when regional lymph nodes may be evaluated. Furthermore, if individuals have palpably abnormal axillary nodes, preoperative ultrasonography-guided fine-needle aspiration or core biopsy may be conducted.

If the biopsy is positive, the axillary lymph nodes are often removed during the final surgical procedure. Nevertheless, if neoadjuvant chemotherapy effectively decreases the node status from N1 to N0, it may be possible to perform sentinel lymph node biopsy. The anatomic staging methodology categorizes patients on the basis of the structure of the tumor and is used in regions where biomarkers are not consistently accessible (Bever et al., 2018).

Stages 0 to IV are used to classify noninvasive cancers that are confined to their original site. Stage 0 refers to noninvasive cancers that have spread beyond the breast to other areas of the body, whereas stage IV refers to invasive cancers that have spread beyond the breast to other areas of the body (Breastcancer.org, 2021).

#### **1.1.4 Treatments for breast cancer**

Several maneuvers, such as surgery, radiotherapy, and pharmacotherapy, are used to treat breast cancer. The focus of this part is pharmacotherapy.

Systemic therapy refers to the administration of medications with the purpose of eliminating cancer cells (Gonzalez-Angulo, Morales-Vasquez, & Hortobagyi, 2007). Medications have the ability to distribute themselves throughout the whole body, allowing them to reach cancer cells in all areas.

There are several instances of systemic therapy used for breast cancer. The treatment options for cancer include chemotherapy, hormonal therapy, targeted therapy, and immunotherapy (Waks & Winer, 2019).

Systemic treatment may be delivered either alone or in conjunction with other systemic therapies. In addition, they might be used in conjunction with surgical procedures and radiation treatment.

Chemotherapy employs pharmaceutical agents to eradicate cancer cells by inhibiting their growth, division, and proliferation. Neoadjuvant chemotherapy is administered before surgery to reduce the size of a large tumor, facilitate the surgical procedure, or lessen the likelihood of the tumor returning. Another alternative is adjuvant chemotherapy, which is given after surgery to reduce the likelihood of recurrence (Hassan, Ansari, Spooner, & Hussain, 2010).

A chemotherapy regimen, sometimes referred to as a schedule, consists of a collection of medications given in a certain number of cycles within a predetermined time frame. Chemotherapy may be delivered on several schedules on the basis of the most effective approach identified in clinical research for that specific treatment plan. For example, it might be given on a weekly basis, biweekly, triweekly, or even quadruple weekly. There are many categories: docetaxel, paclitaxel, doxorubicin, epirubicin, pegylated liposomal doxorubicin, capecitabine, carboplatin, cisplatin, cyclophosphamide, eribulin,

fluorouracil (5-FU), gemcitabine (Gemzar®), ixabepilone, methotrexate, paclitaxel, and vinorelbine (Hassan et al., 2010).

Additionally, the majority of tumors that have positive results for estrogen or progesterone receptors exhibit a favorable response to hormone treatment. Breast cancer hormone therapy and menopausal hormone therapy (MHT) are distinct treatments. MHT, an acronym for hormone replacement treatment or postmenopausal hormone therapy (HRT), is an alternative name for MHT. Hormone therapies for breast cancer are often referred to as "antihormone" or "antiestrogen" therapies. They may either inhibit the function of hormones or decrease hormone levels in the body. Hormonal treatment consists of two main types of medications, tamoxifen and aromatase inhibitors, which include anastrozole, exemestane, and letrozole (Drăgănescu & Carmocan, 2017).

Moreover, targeted treatment specifically targets genes, proteins, or the tissue environment that play a role in the development and survival of cancer (Mohamed, Krajewski, Cakar, & Ma, 2013). These medicines are far more focused than chemotherapy and function in a distinct manner. This treatment inhibits the proliferation and metastasis of cancer cells while minimizing damage to healthy cells. Not all malignancies have the same objectives. Physicians may conduct diagnostic examinations to identify the genetic material, proteins, and other constituents present in the tumor to determine the optimal course of therapy. Moreover, ongoing research inquiries are continuing to reveal new insights into distinct molecular targets and innovative treatments.

Initially, hormonal therapies were approved as pioneering types of targeted therapy for breast cancer. For the purpose of managing HER2-positive breast cancer, therapeutic interventions specifically targeting HER2 were subsequently approved. There are several medications with specific treatment plans and objectives, including trastuzumab, pertuzumab, trastuzumab, hyaluronidase, neratinib, adrastuzumab emtansine, olaparib, alpelisib, lapatinib, and tucatinib (Den Hollander, Savage, & Brown, 2013).

### **1.1.5 Side effects of breast cancer therapy**

The adverse effects of chemotherapy may differ on the basis of factors such as the individual patient, the specific drug(s) administered, whether additional medications were taken in conjunction with chemotherapy and the timing and amount of the doses. The possible side effects of the treatment include fatigue, increased susceptibility to infections, nausea and vomiting, hair loss, reduced appetite, diarrhea, constipation, numbness, tingling, pain, premature menopause, weight gain, and chemo-brain or cognitive impairment (Moo, Sanford, Dang, & Morrow, 2018). These undesirable consequences are often prevented or managed well by the use of supportive medications throughout therapy, and patients often cease treatment after it is completed. Physicians should be asked about the use of cold cap therapies for ameliorating hair loss. In rare instances, long-term complications may arise, such as cardiac impairment, irreversible neuropathy, or the development of secondary malignancies such as leukemia or lymphoma. While individual experiences may vary, a significant number of individuals undergoing chemotherapy report feeling healthy and actively fulfilling their familial, occupational, and physical exercise responsibilities during the treatment process (Waks & Winer, 2019).

The possible side effects of aromatase inhibitors include muscle and joint soreness, hot flashes, vaginal dryness, increased susceptibility to osteoporosis and fractures, and, in rare instances, increased cholesterol levels and hair loss (Garreau, DeLaMena, Walts, Karamlou, & Johnson, 2006).

Women diagnosed with primary invasive breast cancer receive both local and systemic treatment. Local interventions, including surgical procedures and radiation treatment, are used to reduce the likelihood of cancer recurrence in the breast, chest wall, and adjacent lymph nodes. These localized treatments have the potential to inhibit the metastasis of cancer and reduce mortality rates associated with breast cancer in certain situations. Cytotoxic chemotherapy and hormone therapy are used as systemic treatments after local treatment to prevent the spread of cancer throughout the body and reduce the overall risk of death from breast cancer (Partridge, Burstein, & Winer, 2001). Recent guidelines from the National Institutes of Health Consensus Conference, the National Comprehensive Cancer Center Network, and other groups recommend the use

of adjuvant chemotherapy, tamoxifen, or both for women with invasive breast tumors larger than 1 cm in diameter, regardless of the involvement of axillary lymph nodes.

Shapiro and Recht reviewed the side effects of adjuvant therapy in breast cancer; their findings are summarized below (Shapiro & Recht, 2001):

- Myelosuppression: Approximately 10--14 days after each cycle of adjuvant chemotherapy, a small-to-moderate decrease in the white-cell count occurs.
- Nausea and vomiting: Mild to moderate nausea and vomiting occur, but only approximately 5% of women experience severe symptoms.
- Neurotoxicity: Taxanes cause sensory and motor peripheral neuropathy. The severity of neuropathy is typically mild to severe, and it is dependent on the individual dosage, cumulative dose, and delivery schedule.
- Weight gain: Most women with breast cancer who are given cyclophosphamide, methotrexate, or fluorouracil gain weight as a result of their treatment. The typical weight increase is between 2 and 6 kg.
- Ovarian failure: Six months of treatment with cyclophosphamide, methotrexate, and fluorouracil leads to permanent ovarian failure in 70% of women over 40 years old and 40% of women younger than 40 years old.
- Cardiac toxicity: Doxorubicin causes cardiomyopathy by directly damaging the myocardium.
- Second cancer: There is minimal evidence that receiving cyclophosphamide, methotrexate, or fluorouracil increases the chance of developing second cancer.
- Fatigue and quality of life: Most people are tired, and roughly two-thirds of them describe their fatigue as moderate or severe. Anemia, vasomotor symptoms that induce sleep disturbances, and sadness might all be contributing factors.

#### **1.1.6 Breast cancer in Palestine**

According to the latest Health Annual Report (2020), breast cancer is the most common cancer in the country, with 526 cases reported in 2020. A total of 32.0% of all cancer cases are female, with an incidence rate of 38.4 per 100,000 females (Palestinian Ministry of Health, 2020).

Among Palestinian women, breast cancer was the first type of cancer documented and accounted for 28.9% of all recorded cancer cases. Moreover, breast cancer is the

primary factor leading to death in women, with colon cancer being the subsequent cause (Ministry of Health, Palestine, 2017).

The Palestine Health Annual Report 2020 includes statistics on health sector themes such as government expenditures and programs, health facility utilization, health infrastructure, and general demographic and population data and health indicators. In addition, infectious disorders, malignancies, and mortality are also covered.

### **1.1.7 Quality of life**

Several demographic and clinical characteristics have been found to influence the quality of life of breast cancer patients.

HRQoL (health-related quality of life) is a subset of QoL focused on physiological elements of well-being, such as the absence of disease and sickness. HRQoL is a multidimensional concept used to monitor public health statistics. HRQoL is linked to certain variables that make it more specific than generic QoL. For example, health risks and conditions, physical functioning, social support, and socioeconomic position correlate with HRQoL at the individual level. For public health researchers, HRQoL has been a crucial idea since recording these data allows for broad patterns in disease; mortality and morbidity may be anticipated on the basis of the prevalence of this notion of well-being (Khanna & Tsevat, 2007).

These findings suggest that there is a bidirectional association between measures of QoL. QoL appears to be linked to better health outcomes, and greater levels of QoL tend to be linked to better health outcomes. While the physiological part of well-being is linked to HRQoL, it is also linked to social and psychological well-being. According to researchers, improvements in HRQoL are also linked to considerably improved psychological and social well-being. As a result, it appears that focusing on HRQoL has benefits that extend beyond physical well-being. While all parts of QoL are subjective owing to personal criteria that define well-being, these individual ideas of well-being and QoL are crucial intervention outcome variables because of their impact on numerous dimensions of health. As a result, it is critical to recognize that health-related QoL is important for people with cancer in general and women with breast cancer in particular.

In Arab and surrounding nations, recent interest in quality of life (QOL) as a medical outcome metric has sparked research in chronic medical and general populations. Therefore, it is critical to adopt psychometrically sound and cross-culturally reliable evaluation tools to compare findings across nations to develop this interest.

The World Health Organization Quality of Life (WHOQOL-BREF), a shorter version of the widely used QOL assessment instrument that comprises 26 items in the domains of physical health, psychological health, social relationships, and the environment

The WHOQOL-BREF was created concurrently in many cultures, avoiding the traditional debate over the difficulty of using a questionnaire written in one culture in a different culture. In addition, because the items are phrased in culture-neutral vocabulary, the instrument has high potential for simple cross-cultural use.

Additionally, the elements contain highly valued life context characteristics that are not often associated with health. As a result, it is a general tool for assessing health-related quality of life (HRQOL), as well as social, environmental, and subjective well-being concerns. The WHOQOL-BREF Arabic translation has been demonstrated to have considerable structural integrity. In addition, this translated version has been validated and shown to have high reliability (Ohaeri & Awadalla, 2009).

The current study uses this tool to measure the quality of life of breast cancer patients in Palestine.

## **1.2 Problem statement**

Breast cancer is becoming more prevalent in Palestine, and the treatment for this disease is obnoxious. When treated either nonpharmacologically (surgery or radiation) or pharmacologically (chemotherapy, hormonal, targeted), patients are prone to side effects. Reporting patients' side effects is crucial to improving their quality of life. Hence, the current study explores the measures undertaken to report, dig, and seek to determine what patients are experiencing. This will improve pharmaceutical care and push patients toward an optimum quality of life.\

### **1.3 Research questions**

- What were the side effects that breast cancer patients experienced because of the treatment?
- How did the patient interact with the side effects that emerged because of the treatment?
- How do these side effects affect patients' quality of life?
- What was the current quality of life of the patient?
- What was the relationship between quality of life and the side effects that the patients experienced?

### **1.4 Objectives**

#### **1.4.1 General objectives**

This study aimed to determine the side effects of breast cancer treatment reported by Palestinians with breast cancer and their quality of life.

#### **1.4.2 Specific objectives**

- To determine the side effects that breast cancer patients experience because of treatment.
- Understanding how the patient interacts with the side effects emerged because of the treatment.
- To explore the effects of these side effects on patients' quality of life.
- To evaluate the current quality of life of the patients.
- To assess the relationship between quality of life and side effects that patients experience because of breast cancer treatment.

### **1.5 Importance of the study**

Pharmaceutical care, specifically clinical care, involves providing the correct treatment of the disease and managing the side effects that might emerge from this treatment by going to the next step to improve quality of life.

This study provides knowledge to healthcare professionals about the side effects that patients experience because of breast cancer treatment. Additionally, clinicians should understand the quality of life of breast cancer patients in Palestine. Understanding this would be helpful for improving the quality of healthcare provided to patients. To improve quality of life, it is mandatory to understand what the patient is currently experiencing by making him report the side effects the patients were experiencing and their impact on their daily life.

## Chapter Two

### Methods

#### 2.1 Study design

This study was a cross-sectional questionnaire-based survey.

#### 2.2 Study setting

The study was undertaken in Nablus, a major city in the Northern West Bank, Palestine. Two hospitals were involved, namely, Al-Watani Hospital and An-Najah National University Hospital. These two hospitals are the only hospitals that deal with cancer patients in Nablus, which is why they were chosen among all hospitals in the city. Additionally, these hospitals serve as referral hospitals, as they accept patients from other cities in the country.

#### 2.3 Population

Females with breast cancer disease in Nablus.

#### 2.4 Sample size

According to the latest Health Annual Report (2020), breast cancer is the most common cancer in the country, with 526 cases reported in 2020 in the West Bank.

Raosoft<sup>®</sup> is an online tool used freely to calculate the sample size for surveys (available at: <http://www.raosoft.com/samplesize.html>). Raosoft<sup>®</sup> was used to calculate the sample size for this study.

By applying 5% as a margin of error, a 95% confidence level, and a population size of 526 women with breast cancer in the West Bank, the resulting sample size was 223 women.

To yield a representative sample for a known proportion, the equation by Cochran (1963:75) shown below was recommended.  $Z$  is a constant for the determined confidence level,  $P$  is the expected prevalence or proportion, and  $d$  is the margin of error.

$$n_0 = \frac{Z^2 P(1 - P)}{d^2} \text{ ----- } 1$$

The proportion reported by the annual health report is 16.5%; by applying the equation to the study design, Z equals 1.96, P is 16.5%, and d is 5%. Therefore, the result would be 212, which was near that calculated by Raosoft.

However, to compensate for any risk of missing data or withdrawal of patients, the determined sample size was 250 patients. In this study, all women were recruited from Nablus governorate.

## **2.5 Sampling procedure**

The current study included patients with breast cancer who received medical treatment for their condition. In addition, patients from Najah National University Hospital and Al-Watani Hospital were included in the study.

Patients were recruited from the oncology clinic on the basis of the inclusion criteria, asked to provide written informed consent, and then asked to fill out the questionnaire.

### **2.5.1 Inclusion criteria**

- Female breast cancer patients
- Above 18 years of age
- Received treatment for breast cancer (chemotherapy, hormonal, or targeted)
- Agree to participate in the study and cooperate

### **2.5.2 Exclusion criteria**

- Pregnant
- Patients with mental illness

## **2.6 Data collection and study tools**

Given the significance of data standardization for a study's internal validity, data collection was standardized by employing a data collection form.

The data collection instrument was divided into two distinctive sections. Part (A) collected data covering age at diagnosis, clinical symptoms, complications, treatment measures, and side effects of the treatments.

While part (B) of the questionnaire involved the quality-of-life assessment tool, the current study employed the WHOQOL-BREF (Arabic version) as an assessment tool.

The World Health Organization Quality of Life (WHOQOL-BREF) is a shorter version of the WHO-QOL (100-item) assessment instrument that comprises 26 items in the domains of physical health, psychological health, social relationships, and the environment. Data collected via the WHOQOL-BREF need to be calculated to determine QOL. The table below presents how to calculate the scores.

## 2.7 Data and statistical analysis

The scores of the items in each domain of the WHOQOL-BREF questionnaire were summed. After that, the scores in each domain were transformed to 0--100 via the following equation:

$$\text{Transformed Scale} = \left[ \frac{(\text{Actual raw score} - \text{lowest possible raw score})}{\text{Possible raw score range}} \right] \times 100 \quad \text{-----} \quad 2$$

The term "actual raw score" refers to the values obtained by adding up certain quantities. The "lowest possible raw score" represents the smallest value that can be obtained by adding up these quantities (which would be 4 for all aspects). The "possible raw score range" is the difference between the highest possible raw score and the lowest possible raw score (which would be 16 for all aspects: 20 minus 4).

The data were entered and analyzed with the IBM Statistical Package for Social Sciences (IBM SPSS) version 21. Data are expressed as the means  $\pm$  SDs for continuous variables and as frequencies and percentages for categorical variables. Differences in the means of the transformed scores of each domain between categories were tested via t tests or analysis of variance (ANOVA) followed by Tukey's post hoc tests. A p value of  $< 0.05$  was considered statistically significant.

## 2.8 Ethical approval

All aspects of the study protocol, including access to and use of patient clinical information, were authorized by the Institutional Review Boards (IRBs) and local health authorities.

We confirm that the collected data were used for clinical research only. The information was confidential and was not used for any purpose other than this study. Written informed consent was given by participants that confirmed data privacy, and all the data were kept safe and used only for research purposes. The questionnaire could be completed in 15-20 min.

## Chapter Three

### Results

#### 3.1 Characteristics of the participants

A total of 258 patients with breast cancer participated in this study. The characteristics of the patients are described in Table 1. The demographic and clinical characteristics of the patients are displayed in this table. When the age was categorized around the mean, 135 (52.3%) patients were younger than 50 years, and 123 (47.7%) were 50 years or older. Blood group A was the most common blood group among the patients, followed by blood groups O, B, and AB. Among the patients, 99 (38.4%) had a normal weight, and 159 (61.6%) were either overweight or obese. The majority (66.3%) of the patients were currently married, and 33.7% were never married. With respect to educational status, 156 (60.5%) patients had a school education, and 102 (39.5%) had a university education. The vast majority of the patients (93%) were nonsmokers, and only 7% were either current smokers or ex-smokers. When asked about their family history, 72 (27.9%) of the patients had a family history of cancer.

In addition to patients with breast cancer, the majority (80.2%) of the patients had one or more comorbid conditions. More than half (59.3%) of the patients were diagnosed less than 3 years ago. With respect to disease stage, 147 (57%) patients were in Stage I, 51 (19.8%) patients were in Stage II, 54 (20.9%) patients were in Stage III, and 6 (2.3%) patients were in Stage IV. The detailed characteristics of the patients are shown in Table 1.

**Table 1***Demographic and disease characteristics of the patients*

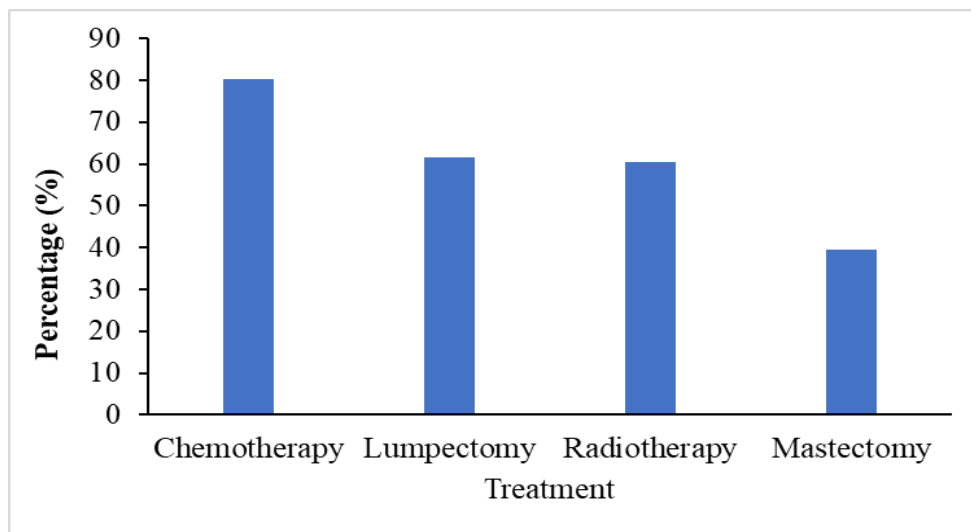
Variable	n (%)
Demographics	
Age (years)	
< 50	135 (52.3)
≥ 50	123 (47.7)
BMI	
Normal weight	99 (38.4)
Overweight/obese	159 (61.6)
Marital status	
Never married	87 (33.7)
Ever married (married/divorced/widowed)	171 (66.3)
Educational level	
School	156 (60.5)
University	102 (39.5)
Smoking	
Nonsmoker	240 (93)
Smoker/Ex-smoker	18 (7)
Family history of cancer	
No	186 (72.1)
Yes	72 (27.9)
Disease history	
Have a comorbidity	
No	51 (19.8)
Yes	207 (80.2)
Time since diagnosis (years)	
< 3	153 (59.3)
≥ 3	105 (40.7)
Stage	
I	147 (57)
II	51 (19.8)
III	54 (20.9)
IV	6 (2.3)

### 3.2 Treatment modalities received by the patients

Figure 1 shows the treatment modalities received by the patients who participated in this study. Among the patients, 207 (80.2%) received chemotherapy, 159 (61.6%) underwent lumpectomy, 156 (60.5%) received radiotherapy, and 102 (39.5%) underwent mastectomy.

**Figure 1**

*Treatment modalities received by the patients*



### 3.3 Adverse effects of cancer treatment

When screened for the adverse effects of breast cancer treatments, the patients reported adverse effects and health issues that were categorized as follows: pain; gastrointestinal, skin and hair; health issues; pain; sleep and mental health; and respiratory/mouth and throat, hematologic, genitourinary, sensory, and general health issues.

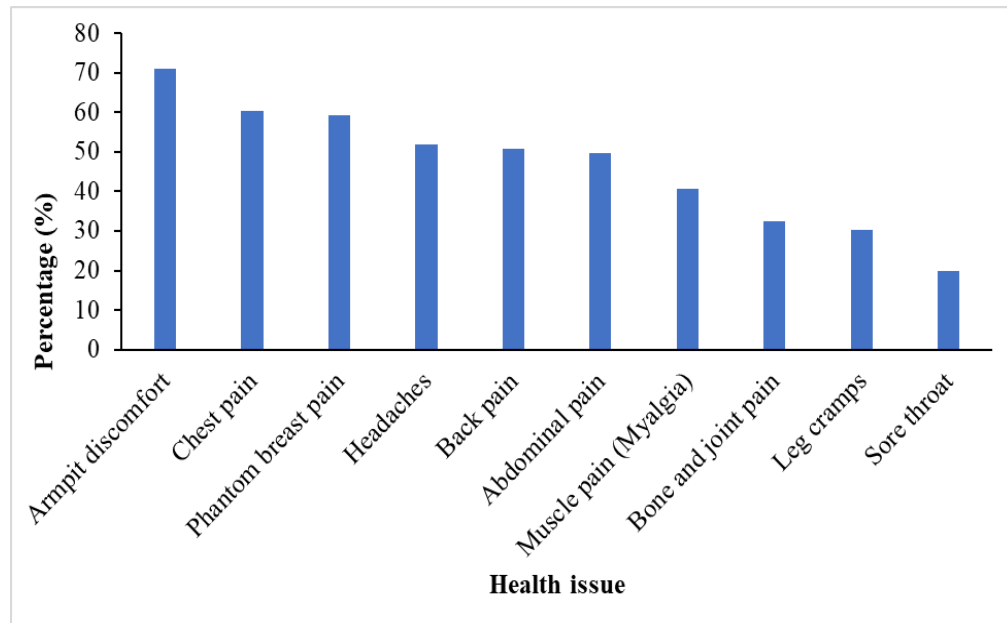
#### 3.3.1 Pain

Figure 2 shows the prevalence of pain among patients who received treatment for breast cancer. As shown in the figure, armpit discomfort was the most commonly reported pain that affected approximately 75% of the patients. Similarly, chest pain and phantom breast pain were reported by approximately 65% and 60% of the patients, respectively. The patients were also affected by headaches and back pain, as approximately 55% and 50% reported suffering from these types of pain, respectively.

Approximately 45% and 40% of the patients reported abdominal and muscle (myalgia) pain, respectively. The patients also reported suffering from bone and joint pain, leg cramps, and sore throat (Figure 2).

**Figure 2**

*Prevalence of pain reported by the patients*



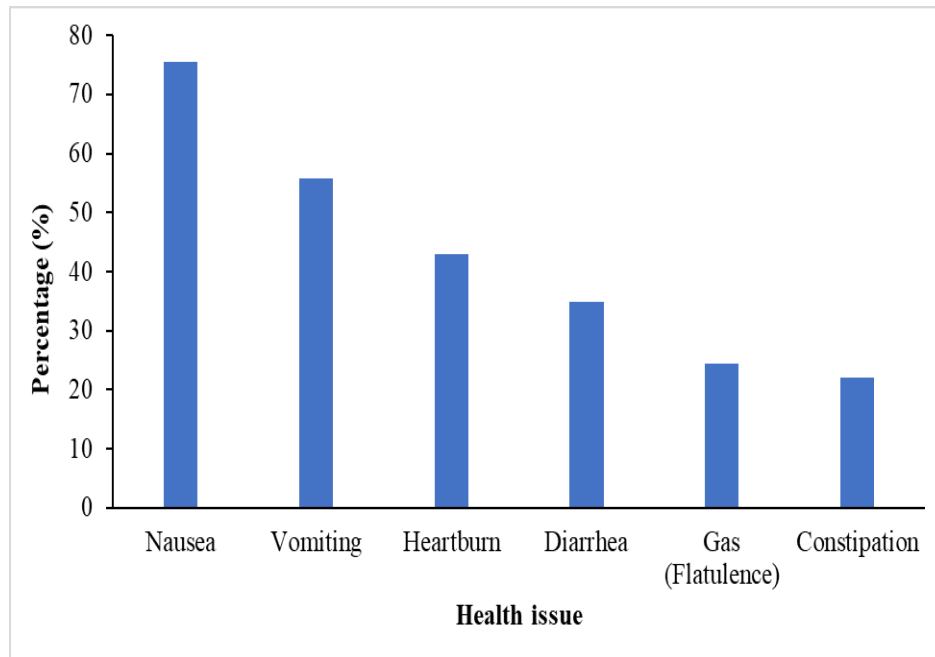
### **3.3.2 Gastrointestinal health issues**

Figure 3 shows the prevalence of gastrointestinal health issues reported by the patients who participated in this study. Approximately 80% of the patients experienced nausea, and approximately 60% experienced vomiting. Approximately half of the patients experienced heartburn, and approximately 40% of the patients experienced diarrhea.

On the other hand, gas (flatulence) and constipation were less frequently reported by the patients who participated in this study, as shown in Figure 3.

**Figure 3**

*Prevalence of gastrointestinal health issues among patients*



### **3.3.3 Skin and hair health issues**

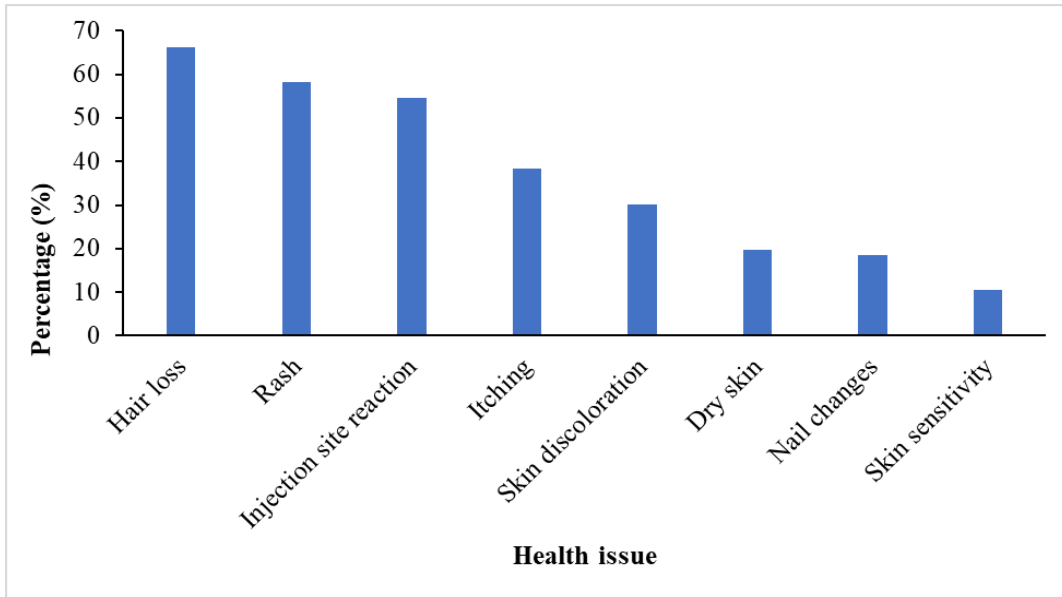
Figure 4 shows the prevalence of skin and hair health issues among the patients who participated in this study.

Approximately 70% of the patients reported experiencing hair loss (alopecia), and approximately 60% reported experiencing skin rashes and injection site reactions. In addition, approximately 40% of the patients reported experiencing itching.

On the other hand, skin discoloration was reported by approximately 305 patients. Dry skin, nail changes, and skin sensitivity were less commonly reported by patients, as shown in Figure 4.

**Figure 4**

*Prevalence of skin and hair health issues*

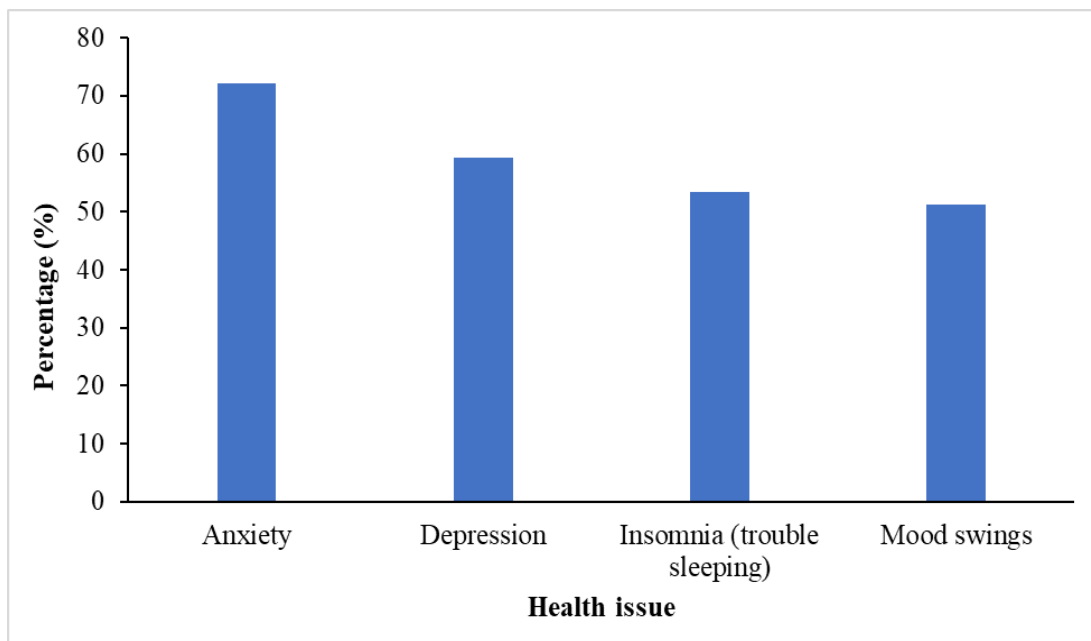


### 3.3.4 Sleep and mental health issues

Figure 5 shows the prevalence of sleep and mental health issues reported by the patients. Approximately 70% of the patients experienced anxiety. Approximately 60% of the patients reported experiencing depression and insomnia (trouble sleeping). Similarly, more than half of the patients reported experiencing mood swings, as shown in Figure 5.

**Figure 5**

*Prevalence of sleep and mental health issues*



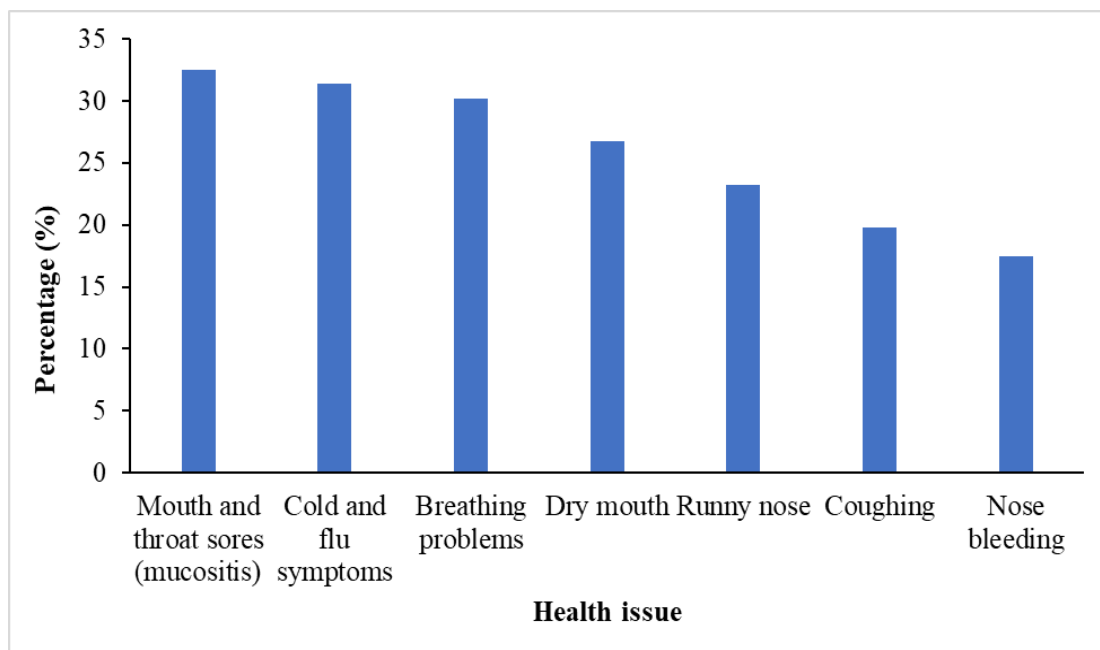
### 3.3.5 Respiratory/mouth and throat health issues

Figure 6 shows the prevalence of respiratory/mouth and throat health issues reported by the patients.

In this study, mouth and throat sores, cold and flu symptoms, and breathing problems were reported by more than 30% of the patients, as shown in Figure 6. Similarly, approximately 25% of the patients reported experiencing dry mouth and runny noses. Approximately 20% of the patients reported having cough. On the other hand, nose bleeding was less commonly reported by patients, as shown in Figure 6.

**Figure 6**

*Prevalence of respiratory/mouth and throat health issues*



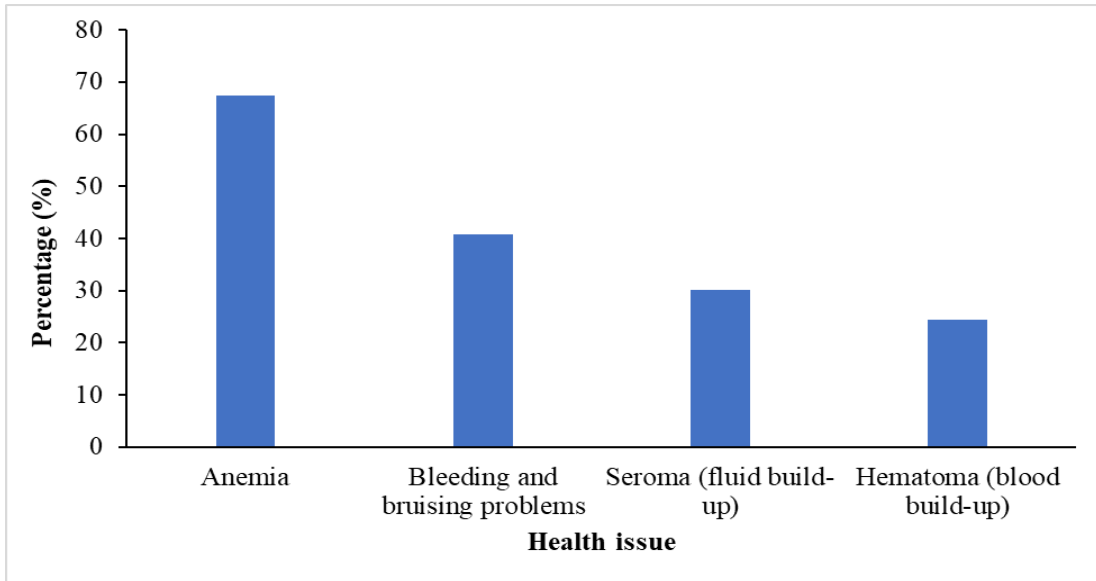
### 3.3.6 Hematologic health issues

Figure 7 shows the prevalence of hematologic health issues reported by the patients who participated in this study.

Approximately 70% of the patients had anemia. On the other hand, approximately 40% of patients reported experiencing bleeding and bruising problems. Similarly, approximately 30% of the patients reported experiencing seroma and hematoma, as shown in Figure 7.

**Figure 7**

*Prevalence of hematologic health issues among patients*

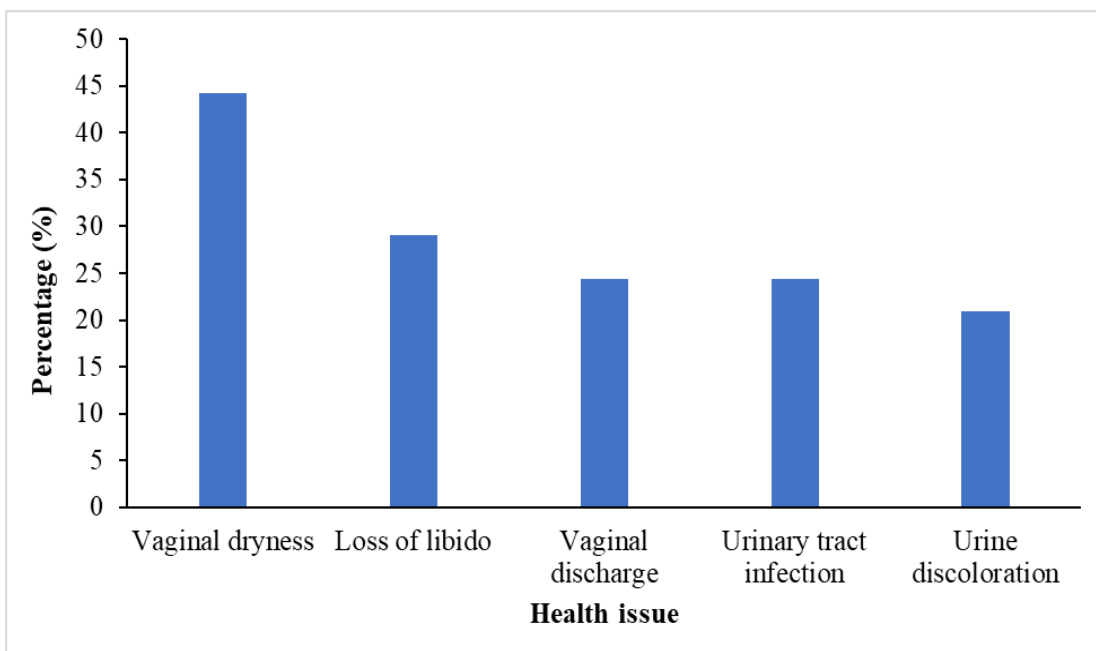


### 3.3.7 Genitourinary health issues

Figure 8 shows the prevalence of genitourinary health issues reported by the patients who participated in this study. Approximately 45% of the patients reported experiencing vaginal dryness, and approximately 30% of the patients reported experiencing loss of libido. In addition, approximately 25% of the patients reported experiencing vaginal discharge, urinary tract infections, and urine discoloration, as shown in Figure 8.

**Figure 8**

*Prevalence of genitourinary health issues among patients*



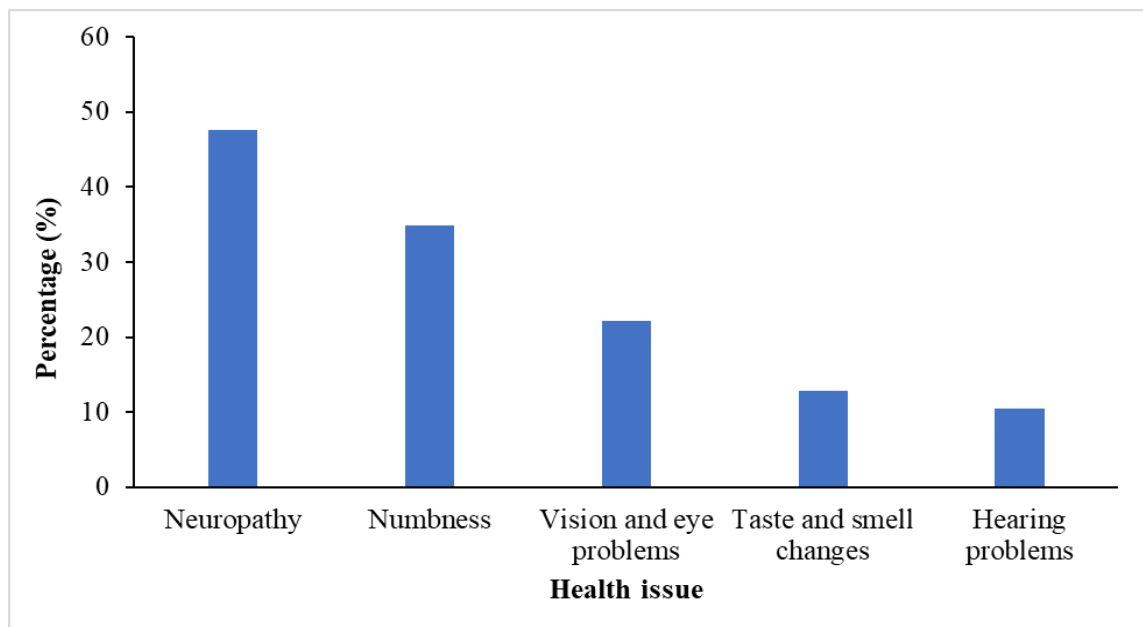
### 3.3.8 Sensory health issues

Figure 9 shows the prevalence of sensory health issues reported by the patients who participated in this study.

In this study, neuropathy was the most common sensory health issue reported by the patients, with approximately half of the patients reported to be affected. Approximately 35% of the patients reported experiencing numbness. Moreover, approximately 20% reported experiencing vision and eye problems. Taste and smell changes and hearing problems were less frequently reported by the patients who participated in this study, as shown in Figure 9.

**Figure 9**

*Prevalence of sensory health issues among patients*



### 3.3.9 General health issues

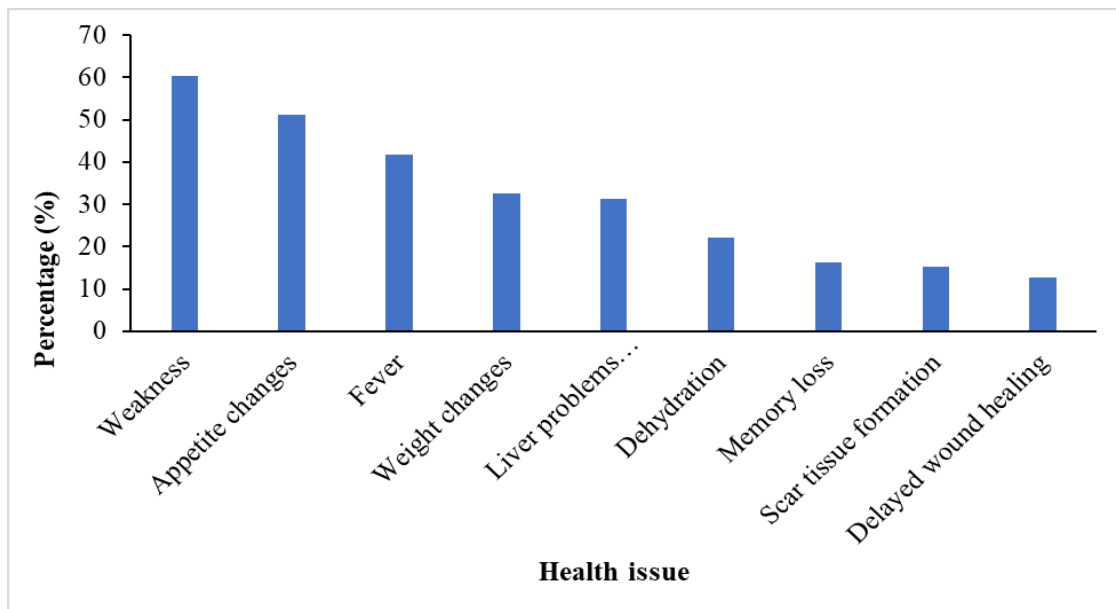
Figure 10 shows the prevalence of general health issues reported by the patients who participated in this study.

Approximately 60% of the patients reported experiencing weakness. Similarly, approximately half of the patients reported experiencing appetite changes. Approximately 40% of the patients reported experiencing fever, and approximately 35% of the patients reported experiencing weight changes and liver problems. Approximately 1 in 5 patients reported experiencing dehydration. On the other hand, memory loss, scar

tissue formation, and delayed wound healing were less commonly reported by patients, as shown in Figure 10.

**Figure 10**

*Prevalence of general health issues among patients*



### **3.4 Answers of the patients to the WHOQOL-BREF questionnaire items**

Table 2 displays the distribution of the answers of the patients to the WHOQOL-BREF questionnaire items.

With respect to general health and quality of life, approximately 35% of the patients reported being dissatisfied or very dissatisfied with their overall health and quality of life.

Moreover, pain and a lack of energy were the most frequent physical complaints expressed by the patients who participated in this study. Approximately half of the patients reported that they had experienced physical pain that significantly limited their ability to perform their activities. Moreover, approximately 45% of the patients stated that they had experienced a lack of energy for their daily life activities. A considerable percentage of the patients reported that they had experienced frequent negative feelings, including depression and anxiety.

Notably, a percentage of the patients stated that they were dissatisfied with their sex life. More than half of the patients expressed concerns about their limited opportunity for leisure activities, as shown in Table 2.

**Table 2***Distribution of answers of the patients to the WHOQOL-BREF questionnaire items*

Item	1, n (%)	2, n (%)	3, n (%)	4, n (%)	5, n (%)
<b>Overall Quality of Life and General Health</b>					
How would you rate your quality of life?*	45 (17.4)	48 (18.6)	81 (31.4)	54 (20.9)	30 (11.6)
How satisfied are you with your health?*	36 (14)	57 (22.1)	87 (33.7)	54 (20.9)	24 (9.3)
<b>Physical Health</b>					
To what extent do you feel that physical pain prevents you from doing what you need to do?	69 (26.7)	54 (20.9)	33 (12.8)	78 (30.2)	24 (9.3)
How much do you need any medical treatment to function in your daily life?	42 (16.3)	54 (20.9)	48 (18.6)	78 (30.2)	36 (14)
Do you have enough energy for everyday life?	42 (16.3)	108 (41.9)	42 (16.3)	54 (20.9)	12 (4.7)
How well are you able to get around?	42 (16.3)	63 (24.4)	81 (31.4)	54 (20.9)	18 (7)
How satisfied are you with your sleep	45 (17.4)	75 (29.1)	72 (27.9)	39 (15.1)	27 (10.5)
How satisfied are you with your ability to perform your daily living activities?	39 (15.1)	114 (44.2)	42 (16.3)	48 (18.6)	15 (5.8)
How satisfied are you with your capacity for work?	33 (12.8)	78 (30.2)	81 (31.4)	36 (14)	30 (11.6)
<b>Psychological</b>					
How much do you enjoy life?	27 (10.5)	60 (23.3)	99 (38.4)	45 (17.4)	27 (10.5)
To what extent do you feel your life to be meaningful?	45 (17.4)	54 (20.9)	87 (33.7)	54 (20.9)	18 (7)
How well are you able to concentrate?	54 (20.9)	51 (19.8)	78 (30.2)	51 (19.8)	24 (9.3)
Are you able to accept your bodily appearance?	27 (10.5)	69 (26.7)	93 (36)	51 (19.8)	18 (7)
How satisfied are you with yourself?	45 (17.4)	51 (19.8)	87 (33.7)	54 (20.9)	21 (8.1)
How often do you have negative feelings such as blue mood, despair, anxiety, depression?*	36 (14)	45 (17.4)	72 (27.9)	66 (25.6)	39 (15.1)
<b>Social relationships</b>					
How satisfied are you with your personal relationships?	39 (15.1)	39 (15.1)	87 (33.7)	48 (18.6)	45 (17.4)
How satisfied are you with your sex life?	30 (11.6)	57 (22.1)	84 (32.6)	33 (12.8)	54 (20.9)
How satisfied are with the support you get from your friends?	33 (12.8)	39 (15.1)	84 (32.6)	48 (18.6)	54 (20.9)
<b>Environment</b>					
How safe do you feel in your daily life?	27 (10.5)	72 (27.9)	99 (38.4)	30 (11.6)	30 (11.6)
How healthy is your physical environment?	33 (12.8)	54 (20.9)	90 (34.9)	63 (24.4)	18 (7)
Have you enough money to meet your needs?	57 (22.1)	63 (24.4)	78 (30.2)	45 (17.4)	15 (5.8)
How available to you is the information that you need in your daily to-day life?	21 (8.1)	54 (20.9)	96 (37.2)	57 (22.1)	30 (11.6)
To what extent do you have the opportunity for leisure activities?	60 (23.3)	66 (25.6)	78 (30.2)	42 (16.3)	12 (4.7)
How satisfied are you with the condition of your living place?	48 (18.6)	57 (22.1)	78 (30.2)	45 (17.4)	30 (11.6)
How satisfied are you with your access to health services?	60 (23.3)	66 (25.6)	84 (32.6)	24 (9.3)	24 (9.3)
How satisfied are you with your transport?	72 (27.9)	66 (25.6)	60 (23.3)	42 (16.3)	18 (7)

*Note.* 1: Very poor/dissatisfied/Not at all, 2: Poor/dissatisfied/a little/slightly, 3: Neither poor nor good/a moderate amount/neither satisfied nor dissatisfied, 4: Good/satisfied/very much/very often/very much, 5: Very good/very satisfied/an extreme amount/always/extremely

### **3.5 Scores of the different domains of the WHOQOL-BREF questionnaire**

Table 3 shows the scores of the patients in the different domains of the WHOQOL-BREF questionnaire.

The scores of the patients indicated that their overall quality of life and wellbeing were moderately low, as indicated by the transformed score of 47.1%. This moderately low score was observed across the different domains of the WHOQOL-BREF questionnaire, including overall quality of life and general health, physical health, psychological health, social relationships, and the environment, as shown in Appendix C.

### **3.6 Associations between the demographic and disease characteristics of patients and their scores on the different domains of the WHOQOL-BREF questionnaire**

Table 4 shows a univariate analysis of the associations between the demographic and disease characteristics of the patients and their scores on the different domains of the WHOQOL-BREF questionnaire.

As shown in Table 4, compared with younger patients, older patients were significantly associated with lower physical health scores ( $p = 0.002$ ), psychological health scores ( $p = 0.029$ ), social relationships ( $p = 0.046$ ), environments ( $p = 0.009$ ), and overall scores ( $p = 0.018$ ).

Similarly, being overweight or obese was significantly associated with lower overall quality of life scores ( $p = 0.039$ ), physical health ( $p = 0.024$ ), social relationships ( $p = 0.010$ ), environment ( $p = 0.035$ ), and overall scores ( $p = 0.032$ ) than were normal weight.

Compared with never married patients, married patients reported significantly lower social relationship scores ( $p = 0.046$ ).

On the other hand, the patients who had a university education reported significantly higher overall quality of life scores ( $p = 0.048$ ), physical health scores ( $p = 0.031$ ), social relationship scores ( $p = 0.014$ ), environments ( $p = 0.051$ ), and overall scores ( $p = 0.037$ ) than did the patients who had only a school education.

Similarly, nonsmokers reported significantly higher overall quality of life scores ( $p = 0.037$ ), physical health scores ( $p = 0.034$ ), psychological health scores ( $p = 0.050$ ),

social relationship scores ( $p = 0.006$ ), and overall scores ( $p = 0.031$ ) than smokers and ex-smokers did. Moreover, the patients who had comorbidities reported significantly lower scores across all domains of the WHOQOL-BREF questionnaire.

Deteriorations in the quality of life of patients were significantly associated with the time since receiving a diagnosis of breast cancer. Patients who were diagnosed with breast cancer less than 3 years prior reported significantly higher overall quality of life scores ( $p = 0.043$ ), psychological health scores ( $p = 0.025$ ), and environment scores ( $p = 0.046$ ). Similarly, there was a significant increase in deterioration across all domains of the WHOQOL-BREF questionnaire with increasing advancement in the stage of cancer. Patients who were in Stage I reported significantly higher scores across all domains of the WHOQOL-BREF questionnaire.

The patients who received lumpectomy reported significantly higher scores across all domains of the WHOQOL-BREF questionnaire. On the other hand, the patients who received mastectomy reported deterioration in different domains of the WHOQOL-BREF questionnaire. Similarly, patients who received chemotherapy also reported deterioration in different domains of the WHOQOL-BREF questionnaire. Moreover, patients who received radiotherapy had significantly lower overall quality of life scores than patients who did not receive radiotherapy.

Patients who had adverse effects and health issues, including pain; gastrointestinal, skin and hair; health issues; pain; sleep and mental health; respiratory/mouth and throat; and hematologic, genitourinary, sensory, and general health issues, reported deterioration in different domains of their quality of life. Patients who had abdominal pain, bone and joint pain, chest pain, phantom breast pain, armpit discomfort, back pain, muscle pain (myalgia), headaches, nausea, vomiting, diarrhea, depression, anxiety, mood swings, anemia, urine discoloration, loss of libido, hematoma (blood build-up), seroma (fluid build-up), hair loss, mouth and throat sores (mucositis), injection site reactions, fever, weight changes, neuropathy, insomnia (trouble sleeping), weakness, and liver problems (hepatotoxicity) reported significantly lower scores in the different domains of the WHOQOL-BREF questionnaire, as shown in Appendix D.

The factors that were significantly associated with deterioration in the different domains of the WHOQOL-BREF questionnaire were included in multiple linear regression models to control for confounding factors.

Deteriorations in overall quality of life and general health scores were predicted by having comorbidities, having advanced-stage breast cancer, receiving mastectomy, experiencing vomiting, depression, anxiety, fever, and insomnia. Table 3 shows the predictors of lower scores in the overall quality of life and general health scores as measured using the WHOQOL-BREF questionnaire.

**Table 3**

*Predictors of lower scores in the overall quality of life and general health scores as measured using the WHOQOL-BREF questionnaire*

Domain/Variable	Unstandardized Coefficients	SE	Standardized Coefficients	t	p
BMI	-2.85	2.76	-0.05	-1.03	0.302
Educational level	-4.42	2.57	-0.07	-1.72	0.087
Smoking	-5.21	4.34	-0.04	-1.20	0.231
Have a comorbidity	-10.82	3.23	-0.14	-3.35	0.001
Time since diagnosis	2.52	3.06	0.04	0.82	0.411
Stage	-15.53	1.62	-0.46	-9.60	0.000
Lumpectomy	3.13	2.88	0.05	1.09	0.279
Mastectomy	-27.04	3.06	-0.44	-8.83	0.000
Radiotherapy	-4.22	2.74	-0.07	-1.54	0.124
Chemotherapy	2.83	3.12	0.04	0.91	0.366
Abdominal pain	0.99	2.40	0.02	0.41	0.682
Bone and joint pain	4.52	3.44	0.07	1.32	0.190
Chest pain	-3.65	12.37	-0.06	-0.30	0.768
Phantom breast pain	-8.75	12.13	-0.14	-0.72	0.471
Armpit discomfort	-3.84	2.83	-0.06	-1.36	0.176
Back pain	3.75	3.03	0.06	1.24	0.217
Muscle pain (Myalgia)	-3.70	3.08	-0.06	-1.20	0.231
Nausea	-3.26	2.85	-0.05	-1.15	0.253
Vomiting	-13.54	2.72	-0.23	-4.97	0.000
Diarrhea	-0.91	2.51	-0.01	-0.36	0.717
Depression	-13.99	3.08	-0.23	-4.54	0.000
Anxiety	-10.29	2.86	-0.15	-3.59	0.000
Mood swings	-5.44	2.98	-0.09	-1.82	0.069
Anemia	-5.49	3.18	-0.09	-1.73	0.086
Urine discoloration	5.34	3.77	0.07	1.42	0.158
Loss of libido	2.75	3.18	0.04	0.87	0.387
Hematoma (blood build-up)	-0.95	3.06	-0.01	-0.31	0.757
Seroma (fluid build-up)	-4.73	3.01	-0.07	-1.57	0.118
Mouth and throat sores (mucositis)	-5.20	2.77	-0.08	-1.88	0.061
Injection site reaction	-0.85	2.94	-0.01	-0.29	0.772
Fever	-9.18	2.62	-0.15	-3.50	0.001
Weight changes	3.94	3.16	0.06	1.25	0.214
Neuropathy	1.10	2.97	0.02	0.37	0.711
Insomnia (trouble sleeping)	-7.70	2.57	-0.13	-3.00	0.003
Weakness	-1.54	2.98	-0.03	-0.52	0.606
Liver problems (Hepatotoxicity)	-0.93	2.75	-0.01	-0.34	0.735

Deteriorations in physical health scores were predicted by lower educational achievement, being a smoker/ex-smoker, having comorbidities, having advanced-stage breast cancer, receiving mastectomy, experiencing headaches, vomiting, depression, anxiety, anemia, urine discoloration, mouth and throat sores (mucositis), fever, insomnia (trouble sleeping), and weakness. Table 4 shows the predictors of lower physical health scores.

**Table 4***Predictors of lower physical health scores*

Domain/Variable	Unstandardized Coefficients	SE	Standardized Coefficients	t	p
Age	0.93	2.40	0.02	0.39	0.699
BMI	2.61	2.36	0.04	1.11	0.270
Educational level	-6.35	2.43	-0.11	-2.61	0.010
Smoking	-8.51	4.25	-0.07	-2.00	0.047
Have a comorbidity	-10.32	3.15	-0.14	-3.28	0.001
Stage	-14.58	1.62	-0.43	-9.02	0.000
Lumpectomy	2.67	2.66	0.04	1.01	0.316
Mastectomy	-22.96	3.13	-0.38	-7.33	0.000
Chemotherapy	-0.84	3.11	-0.01	-0.27	0.788
Abdominal pain	1.05	2.37	0.02	0.44	0.659
Bone and joint pain	-0.30	3.46	0.00	-0.09	0.931
Chest pain	-9.86	11.62	-0.16	-0.85	0.397
Phantom breast pain	-3.65	11.74	-0.06	-0.31	0.756
Armpit discomfort	-2.14	2.78	-0.03	-0.77	0.442
Back pain	-2.31	2.83	-0.04	-0.82	0.416
Muscle pain (Myalgia)	2.18	2.64	0.04	0.83	0.409
Headaches	4.57	2.20	0.08	2.08	0.039
Nausea	-4.78	2.76	-0.07	-1.73	0.085
Vomiting	-7.13	2.68	-0.12	-2.66	0.008
Depression	-7.80	2.98	-0.13	-2.62	0.009
Anxiety	-15.79	2.72	-0.24	-5.80	0.000
Mood swings	-4.95	2.85	-0.08	-1.74	0.084
Anemia	-8.62	3.21	-0.14	-2.68	0.008
Urine discoloration	8.43	3.54	0.12	2.38	0.018
Seroma (fluid build-up)	2.84	2.84	0.04	1.00	0.318
Rash	-1.18	2.75	-0.02	-0.43	0.669
Hair loss	-1.79	2.70	-0.03	-0.67	0.506
Mouth and throat sores (mucositis)	-7.35	2.76	-0.12	-2.67	0.008
Injection site reaction	-2.05	2.93	-0.03	-0.70	0.483
Fever	-11.84	2.70	-0.20	-4.38	0.000
Neuropathy	-0.85	2.88	-0.01	-0.29	0.768
Insomnia (trouble sleeping)	-11.00	2.45	-0.19	-4.49	0.000
Weakness	-9.81	2.85	-0.16	-3.44	0.001
Liver problems (Hepatotoxicity)	0.04	2.69	0.00	0.02	0.987

Deteriorations in psychological health scores were predicted by having comorbidities, having advanced-stage breast cancer, receiving mastectomy, experiencing muscle pain (myalgia), vomiting, depression, anxiety, mouth and throat sores (mucositis), fever, weight changes, and insomnia (trouble sleeping). Table 5 shows the predictors of lower psychological health scores.

**Table 5***Predictors of lower psychological health scores*

<b>Domain/Variable</b>	<b>Unstandardized Coefficients</b>	<b>SE</b>	<b>Standardized Coefficients</b>	<b>t</b>	<b>p</b>
Age	3.35	2.41	0.06	1.39	0.166
Have a comorbidity	-11.74	3.08	-0.16	-3.82	0.000
Time since diagnosis	4.66	2.55	0.08	1.83	0.069
Stage	-15.34	1.52	-0.47	-10.09	0.000
Lumpectomy	3.06	2.59	0.05	1.18	0.239
Mastectomy	-26.46	2.85	-0.45	-9.30	0.000
Chemotherapy	2.35	2.90	0.03	0.81	0.418
Abdominal pain	-1.95	2.39	-0.03	-0.82	0.416
Bone and joint pain	0.33	3.28	0.01	0.10	0.920
Chest pain	-0.59	11.04	-0.01	-0.05	0.957
Phantom breast pain	-12.78	11.17	-0.22	-1.14	0.254
Armpit discomfort	-2.35	2.62	-0.04	-0.90	0.371
Back pain	2.19	2.77	0.04	0.79	0.429
Muscle pain (Myalgia)	-9.66	3.12	-0.16	-3.10	0.002
Nausea	-4.97	2.74	-0.07	-1.82	0.070
Vomiting	-11.31	2.59	-0.20	-4.37	0.000
Diarrhea	3.58	2.46	0.06	1.46	0.147
Depression	-12.85	2.82	-0.22	-4.55	0.000
Anxiety	-8.93	2.80	-0.14	-3.19	0.002
Mood swings	-3.93	2.77	-0.07	-1.42	0.157
Anemia	-4.58	3.13	-0.07	-1.46	0.145
Urine discoloration	2.08	3.45	0.03	0.60	0.547
Loss of libido	-1.80	2.84	-0.03	-0.64	0.526
Seroma (fluid build-up)	-4.48	2.84	-0.07	-1.58	0.116
Hair loss	-4.63	2.95	-0.08	-1.57	0.117
Mouth and throat sores (mucositis)	-5.35	2.51	-0.09	-2.13	0.034
Injection site reaction	-1.89	2.76	-0.03	-0.68	0.494
Fever	-8.22	2.46	-0.14	-3.34	0.001
Weight changes	10.20	3.36	0.17	3.04	0.003
Neuropathy	0.89	2.61	0.02	0.34	0.734
Insomnia (trouble sleeping)	-6.67	2.36	-0.12	-2.83	0.005
Weakness	1.35	2.90	0.02	0.47	0.641
Liver problems (Hepatotoxicity)	-2.63	2.63	-0.04	-1.00	0.318

Deteriorations in social relationship scores were predicted by lower educational achievement, having comorbidities, having advanced-stage breast cancer, receiving mastectomy, experiencing vomiting, depression, anxiety, mood swings, seroma (fluid build-up), dry mouth, mouth and throat sores (mucositis), fever, and insomnia (trouble sleeping). Table 6 shows the predictors of lower social relationship scores.

**Table 6***Predictors of lower social relationship scores*

Domain/Variable	Unstandardized Coefficients	SE	Standardized Coefficients	t	p
Age	-1.13	2.74	-0.02	-0.41	0.681
BMI	1.52	4.65	0.02	0.33	0.744
Marital status	-5.42	4.69	-0.08	-1.15	0.250
Educational level	-7.19	3.08	-0.11	-2.33	0.021
Smoking	-6.60	4.77	-0.05	-1.38	0.168
Have a comorbidity	-13.83	3.68	-0.17	-3.76	0.000
Stage	-16.59	1.80	-0.46	-9.21	0.000
Lumpectomy	-0.08	3.13	0.00	-0.03	0.979
Mastectomy	-26.50	3.26	-0.41	-8.13	0.000
Chemotherapy	-6.68	3.63	-0.08	-1.84	0.067
Abdominal pain	2.70	2.84	0.04	0.95	0.342
Bone and joint pain	6.11	4.02	0.09	1.52	0.129
Chest pain	-7.66	12.19	-0.12	-0.63	0.531
Phantom breast pain	-4.96	12.56	-0.08	-0.39	0.694
Back pain	5.15	3.22	0.08	1.60	0.111
Dry skin	3.14	4.75	0.04	0.66	0.509
Nausea	-0.04	3.35	0.00	-0.01	0.990
Vomiting	-8.74	3.23	-0.14	-2.70	0.007
Depression	-11.71	3.38	-0.18	-3.46	0.001
Anxiety	-13.60	3.36	-0.19	-4.04	0.000
Mood swings	-7.12	3.44	-0.11	-2.07	0.040
Anemia	2.08	4.32	0.03	0.48	0.631
Urine discoloration	-1.96	4.73	-0.03	-0.41	0.679
Loss of libido	6.95	4.39	0.10	1.58	0.115
Hematoma (blood build-up)	0.61	3.90	0.01	0.16	0.877
Seroma (fluid build-up)	-9.13	3.62	-0.13	-2.52	0.012
Hair loss	-6.62	3.54	-0.10	-1.87	0.063
Dry mouth	-8.75	3.26	-0.12	-2.68	0.008
Mouth and throat sores (mucositis)	-7.34	3.22	-0.11	-2.28	0.023
Injection site reaction	-2.73	3.85	-0.04	-0.71	0.480
Fever	-8.43	2.80	-0.13	-3.01	0.003
Dehydration	4.02	3.63	0.05	1.11	0.269
Cold and flu symptoms	7.48	4.12	0.11	1.82	0.071
Weight changes	5.76	3.73	0.09	1.54	0.124
Neuropathy	0.12	3.15	0.00	0.04	0.969
Numbness	2.52	2.72	0.04	0.93	0.355
Insomnia (trouble sleeping)	-11.86	2.65	-0.19	-4.48	0.000
Weakness	-2.10	3.37	-0.03	-0.62	0.535
Liver problems (Hepatotoxicity)	-1.31	3.46	-0.02	-0.38	0.706

Deteriorations in the environment scores were predicted by having comorbidities, time since diagnosis, advanced stage of breast cancer, not receiving lumpectomy, receiving mastectomy, experiencing headaches, vomiting, depression, anxiety, mood swings, urine discoloration, fever, and insomnia (trouble sleeping). Table 7 shows the predictors of lower environment scores.

**Table 7**

*Predictors of lower environment scores*

Domain/Variable	Unstandardized Coefficients	SE	Standardized Coefficients	t	p
Age	0.02	2.34	0.00	0.01	0.993
BMI	-0.26	2.40	0.00	-0.11	0.914
Have a comorbidity	-7.27	3.00	-0.10	-2.42	0.016
Time since diagnosis	5.90	2.48	0.10	2.38	0.018
Stage	-14.20	1.51	-0.44	-9.40	0.000
Lumpectomy	5.29	2.55	0.09	2.07	0.040
Mastectomy	-24.80	2.82	-0.43	-8.78	0.000
Chemotherapy	1.74	2.88	0.02	0.60	0.547
Abdominal pain	2.97	2.27	0.05	1.31	0.193
Bone and joint pain	5.99	3.27	0.10	1.83	0.068
Chest pain	1.21	10.80	0.02	0.11	0.911
Phantom breast pain	-9.91	10.96	-0.17	-0.90	0.367
Armpit discomfort	-4.00	2.57	-0.06	-1.56	0.121
Back pain	-3.41	2.58	-0.06	-1.32	0.188
Muscle pain (Myalgia)	-0.77	2.52	-0.01	-0.31	0.761
Headaches	5.47	2.08	0.10	2.63	0.009
Nausea	-4.21	2.63	-0.06	-1.60	0.111
Vomiting	-8.92	2.52	-0.16	-3.54	0.000
Depression	-7.21	2.84	-0.12	-2.54	0.012
Anxiety	-12.33	2.56	-0.19	-4.82	0.000
Mood swings	-8.39	2.74	-0.15	-3.07	0.002
Anemia	-4.43	3.05	-0.07	-1.45	0.148
Urine discoloration	7.73	3.38	0.11	2.28	0.023
Loss of libido	-1.27	2.97	-0.02	-0.43	0.670
Seroma (fluid build-up)	-1.04	2.70	-0.02	-0.38	0.702
Hair loss	-2.97	2.59	-0.05	-1.15	0.253
Mouth and throat sores (mucositis)	-3.81	2.57	-0.06	-1.48	0.140
Injection site reaction	-2.97	2.76	-0.05	-1.08	0.283
Fever	-10.89	2.52	-0.19	-4.32	0.000
Neuropathy	1.04	2.58	0.02	0.40	0.687
Insomnia (trouble sleeping)	-10.84	2.32	-0.19	-4.67	0.000
Weakness	-4.25	2.69	-0.07	-1.58	0.115
Liver problems (Hepatotoxicity)	-0.26	2.58	0.00	-0.10	0.918

Deteriorations in the overall scores were predicted by having comorbidities; having advanced-stage breast cancer; receiving mastectomy; and experiencing headaches, vomiting, depression, anxiety, mood swings, mouth and throat sores (mucositis), fever, and insomnia (trouble sleeping). Table 8 shows the predictors of lower overall scores.

**Table 8**

*Predictors of lower overall scores*

Domain/Variable	Unstandardized Coefficients	SE	Standardized Coefficients	t	p
Age	1.48	2.46	0.03	0.60	0.546
BMI	-1.19	2.55	-0.02	-0.47	0.641
Educational level	-4.83	2.53	-0.08	-1.91	0.057
Smoking	-4.66	4.25	-0.04	-1.10	0.274
Have a comorbidity	-10.52	3.15	-0.14	-3.34	0.001
Time since diagnosis	4.88	2.58	0.08	1.89	0.060
Stage	-15.40	1.58	-0.46	-9.76	0.000
Lumpectomy	1.71	2.76	0.03	0.62	0.536
Mastectomy	-24.63	2.98	-0.41	-8.27	0.000
Chemotherapy	0.30	3.05	0.00	0.10	0.922
Abdominal pain	0.76	2.46	0.01	0.31	0.757
Bone and joint pain	3.59	3.34	0.06	1.07	0.284
Chest pain	1.84	11.33	0.03	0.16	0.871
Phantom breast pain	-13.14	11.42	-0.22	-1.15	0.251
Armpit discomfort	-3.83	2.70	-0.06	-1.42	0.158
Back pain	1.09	2.88	0.02	0.38	0.706
Muscle pain (Myalgia)	-5.67	3.26	-0.10	-1.74	0.084
Headaches	4.37	2.18	0.07	2.01	0.046
Nausea	-3.73	2.81	-0.05	-1.33	0.185
Vomiting	-10.61	2.66	-0.18	-3.99	0.000
Diarrhea	3.08	2.51	0.05	1.23	0.221
Depression	-10.30	2.96	-0.17	-3.48	0.001
Anxiety	-11.98	2.98	-0.18	-4.02	0.000
Mood swings	-6.84	2.82	-0.12	-2.42	0.016
Anemia	-4.84	3.27	-0.08	-1.48	0.140
Urine discoloration	2.39	3.66	0.03	0.65	0.515
Loss of libido	2.29	3.52	0.04	0.65	0.516
Seroma (fluid build-up)	-3.82	2.93	-0.06	-1.30	0.194
Hair loss	-3.49	3.10	-0.06	-1.13	0.261
Mouth and throat sores (mucositis)	-5.88	2.70	-0.09	-2.18	0.031
Injection site reaction	-2.18	2.89	-0.04	-0.75	0.452
Fever	-10.01	2.61	-0.17	-3.84	0.000
Weight changes	6.39	3.47	0.10	1.84	0.067
Neuropathy	-0.81	2.76	-0.01	-0.29	0.768
Insomnia (trouble sleeping)	-9.87	2.43	-0.17	-4.06	0.000
Weakness	-3.07	3.15	-0.05	-0.97	0.331
Liver problems (Hepatotoxicity)	-1.63	2.68	-0.03	-0.61	0.543

### **3.7 Discussion**

#### **3.8 Interpretation and discussion of the main findings**

##### **3.8.1 Demographics and clinical characteristics**

This study provided a comprehensive overview of the demographic variables and clinical characteristics of Palestinian women who received different treatment modalities for breast cancer. The findings of this study revealed that the Palestinian women with breast cancer who participated were relatively young, with a mean age of approximately 50 years. Moreover, more than half (61.6%) of the women were overweight or obese. Obesity was previously identified as a predictor of the development of breast cancer (Brown, 2021; Devericks, Carson, McCullough, Coleman, & Hursting, 2022). It has been suggested that hormones, inflammatory biomarkers, and insulin resistance can be involved in the pathogenesis of breast cancer (Brown, 2021). In addition, comorbid conditions were highly prevalent (80.2%) among the Palestinian women with breast cancer who participated in this study. This high prevalence highlights the complexities in managing breast cancer in this population of patients. Notably, diabetes mellitus, hypertension, cardiovascular disease, and hormonal issues can further complicate treatment, deteriorate outcomes, and reduce the overall survival and quality of life outcomes of patients (Anwar et al., 2021; Nyrop et al., 2021; Park et al., 2021). Notably, the majority of the patients were in their early stages of breast cancer. These findings indicate that women suffer a considerable burden of disease. Moreover, these findings indicate an urgent need for early detection and improvement of management strategies for breast cancer itself and comorbid conditions. The adoption of a multidisciplinary approach for the treatment of women with breast cancer should be encouraged. multidisciplinary treatments, including oncologists, clinical pharmacists, mental health specialists, and other healthcare professionals, can share expertise to manage these comorbid conditions along with cancer treatment. Multidisciplinary efforts might also include routine screening for comorbid conditions, screening for treatment-related adverse effects, and developing personalized care plans.

Additionally, given these young patient populations and high obesity levels, health authorities are encouraged to develop and implement targeted screening programs. Moreover, weight management interventions should also be prioritized among women who are at risk of breast cancer. Educational and awareness campaigns should

encourage healthy lifestyles. These targeted interventions might reduce the odds of developing breast cancer and improve patient outcomes.

### **3.9 Treatment modalities and adverse effects**

The findings of this study revealed that chemotherapy was the most prevalent (80.2%) treatment modality received by patients, followed by lumpectomy (61.6%) and radiotherapy (60.5%). Although these treatment modalities are standard in the management of breast cancer (Bhushan, Gonsalves, & Menon, 2021; Riis, 2020), significant adverse effects have been shown to be associated with certain breast cancer treatment modalities. These adverse effects include different forms of pain, gastrointestinal issues, and skin and hair problems, among other health issues. In this study, armpit discomfort, chest pain, and phantom breast pain were common forms of pain reported by the patients. In addition, gastrointestinal issues, including nausea and vomiting, were also commonly reported by the patients in this study. Chemotherapy is a mainstay in the treatment of breast cancer and is often used to reduce the size of the tumor prior to surgery (as neoadjuvant therapy) or to remove residual cancer cells after surgery (as adjuvant therapy) (Asaoka, Gandhi, Ishikawa, & Takabe, 2020; Montemurro, Nuzzolese, & Ponzzone, 2020; Wang & Mao, 2020).

However, lumpectomy and radiotherapy are standard and commonly used procedures in breast-conserving therapy (McClelland, Burney, Zellars, Ohri, & Rhome, 2020; Vaidya et al., 2020). Previous studies have extensively reported the adverse effects of chemotherapy and other treatment modalities used to manage breast cancer (Basak, Arrighi, Darwiche, & Deb, 2022; Burguin, Diorio, & Durocher, 2021; Franzoi et al., 2021). The findings of this study highlight the need to comprehensively educate patients on the potential adverse effects of these treatment modalities, when to seek medical help, and how these adverse effects can be managed. Moreover, oncologists, clinical pharmacists, and other clinicians should make efforts to routinely assess and monitor the adverse effects of the therapeutic options used to treat breast cancer. Moreover, a program for timely interventions should be developed and implemented to mitigate these adverse effects. Supportive efforts might consider using antiemetics to manage nausea and vomiting, analgesics to manage the different forms of pain, and dermatological products to manage skin and hair health issues. These efforts can

improve the outcomes and quality of life of patients. Moreover, personalizing treatment modalities can reduce adverse effects and improve patient outcomes.

### **3.10 Patient quality of life**

The quality of life of the patients was assessed via the WHOQOL-BREF questionnaire. As indicated by the transformed scores, the quality of life of the patients was relatively low across the different domains, as indicated by the scores of each domain. In this study, physical pain and a lack of energy were the most common physical health complaints that significantly limited the ability of the patients to perform their activities. It is well established that physical symptoms significantly affect the quality of life of patients, including those with breast cancer (Aydin et al., 2021; Koboto et al., 2020; Kovačević, Miljković, Višnjić, Kozarski, & Janković, 2020; Marinkovic et al., 2021; Shamloo, Nasiri, Maneiy, Kiarsi, & Madmoli, 2020). Moreover, mental health issues, including anxiety and depression, were also common among the patients who participated in this study. These findings highlight another need to adopt a multidisciplinary approach to care for patients with breast cancer. Through this approach, clinicians and mental health specialists can join efforts to reduce the prevalence of these issues and support patients with breast cancer.

### **3.11 Predictors of quality of life**

In this study, several predictors of lower quality of life scores were identified. These predictors included older age, obesity, comorbid conditions, and advanced breast cancer stage. The findings reported in this study were consistent with those previously reported in prior studies and highlighted the complex cross-talks between the demographics, clinical characteristics, and different aspects of the quality of life of the patients (Aydin et al., 2021; Koboto et al., 2020; Kovačević et al., 2020; Marinkovic et al., 2021; Shamloo et al., 2020). These findings indicate a need to personalize care plans, educational materials, and counseling sessions to meet the needs of individual patients. In this study, patients who had higher education levels and did not smoke reported higher quality of life scores across different domains of the WHOQOL-BREF questionnaire. These findings indicate that lifestyle and educational interventions might be beneficial for improving the quality of life outcomes of patients.

### **3.11.1 Impact of treatment on quality of life**

In this study, the quality of life of the patients was affected by the treatment modality they received. Patients who received mastectomy or chemotherapy reported significant deterioration in quality of life across all domains. These findings were consistent with those reported in previous studies. It is well established that invasive treatments are more likely to be associated with a higher incidence of adverse effects and, subsequently, greater deterioration of the quality of life of patients. On the other hand, patients who received lumpectomy reported less deterioration in their quality of life. These findings suggest that breast-conserving therapies are associated with less deterioration in the quality of life of patients.

### **3.11.2 Adverse effects and quality of life**

In this study, vomiting, depression, anxiety, and insomnia were significant predictors of deteriorated quality of life, as indicated by the scores across the different domains of the WHOQOL-BREF questionnaire. These findings indicate that managing such adverse effects can improve the quality of life of patients with breast cancer. For example, clinical pharmacists and clinicians can suggest the use of antiemetics to reduce the incidence of nausea and vomiting. Moreover, mental health specialists and other healthcare providers can contribute to reducing the incidence of depression, anxiety, and insomnia among breast cancer patients. Such efforts can improve the quality of life outcomes of patients.

### **3.12 Summary of the main findings**

Breast cancer is the most common solid malignancy among women (Bray et al., 2018). Recently, there have been significant advances in the techniques used to treat breast cancer (Bhushan et al., 2021). These advances have increased the survival of affected patients (Bhushan et al., 2021; Riis, 2020). Notably, these treatment options are not without adverse effects. For the first time, in Palestine, this study sought to determine the prevalence of adverse effects experienced by Palestinian women who received treatment for breast cancer. Moreover, the study also sought to assess the impact of these adverse effects on the quality of life of affected patients.

The findings of this study revealed that Palestinian women with breast cancer experienced a heavy burden of disease and therapy-related adverse effects. These

adverse effects significantly impact different aspects of the quality of life of patients as assessed via the WHOQOL-BREF questionnaire. The findings of this study revealed that a considerable proportion of the patients were relatively young, overweight/obese, and were mostly in the early stages of the disease. The most common treatment modality received by patients is chemotherapy, followed by lumpectomy and radiotherapy. Different forms of pain, gastrointestinal issues, skin and hair problems, and mental health issues are highly prevalent disease- and therapy-related adverse effects among patients. In general, the quality of life of the patients was considered low. Advanced breast cancer stage, the presence of comorbid conditions, and experiencing disease and therapy-related adverse effects were significant predictors of poor quality of life. On the other hand, higher education attainment and being a nonsmoker were associated with better quality of life outcomes. The findings of this study are worthy of consideration for oncologists, clinical pharmacists, mental health specialists, and other healthcare providers who care for patients with breast cancer.

### **3.13 Limitations of the study**

This study has several limitations:

- This study was conducted with a cross-sectional design. This design is limited in its ability to establish causal relationships as opposed to the interventional designs.
- This study was merely observational, and no interventions were investigated to reduce adverse effects or improve the quality of life of the patients.
- The data collected in this study were self-reported. It is well established that self-reported data are subject to desirability and recall bias.

### **3.14 Conclusion**

The findings of this study highlighted the heavy burden of the disease and therapy-related adverse effects on the quality of life of patients with breast cancer who received treatment in Palestine. Providing comprehensive assessment, personalizing care plans, and reducing the incidence of adverse effects can improve the quality of life and wellbeing of patients with breast cancer. A multidisciplinary holistic care plan for breast cancer patients who integrates physical and mental health support is urgently needed to improve the quality of life of these patients.

### **3.15 Implications for practice and recommendations**

On the basis of the results of this study, the following implications and recommendations can be made:

- Comprehensive management plans to address physical, psychological, relationship, and environmental aspects of the quality of life of breast cancer patients should be developed and implemented.
- Early screening and interventions to detect and manage disease and therapy-related adverse effects are needed to improve the quality of life of patients.
- Personalized care plans that consider the demographic and clinical characteristics of patients should be developed to improve patient outcomes.

## List of abbreviations

---

Abbreviation	Meaning
BMI	Body mass index
BRACA	Breast cancer genes
HRQOL	Health related quality of life
HRT	Hormone replacement therapy
IBM	International business machines corporation
MHT	Menopausal hormone therapy
PET	Positron emission tomography scan
PHIC	Palestinian health insurance corporation
QOL	Quality of life
TNM	Tumor size, lymph node, metastatic spread
WHOQOL	The world health organization quality of life

---

## References

- Abu Farha, N. H., Khatib, M. T., Salameh, H., & Zyoud, S. e. H. (2017). Cancer-related post-treatment pain and its impact on health-related quality of life in breast cancer patients: a cross sectional study in Palestine. *Asia Pacific Family Medicine*, *16*(1), 1-9.
- Aebi, S., Gelber, S., Lang, I., Anderson, S., Robidoux, A., Martin, M., . . . Maibach, R. (2012). Abstract S3-2: Chemotherapy prolongs survival for isolated local or regional recurrence of breast cancer: The CALOR trial (Chemotherapy as Adjuvant for Locally Recurrent breast cancer; IBCSG 27-02, NSABP B-37, BIG 1-02): AACR.
- Anwar, S. L., Cahyono, R., Prabowo, D., Avanti, W. S., Choridah, L., Dwianingsih, E. K., . . . Aryandono, T. (2021). Metabolic comorbidities and the association with risks of recurrent metastatic disease in breast cancer survivors. *BMC Cancer*, *21*(1), 590. doi: 10.1186/s12885-021-08343-0
- Asaoka, M., Gandhi, S., Ishikawa, T., & Takabe, K. (2020). Neoadjuvant Chemotherapy for Breast Cancer: Past, Present, and Future. *Breast Cancer: Basic and Clinical Research*, *14*, 1178223420980377. doi: 10.1177/1178223420980377
- Aydin, M., Kose, E., Odabas, I., Meric Bingul, B., Demirci, D., & Aydin, Z. (2021). The Effect of Exercise on Life Quality and Depression Levels of Breast Cancer Patients. *22*(3), 725-732. doi: 10.31557/apjcp.2021.22.3.725
- Basak, D., Arrighi, S., Darwiche, Y., & Deb, S. (2022). Comparison of Anticancer Drug Toxicities: Paradigm Shift in Adverse Effect Profile. *Life*, *12*(1), 48.
- Bever, T. B., Helvie, M., Bonaccio, E., Calhoun, K. E., Daly, M. B., Farrar, W. B., . . . Greenup, R. (2018). Breast cancer screening and diagnosis, version 3.2018, NCCN clinical practice guidelines in oncology. *Journal of the National Comprehensive Cancer Network*, *16*(11), 1362-1389.
- Bhushan, A., Gonsalves, A., & Menon, J. U. (2021). Current State of Breast Cancer Diagnosis, Treatment, and Theranostics. *Pharmaceutics*, *13*(5), 723.

- Bray, F., Ferlay, J., Soerjomataram, I., Siegel, R. L., Torre, L. A., & Jemal, A. (2018). Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA: a cancer journal for clinicians*, 68(6), 394-424.
- Breastcancer.org. (2021). Breast Cancer Stages. 2021, from <https://www.breastcancer.org>
- Brown, K. A. (2021). Metabolic pathways in obesity-related breast cancer. *Nature Reviews Endocrinology*, 17(6), 350-363. doi: 10.1038/s41574-021-00487-0
- Burguin, A., Diorio, C., & Durocher, F. (2021). Breast Cancer Treatments: Updates and New Challenges. *Journal of Personalized Medicine*, 11(8), 808.
- Den Hollander, P., Savage, M. I., & Brown, P. H. (2013). Targeted therapy for breast cancer prevention. *Frontiers in oncology*, 3, 250.
- Devericks, E. N., Carson, M. S., McCullough, L. E., Coleman, M. F., & Hursting, S. D. (2022). The obesity-breast cancer link: a multidisciplinary perspective. *Cancer and Metastasis Reviews*, 41(3), 607-625. doi: 10.1007/s10555-022-10043-5
- Drăgănescu, M., & Carmocan, C. (2017). Hormone therapy in breast cancer. *Chirurgia*, 112(4), 413-417.
- Fahad Ullah, M. (2019). Breast cancer: current perspectives on the disease status. *Breast Cancer Metastasis and Drug Resistance*, 51-64.
- Finck, C., Barradas, S., Zenger, M., & Hinz, A. (2018). Quality of life in breast cancer patients: Associations with optimism and social support. *International Journal of Clinical and Health Psychology*, 18(1), 27-34.
- Franzoi, M. A., Agostinetti, E., Perachino, M., Del Mastro, L., de Azambuja, E., Vaz-Luis, I., . . . Lambertini, M. (2021). Evidence-based approaches for the management of side-effects of adjuvant endocrine therapy in patients with breast cancer. *The Lancet Oncology*, 22(7), e303-e313. doi: 10.1016/S1470-2045(20)30666-5

- Garreau, J. R., DeLaMelena, T., Walts, D., Karamlou, K., & Johnson, N. (2006). Side effects of aromatase inhibitors versus tamoxifen: the patients' perspective. *The American journal of surgery*, *192*(4), 496-498.
- Geay, J.-F. (2013). Physiopathology, diagnosis and treatment of breast cancer. *Soins; la Revue de Reference Infirmiere*(776), 25-29.
- Gonzalez-Angulo, A. M., Morales-Vasquez, F., & Hortobagyi, G. N. (2007). Overview of resistance to systemic therapy in patients with breast cancer. *Breast cancer chemosensitivity*, 1-22.
- Harbeck, N., Penault-Llorca, F., Cortes, J., Gnant, M., Houssami, N., Poortmans, P., . . . Cardoso, F. (2019). Breast cancer. *Nature reviews Disease primers*, *5*(1), 1-31.
- Hassan, M., Ansari, J., Spooner, D., & Hussain, S. (2010). Chemotherapy for breast cancer. *Oncology reports*, *24*(5), 1121-1131.
- Khanna, D., & Tsevat, J. (2007). Health-related quality of life-an introduction. *American Journal of Managed Care*, *13*(9), S218.
- Kharroubi, A. T., & Abu Seir, R. Y. (2016). Cancer care in Palestine *Cancer care in countries and societies in transition* (pp. 77-97): Springer.
- Koboto, D. D., Deribe, B., Gebretsadik, A., Ababi, G., Bogale, N., Geleta, D., . . . Mengistu, K. (2020). Quality of Life Among Breast Cancer Patients Attending Hawassa University Comprehensive Specialized Hospital Cancer Treatment Center. *Breast Cancer: Targets and Therapy*, *12*(null), 87-95. doi: 10.2147/BCTT.S252030
- Kovačević, P., Miljković, S., Višnjić, A., Kozarski, J., & Janković, R. (2020). Quality of Life Indicators in Patients Operated on for Breast Cancer in Relation to the Type of Surgery—A Retrospective Cohort Study of Women in Serbia. *Medicina*, *56*(8), 402.
- Marinkovic, M., Djordjevic, N., Djordjevic, L., Ignjatovic, N., Djordjevic, M., & Karanikolic, V. (2021). Assessment of the quality of life in breast cancer

- depending on the surgical treatment. *Supportive Care in Cancer*, 29(6), 3257-3266. doi: 10.1007/s00520-020-05838-7
- McClelland, S., Burney, H. N., Zellars, R. C., Ohri, N., & Rhome, R. M. (2020). Predictors of Whole Breast Radiation Therapy Completion in Early Stage Breast Cancer Following Lumpectomy. *Clinical Breast Cancer*, 20(6), 469-479. doi: <https://doi.org/10.1016/j.clbc.2020.06.006>
- Ministry of Health, P. H. I. C. (2019). Health Status, Palestine, 2018.
- Ministry of Health, P. H. I. C. H. S., Palestine. (2017). Health Annual Report 2016: Palestine.
- Mohamed, A., Krajewski, K., Cakar, B., & Ma, C. X. (2013). Targeted therapy for breast cancer. *The American journal of pathology*, 183(4), 1096-1112.
- Mokhatri-Hesari, P., & Montazeri, A. (2020). Health-related quality of life in breast cancer patients: review of reviews from 2008 to 2018. *Health and quality of life outcomes*, 18(1), 1-25.
- Montemurro, F., Nuzzolese, I., & Ponzone, R. (2020). Neoadjuvant or adjuvant chemotherapy in early breast cancer? *Expert Opinion on Pharmacotherapy*, 21(9), 1071-1082. doi: 10.1080/14656566.2020.1746273
- Moo, T.-A., Sanford, R., Dang, C., & Morrow, M. (2018). Overview of breast cancer therapy. *PET clinics*, 13(3), 339-354.
- Narod, S. A. (2018). Personalised medicine and population health: breast and ovarian cancer. *Human genetics*, 137(10), 769-778.
- Nyrop, K. A., Damone, E. M., Deal, A. M., Carey, L. A., Lorentsen, M., Shachar, S. S., . . . Muss, H. B. (2021). Obesity, comorbidities, and treatment selection in Black and White women with early breast cancer. *Cancer*, 127(6), 922-930. doi: <https://doi.org/10.1002/cncr.33288>
- Ohaeri, J. U., & Awadalla, A. W. (2009). The reliability and validity of the short version of the WHO Quality of Life Instrument in an Arab general population. *Annals of Saudi medicine*, 29(2), 98-104.

- Palestinian Ministry of Health. (2020). Health Annual Report 2020 *Palestinian Health Information Center: Health Status, Palestine*.
- Park, J., Rodriguez, J. L., O'Brien, K. M., Nichols, H. B., Hodgson, M. E., Weinberg, C. R., & Sandler, D. P. (2021). Health-related quality of life outcomes among breast cancer survivors. *Cancer*, *127*(7), 1114-1125. doi: <https://doi.org/10.1002/cncr.33348>
- Partridge, A. H., Burstein, H. J., & Winer, E. P. (2001). Side effects of chemotherapy and combined chemohormonal therapy in women with early-stage breast cancer. *JNCI Monographs*, *2001*(30), 135-142.
- Porter, P. L. (2009). Global trends in breast cancer incidence and mortality. *Salud publica de Mexico*, *51*, s141-s146.
- Riis, M. (2020). Modern surgical treatment of breast cancer. *Annals of Medicine and Surgery*, *56*, 95-107. doi: <https://doi.org/10.1016/j.amsu.2020.06.016>
- Schmidt, M. E., Wiskemann, J., & Steindorf, K. (2018). Quality of life, problems, and needs of disease-free breast cancer survivors 5 years after diagnosis. *Quality of Life Research*, *27*(8), 2077-2086.
- Shamloo, M. B. B., Nasiri, M., Maneiy, M., Kiarsi, M., & Madmoli, Y. (2020). Correlation between ways of coping and quality of life in Iranian husbands of women with breast cancer. *International Journal of Palliative Nursing*, *26*(2), 84-90. doi: [10.12968/ijpn.2020.26.2.84](https://doi.org/10.12968/ijpn.2020.26.2.84)
- Shapiro, C. L., & Recht, A. (2001). Side effects of adjuvant treatment of breast cancer. *New England Journal of Medicine*, *344*(26), 1997-2008.
- Vaidya, J. S., Bulsara, M., Baum, M., Wenz, F., Massarut, S., Pigorsch, S., . . . Tobias, J. S. (2020). Long term survival and local control outcomes from single dose targeted intraoperative radiotherapy during lumpectomy (TARGIT-IORT) for early breast cancer: TARGIT-A randomised clinical trial. *BMJ*, *370*, m2836. doi: [10.1136/bmj.m2836](https://doi.org/10.1136/bmj.m2836)

- Waks, A. G., & Winer, E. P. (2019). Breast cancer treatment: a review. *Jama*, *321*(3), 288-300.
- Wang, H., & Mao, X. (2020). Evaluation of the Efficacy of Neoadjuvant Chemotherapy for Breast Cancer. *Drug Design, Development and Therapy*, *14*(null), 2423-2433. doi: 10.2147/DDDT.S253961
- Winters, S., Martin, C., Murphy, D., & Shokar, N. K. (2017). Breast cancer epidemiology, prevention, and screening. *Progress in molecular biology and translational science*, *151*, 1-32.
- Ziegler, R. G., Hoover, R. N., Pike, M. C., Hildesheim, A., Nomura, A. M., West, D. W., . . . Rosenthal, J. F. (1993). Migration patterns and breast cancer risk in Asian-American women. *JNCI: Journal of the National Cancer Institute*, *85*(22), 1819-1827.

## Appendices

### Appendix A

#### Data collection form

#### Data Collection Form (A): Side Effects Reporting

(1) SOCIO-DEMOGRAPHIC			
<b>MEDICAL RECORD</b>			
<b>GENDER</b>	<input type="checkbox"/> Male <input type="checkbox"/> Female		
<b>AGE</b>			
<b>BLOOD GROUP</b>			
<b>HEIGHT</b>			
<b>WEIGHT</b>			
<b>MARITAL STATUS</b>	<input type="checkbox"/> Single <input type="checkbox"/> Married <input type="checkbox"/> Divorced <input type="checkbox"/> Widowed		
<b>EDUCATION</b>	<input type="checkbox"/> No formal Edu. <input type="checkbox"/> Primary <input type="checkbox"/> Secondary <input type="checkbox"/> Tertiary		
<b>SMOKING</b>	<input type="checkbox"/> Smoker <input type="checkbox"/> Non-Smoker <input type="checkbox"/> Ex-smoker		
<b>ALLERGY</b>	<input type="checkbox"/> None <input type="checkbox"/> Allergic to _____		
<b>FAMILY HISTORY</b>	<input type="checkbox"/> Cancer (Type _____) <input type="checkbox"/> No cancer family history		
<b>PAST MEDICAL HISTORY</b>	<input type="checkbox"/> Diabetes <input type="checkbox"/> Dyslipidemia <input type="checkbox"/> Hypertension <input type="checkbox"/> IHD <input type="checkbox"/> Stroke <input type="checkbox"/> Heart Failure <input type="checkbox"/> Arrhythmia <input type="checkbox"/> IBD <input type="checkbox"/> Asthma <input type="checkbox"/> IBS <input type="checkbox"/> L. Cirrhosis <input type="checkbox"/> R. Arthritis <input type="checkbox"/> COPD <input type="checkbox"/> CKD <input type="checkbox"/> Osteoporosis <input type="checkbox"/> Gout		
(2) BREAST CANCER STATUS			
<b>BREAST CANCER</b>	<input type="checkbox"/> Yes <input type="checkbox"/> No		
<b>STAGE</b>			
<b>DIAGNOSIS DATE</b>			
<b>LAST VISIT DATE</b>			
<b>TREATMENT METHOD</b>	<input type="checkbox"/> Surgical <input type="checkbox"/> Radiotherapy <input type="checkbox"/> Chemotherapy		
<b>PHARMACOTHERAPY PROTOCOL</b>			
<b>DRUG HISTORY</b>	<b>Drug</b>	<b>Frequency</b>	<b>Indication</b>

<b>(3) LAB RESULTS</b>					
<b>Na</b>			<b>RBC</b>		<b>RB Glu</b>
<b>K</b>			<b>WBC</b>		<b>HbA1c</b>
<b>Urea</b>			<b>HGB</b>		<b>INR</b>
<b>Cr</b>			<b>HCT</b>		<b>CRP</b>
<b>Cr Cl</b>			<b>MCV</b>		
<b>Uric acid</b>			<b>PLT</b>		
<b>Mg</b>					
<b>Calcium</b>					
<b>Phos</b>					

<b>(4) Side effects</b>					
<input type="checkbox"/> <b>Abdominal Pain</b>	<input type="checkbox"/> <b>Anemia</b>	<input type="checkbox"/> <b>Anxiety</b>	<input type="checkbox"/> <b>Appetite Changes</b>	<input type="checkbox"/> <b>Armpit Discomfort</b>	<input type="checkbox"/> <b>Back Pain</b>
<input type="checkbox"/> <b>Bone and Joint Pain</b>	<input type="checkbox"/> <b>Breathing Problems</b>	<input type="checkbox"/> <b>Chest Pain</b>	<input type="checkbox"/> <b>Cold and Flu Symptoms</b>	<input type="checkbox"/> <b>Constipation</b>	<input type="checkbox"/> <b>Coughing</b>
<input type="checkbox"/> <b>Delayed Wound Healing</b>	<input type="checkbox"/> <b>Depression</b>	<input type="checkbox"/> <b>Diarrhea</b>	<input type="checkbox"/> <b>Dizziness</b>	<input type="checkbox"/> <b>Dry Mouth</b>	<input type="checkbox"/> <b>Dry Skin</b>
<input type="checkbox"/> <b>Fertility Issues</b>	<input type="checkbox"/> <b>Fever</b>	<input type="checkbox"/> <b>Gas (Flatulence)</b>	<input type="checkbox"/> <b>Hair Loss</b>	<input type="checkbox"/> <b>Headaches</b>	<input type="checkbox"/> <b>Hearing Problems</b>
<input type="checkbox"/> <b>Heartburn</b>	<input type="checkbox"/> <b>Hematoma (Blood Build-Up)</b>	<input type="checkbox"/> <b>High Blood Pressure</b>	<input type="checkbox"/> <b>Hot Flashes</b>	<input type="checkbox"/> <b>Infection</b>	<input type="checkbox"/> <b>Injection Site Reaction</b>
<input type="checkbox"/> <b>Itching</b>	<input type="checkbox"/> <b>Kidney Problems</b>	<input type="checkbox"/> <b>Leg Cramps</b>	<input type="checkbox"/> <b>Liver Problems (Hepatotoxicity)</b>	<input type="checkbox"/> <b>Loss of Libido</b>	<input type="checkbox"/> <b>Low Blood Pressure (Hypotension)</b>
<input type="checkbox"/> <b>Memory Loss</b>	<input type="checkbox"/> <b>Menopause</b>	<input type="checkbox"/> <b>Mood Swings</b>	<input type="checkbox"/> <b>Mouth and Throat Sores (Mucositis)</b>	<input type="checkbox"/> <b>Muscle Pain (Myalgia)</b>	<input type="checkbox"/> <b>Nail Changes</b>
<input type="checkbox"/> <b>Neuropathy</b>	<input type="checkbox"/> <b>Nosebleeds</b>	<input type="checkbox"/> <b>Numbness</b>	<input type="checkbox"/> <b>Osteonecrosis of the Jaw</b>	<input type="checkbox"/> <b>Osteoporosis (Bone Loss)</b>	<input type="checkbox"/> <b>Pain</b>
<input type="checkbox"/> <b>Post-Traumatic</b>	<input type="checkbox"/> <b>Rash</b>	<input type="checkbox"/> <b>Runny Nose</b>	<input type="checkbox"/> <b>Scar Tissue</b>	<input type="checkbox"/> <b>Seroma (Fluid)</b>	<input type="checkbox"/> <b>Skin Discoloration</b>

<b>Stress Disorder (PTSD)</b>			<b>Formation</b>	<b>Build-Up)</b>	<b>on</b>
<input type="checkbox"/> <b>Sore Throat</b>	<input type="checkbox"/> <b>Stroke</b>	<input type="checkbox"/> <b>Swallowing Problems</b>	<input type="checkbox"/> <b>Sweating</b>	<input type="checkbox"/> <b>Swelling</b>	<input type="checkbox"/> <b>Taste and Smell Changes</b>
<input type="checkbox"/> <b>Urine Discoloration</b>	<input type="checkbox"/> <b>Vaginal Discharge</b>	<input type="checkbox"/> <b>Vaginal Dryness</b>	<input type="checkbox"/> <b>Vision and Eye Problems</b>	<input type="checkbox"/> <b>Vomiting</b>	<input type="checkbox"/> <b>Weakness</b>
<input type="checkbox"/> <b>Nausea</b>	<input type="checkbox"/> <b>Bleeding and Bruising Problems</b>	<input type="checkbox"/> <b>Dehydration</b>	<input type="checkbox"/> <b>Fatigue</b>	<input type="checkbox"/> <b>Heart Problems</b>	<input type="checkbox"/> <b>Insomnia (Trouble Sleeping)</b>
<input type="checkbox"/> <b>Vomiting</b>	<input type="checkbox"/> <b>Lung Problems</b>	<input type="checkbox"/> <b>Phantom Breast Pain</b>	<input type="checkbox"/> <b>Skin Sensitivity</b>	<input type="checkbox"/> <b>Urinary Tract Inf. (UTI)</b>	<input type="checkbox"/> <b>Weight Changes</b>

Data Collection Form (B): Quality of Life (WHOQOL-BREF-Arabic)

استبيان مختصر لجودة الحياة النوعية النسخة العربية

هذا الاستبيان يستفسر عما تشعر به فيما يتعلق بنوعية حياتك وصحتك ونواحي أخرى من حياتك، نرجو الإجابة على جميع الأسئلة. إذا لم تكن متأكد من الإجابة على سؤال معين، نرجو اختيار الجواب الأنسب. وهذا قد يكون ردك الأول في أحيان كثيرة. نرجو أن تضع في اعتبارك قيمك وآمالك و ما يمنعك و يشغلك. نطلب أن تفكر في نمط حياتك خلال الشهرين الماضيين.

*يرجى قراءة كل سؤال و تقيم مشاعرك ووضع الدائرة حول الرقم الذي يعطي أفضل إجابة بالنسبة لك.					
	سنة للغاية	سنة	لا بأس	جيدة	جيدة جداً
1	1	2	3	4	5
	غير راض مطلقاً	غير راض	لا راض ولا غير راض	راض	راض تماماً
2	1	2	3	4	5
	كيف تقيم جودة حياتك؟	كيف انت راض عن صحتك؟			

*الأسئلة التالية تستفسر عن مدى تعرضك لأشياء معينة خلال الشهرين الماضيين					
	لا يوجد	قليلا	درجة متوسطة	كثير جدا	بدرجة بالغة
3	1	2	3	4	5
	إلى أي حد تشعر بأن الوجع يمنعك من القيام بالأعمال التي تريدها؟				
4	1	2	3	4	5
	كم تحتاج من العلاج الطبي لتتمكن من القيام بأعمالك اليومية؟				
5	1	2	3	4	5
	إلى أي مدى تستمتع بالحياة؟				
6	1	2	3	4	5
	إلى أي مدى تشعر بأن حياتك ذات معنى؟				

7	كم أنت قادر على التركيز؟	1	2	3	4	5
8	كم تشعر بالأمان في حياتك اليومية؟	1	2	3	4	5
9	إلى أي حد تعتبر أن البيئة المحيطة بك صحية؟	1	2	3	4	5

*الأسئلة التالية تستفسر عن مدى قدرتك على إتمام أمور معينة خلال الأسبوعين الماضيين						
درجة بالغة	بدرجة	بدرجة	بدرجة	بدرجة	بدرجة	بدرجة
بدرجة	بدرجة	بدرجة	بدرجة	بدرجة	بدرجة	بدرجة
بدرجة	بدرجة	بدرجة	بدرجة	بدرجة	بدرجة	بدرجة
10	هل لديك طاقة كافية لمزاولة الحياة اليومية؟	1	2	3	4	5
11	هل أنت قادر على قبول مظهرك الخارجي؟	1	2	3	4	5
12	هل لديك من المال ما يكفي لتلبية احتياجاتك؟	1	2	3	4	5
13	كم تتوفر لك المعلومات التي تحتاجها في حياتك اليومية؟	1	2	3	4	5
14	إلى أي مدى لديك الفرصة للأنشطة الترفيهية؟	1	2	3	4	5
	سيئة للغاية	سيئة	لا بأس	جيدة	جيدة جداً	
15	كم أنت قادر على التجول بسهولة؟	1	2	3	4	5

\*الأسئلة التالية تطلب منك أن تعبر عن مدى رضاك نحو جوانب مختلفة من حياتك خلال الشهرين

الماضيين					
راض تماما	راض	لا راض ولا غير راض	غير راض	غير راض مطلقا	
5	4	3	2	1	16 كم أنت راض عن نومك؟
5	4	3	2	1	17 إلى أي مدى أنت راض عن قدرتك على القيام بنشاطاتك اليومية
5	4	3	2	1	18 كم أنت راض عن قدراتك على العمل؟
5	4	3	2	1	19 كم أنت راض عن نفسك؟
5	4	3	2	1	20 كم أنت راض عن علاقاتك الشخصية؟
5	4	3	2	1	21 كم أن راض عن حياتك الجنسية؟
5	4	3	2	1	22 كم أنت راض عن الدعم او المساعدة من الأصدقاء؟
5	4	3	2	1	23 كم أنت راض عن احوالك السكنية؟
5	4	3	2	1	24 كم أنت راض عن الخدمات الصحية الموفرة لديك؟
5	4	3	2	1	25 كم أنت راض عن وسائل مواصلاتك؟

## Appendix B

### Institutional Review Board Approval

An-Najah National University  
Faculty of Medicine & Health  
Sciences  
Institutional Review Board



جامعة النجاح الوطنية  
كلية الطب وعلوم الصحة  
لجنة أخلاقيات البحث العلمي

Ref: Mas. April. 2022/9

#### IRB Approval Letter

**Title of Research:**

**A cross-sectional study of self-reported side effects of breast cancer treatment and quality of life in Palestine**

**Submitted by :**

Karin Abreck

**Supervisor:**

Samah Al-Jabi, Sae'd Zyoud

**Approved:**

18<sup>th</sup> April, 2022

Your Study Title “**A cross-sectional study of self-reported side effects of breast cancer treatment and quality of life in Palestine**” reviewed by An-Najah National University IRB committee and was approved on 18<sup>th</sup> April, 2022.

**Hasan Fitian, MD**  
**IRB Committee Chairman**



## Appendix C

### Scores of the patients in the different domains of the WHOQOL-BREF questionnaire

<b>Domain</b>	<b>Scores range</b>	<b>Raw scores Mean (SD)</b>	<b>Transformed scores Mean (SD)</b>
Overall Quality of Life and General Health	2-10	5.8 (2.4)	47.5 (29.9)
Physical Health	7-35	19.6 (8.3)	45.1 (29.5)
Psychological	6-30	17.1 (6.9)	46.2 (28.9)
Social relationships	3-15	9.4 (3.8)	53.1 (31.7)
Environment	8-40	21.9 (9.1)	43.3 (28.5)
Overall score	26-130	73.8 (30.2)	47.1 (29.4)

## Appendix D

### Association between the demographic and disease characteristics of the patients and their scores on the different domains of the WHOQOL-BREF questionnaire

Variable	Overall quality of life and general health		Physical health		Psychological		Social relationships		Environment		Overall score	
	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p
Age (years)												
< 50	50.8 (28.9)		50.6 (29.1)		49.9 (28.5)	0.02	56.9 (32.1)	0.04	47.7 (27.9)	0.00	51.2 (29)	
≥ 50	43.9 (30.8)	0.063	39.2 (29)	0.002	42.1 (28.8)	0.09	49 (30.9)	0.06	38.5 (28.4)	0.09	42.5 (29.2)	0.018
BMI												
Normal weight	52.4 (34.7)		50.4 (33.9)		49.7 (33.3)	0.12	59.5 (36.1)	0.01	48 (33)	0.03	52 (33.9)	
Overweight/obese	44.5 (26.2)	0.039	41.9 (26.1)	0.024	44 (25.6)	0.1	49.1 (28)	0.0	40.4 (24.9)	0.05	44 (25.8)	0.032
Marital status												
Never married	50 (31.8)		48.3 (31)		47 (29.7)		58.6 (34.4)		45.5 (29.6)		49.9 (31)	
Ever married (married/divorced/widowed)	46.3 (28.9)	0.345	43.5 (28.7)	0.225	45.8 (28.5)	0.74	50.3 (29.9)	0.04	42.2 (27.9)	0.38	45.6 (28.5)	0.272
Education level												
School	44.6 (28.7)		41.9 (28)		43.7 (27.5)	0.08	49.2 (29.3)	0.01	40.5 (27.5)	0.05	44 (27.9)	
University	52.1 (31.4)	0.048	50 (31.3)	0.031	50 (30.6)	0.05	59.1 (34.3)	0.04	47.6 (29.5)	0.01	51.8 (31.1)	0.037
Smoking												
Nonsmoker	48.6 (29)		46.2 (28.7)		47.1 (27.9)	0.05	54.6 (30.7)	0.00	44.1 (27.5)	0.08	48.1 (28.4)	
Smoker/Ex-smoker	33.3 (38.3)	0.037	31 (37.4)	0.034	33.3	0.0	33.3	0.06	32.3	0.08	32.6	0.031

Variable	Overall quality of life and general health		Physical health		Psychological		Social relationships		Environment		Overall score	
	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p
-smoker					(38.3)		(38.3)		(37.9)		(38)	
Family history of cancer												
No	46.4 (25.9)		43 (25.5)		44.2 (24.7)	0.08	52.2 (29.1)	0.44	41.5 (25.1)	0.10	45.5 (25.7)	0.163
Yes	50.3 (38.6)	0.348	50.8 (37.6)	0.056	51.2 (37.3)	1	55.6 (37.7)	0	47.9 (35.4)	9	51.2 (37.1)	
Have a comorbidity												
No	57.4 (30.6)		54.8 (34)		56.6 (29.8)	0.00	67.2 (38.1)	<0.0	53.9 (30.6)	0.00	58 (32.3)	0.003
Yes	45.1 (29.3)	0.009	42.8 (27.9)	0.009	43.6 (28.1)	4	49.6 (29)	0.01	40.7 (27.4)	3	44.4 (28)	
Time since diagnosis (years)												
< 3	50.7 (24.2)		48 (24.3)		49.5 (23.6)	0.02	55.2 (25.9)	0.19	46.2 (22.4)	0.04	49.9 (23.7)	0.058
≥ 3	43 (36.4)	0.043	41 (35.6)	0.061	41.3 (34.7)	5	50 (38.6)	4	39 (35.2)	6	42.9 (35.8)	
Stage												
I	60.5 (1.8)		57.9 (1.9)		58.8 (1.9)		66.2 (1.8)		55.4 (1.9)		59.7 (1.8)	
II	46.6 (3.7)	<0.001	40.1 (3.7)	<0.001	43.6 (3.3)	<0.001	52.5 (4)	<0.001	40.9 (3.4)	<0.001	44.7 (3.6)	<0.001
III	18.1 (3.7)	1	19.6 (3.8)	1	19 (3.6)	19	23.6 (4.6)	0.01	17.2 (3.5)	0.01	19.5 (3.8)	1
IV	4.2 (4.2)		4.2 (4.2)		4.2 (4.2)		4.2 (4.2)		3.6 (3.6)		4.1 (4.1)	
Lumpectomy												
No	40.2 (32.6)	0.002	38.3 (31.9)	0.003	38 (31)	<0.001	47.5 (35.8)	0.02	37.2 (30.7)	0.006	40.2 (32.1)	0.003

Variable	Overall quality of life and general health		Physical health		Psychological		Social relationships		Environment		Overall score	
	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p
Yes	52.1 (27.3)		49.4 (27.2)		51.3 (26.3)		56.6 (28.4)	4	47.1 (26.4)		51.3 (26.8)	
Mastectomy												
No	54.3 (26.7)	<0.001	49.7 (27.5)	0.002	52.8 (26.1)	<0.001	58.7 (27.3)	<0.001	49.3 (26.7)	<0.001	53 (26.5)	<0.001
Yes	37.1 (31.7)		38.2 (31.3)		36 (30)		44.6 (36)		34.1 (28.7)		38 (31.3)	
Radiotherapy												
No	52.2 (32.6)	0.042	48.3 (32)	0.163	49.8 (32.1)	0.107	55.9 (34.5)	0.255	46.1 (32.2)	0.198	50.5 (32.4)	0.132
Yes	44.5 (27.8)		43.1 (27.7)		43.8 (26.4)		51.3 (29.7)		41.5 (25.6)		44.8 (27.1)	
Chemotherapy												
No	60.3 (37.6)	0.001	59.9 (36.9)	<0.001	59.6 (37.4)	<0.001	68.1 (39.5)	<0.001	56.6 (37)	<0.001	60.9 (37.4)	<0.001
Yes	44.4 (26.9)		41.5 (26.3)		42.9 (25.4)		49.4 (28.4)		40 (25)		43.6 (26)	
Abdominal pain												
No	53.5 (28.9)	0.001	50.5 (29.7)	0.003	51.7 (28.4)	0.002	58.7 (30.7)	0.004	48.3 (28.4)	0.005	52.5 (28.8)	0.002
Yes	41.5 (29.9)		39.7 (28.5)		40.6 (28.3)		47.5 (31.9)		38.3 (27.7)		41.5 (29)	
Bone and joint pain												
No	43.1 (28.2)	0.001	42.4 (28)	0.030	43.1 (27.4)	0.014	47.6 (31.8)	<0.001	39.3 (26.5)	0.001	43.1 (28.2)	0.002
Yes	56.7 (31.4)		50.9 (31.9)		52.5 (30.9)		64.6 (28.3)		51.7 (30.6)		55.3 (30.3)	
Chest pain												
No	58.1 (31.9)	<0.001	57.7 (30.6)	<0.001	55.9 (31.5)	<0.001	64.7 (32.9)	<0.001	53.1 (31)	<0.001	57.9 (31.3)	<0.001

Variable	Overall quality of life and general health		Physical health		Psychological		Social relationships		Environment		Overall score	
	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p
Yes	40.6 (26.5)		37 (25.8)		39.8 (25.1)		45.5 (28.6)	01	36.9 (24.7)		40 (25.8)	
Phantom breast pain												
No	59.3 (32.2)	<0.001	58.8 (30.8)	<0.001	57.1 (32)	<0.001	65.7 (32.9)	<0.001	0 (31.4)	<0.001	59.1 (31.6)	<0.001
Yes	39.5 (25.4)		35.8 (24.7)		38.6 (23.9)		44.4 (27.8)	01	35.7 (23.5)	01	38.8 (24.7)	1
Sore throat												
No	48 (28)	0.606	45.8 (28.6)	0.502	46.8 (27.3)	0.51	54.2 (30.6)	0.25	44.1 (27)	0.37	47.8 (27.9)	0.430
Yes	45.6 (37)		42.6 (33.2)		43.8 (34.5)	2	48.5 (36)	1	40.1 (34)	4	44.1 (34.8)	
Leg cramps												
No	49.9 (24.8)	0.057	46.1 (25.8)	0.453	48.2 (24.4)	0.08	55.1 (27.3)	0.11	44.7 (24)	0.25	48.8 (24.8)	0.152
Yes	42.1 (39.1)		43 (36.9)		41.5 (36.9)	7	48.4 (39.8)	7	40.2 (36.8)	2	43.1 (37.7)	
Nose bleeding												
No	49 (26.9)	0.086	46 (27.2)	0.334	47.7 (26.3)	0.06	54.5 (28.6)	0.13	44.2 (26.1)	0.27	48.3 (26.6)	0.148
Yes	40.6 (41.2)		41.3 (38.9)		38.9 (38.3)	2	46.7 (43.5)	4	39.1 (37.7)	5	41.3 (39.8)	
Armpit discomfort												
No	56 (35.8)	0.003	53.4 (34.5)	0.004	54.5 (34.6)	0.00	58.7 (37.9)	0.07	50.5 (32.8)	0.00	54.6 (34.9)	0.008
Yes	44.1 (26.5)		41.7 (26.6)		42.8 (25.5)	3	50.8 (28.6)	1	40.4 (26)	9	44 (26.3)	
Back pain												
No	54 (31)	0.001	53.6 (30.1)	<0.001	53.2 (30.2)	<0.001	58.1 (33.1)	<0.001	50.3 (29.4)	<0.001	53.9 (30.6)	<0.001
Yes	41.2 (27.6)		37 (26.6)		39.3		48.3	01	36.5		40.5	1

Variable	Overall quality of life and general health		Physical health		Psychological		Social relationships		Environment		Overall score	
	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p
					(25.7)		(29.7)		(25.8)		(26.7)	
Muscle pain (Myalgia)												
No	51.2 (29.2)	0.016	48.7 (29.5)	0.018	50.5 (28.6)	0.004	54.4 (32.1)	0.42	46.5 (28.3)	0.02	50.3 (29.3)	0.033
Yes	42.1 (30.3)		39.9 (28.9)		39.9 (28.1)		51.2 (31.2)		38.7 (28.1)		42.4 (29)	
Headaches												
No	51.3 (31.1)	0.051	50.2 (30.8)	0.008	49.7 (30.3)	0.059	57 (33.5)	0.05	47.3 (29.2)	0.03	51.1 (30.7)	0.034
Yes	44 (28.5)		40.5 (27.6)		42.9 (27.1)		49.5 (29.6)		39.7 (27.4)		43.3 (27.7)	
Dry skin												
No	49.3 (25.7)	0.059	45.9 (26)	0.400	47.3 (24.7)	0.19	55.2 (28)	0.03	44.4 (24.4)	0.22	48.4 (25.4)	0.132
Yes	40.4 (42.8)		42 (41.2)		41.4 (41.7)		44.6 (43)		39 (40.9)		41.5 (41.8)	
Nail changes												
No	48.9 (27.8)	0.117	45.9 (28.3)	0.410	47.6 (27.2)	0.09	54 (30.5)	0.31	44.2 (26.6)	0.27	48.1 (27.7)	0.214
Yes	41.4 (37.6)		42 (34.8)		39.8 (34.8)		49 (36.7)		39.3 (35.5)		42.3 (35.6)	
Skin sensitivity												
No	47.9 (29)	0.573	45.1 (28.4)	0.966	46.3 (27.7)	0.78	53.6 (30.3)	0.48	43.3 (27.5)	0.96	47.2 (28.2)	0.763
Yes	44.4 (37.6)		45.4 (38.6)		44.8 (37.8)		49.1 (42.4)		43.5 (36.4)		45.4 (38.4)	
Heartburn												
No	48.5 (27.4)	0.563	46.1 (27.1)	0.565	47.1 (26.6)	0.55	53.2 (30.1)	0.94	44.2 (24.7)	0.56	47.8 (26.9)	0.632
Yes	46.3 (33.1)		43.9 (32.6)		44.9 (31.7)		52.9 (33.9)		42.1 (32.9)		46 (32.5)	

Variable	Overall quality of life and general health		Physical health		Psychological		Social relationships		Environment		Overall score	
	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p
Nausea												
No	57.1 (39.6)	0.003	57.1 (39.2)	<0.001	56 (38.6)	0.001	60.3 (41.3)	0.003	54.2 (38.6)	<0.001	56.9 (39.3)	0.002
Yes	44.4 (25.4)		41.3 (24.5)		43 (24.2)		50.8 (27.6)		39.8 (23.4)		43.9 (24.6)	
Vomiting												
No	55.9 (33.8)	<0.001	54.4 (32.2)	<0.001	54.1 (32.1)	<0.001	60.7 (34.8)	<0.001	51.7 (30.8)	<0.001	55.4 (32.5)	<0.001
Yes	40.9 (24.7)		37.8 (25)		39.9 (24.3)		47 (27.7)		36.7 (24.6)		40.5 (24.8)	
Diarrhea												
No	52.2 (28.2)	0.001	47.5 (28.6)	0.078	50 (27.7)	0.001	55.7 (30.5)	0.007	45.8 (27.2)	0.005	50.2 (28.1)	0.017
Yes	38.9 (31.4)		40.7 (30.9)		39 (29.8)		48.3 (33.5)		38.6 (30.2)		41.1 (31)	
Gas (Flatulence)												
No	48.8 (28.8)	0.215	46 (28.7)	0.418	47.2 (27.6)	0.32	55 (31.4)	0.009	44.2 (26.6)	0.36	48.2 (28.3)	0.250
Yes	43.5 (33.1)		42.5 (32)		43.1 (32.4)		47.2 (32.1)		40.5 (33.7)		43.3 (32.5)	
Constipation												
No	48.3 (26.1)	0.426	44.8 (25.5)	0.751	46.6 (25)	0.62	53.1 (27)	0.99	43.3 (24)	0.97	47.2 (25.1)	0.849
Yes	44.7 (41)		46.2 (41.1)		44.5 (39.7)		53.1 (44.8)		43.4 (40.7)		46.4 (41.3)	
Memory loss												
No	47.9 (26.5)	0.638	45.6 (26.7)	0.585	46.8 (25.6)	0.41	53.9 (29.2)	0.33	43.4 (25.2)	0.91	47.5 (26.3)	0.553
Yes	45.5 (44)		42.9 (41.7)		42.9 (42.2)		48.8 (42.5)		42.9 (41.7)		44.6 (42.3)	
Depression												

Variable	Overall quality of life and general health		Physical health		Psychological		Social relationships		Environment		Overall score	
	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p
No	58.9 (31.7)	<0.001	56.9 (31.6)	<0.001	56.8 (31.4)	<0.001	64.3 (33.7)	<0.001	60 (30.6)	<0.001	58.1 (31.5)	<0.001
Yes	39.7 (26)	1	37 (25.1)	1	38.9 (24.6)	01	45.4 (27.9)	01	36.4 (24.7)	01	39.5 (25.3)	1
<b>Anxiety</b>												
No	62 (32.2)	<0.001	60.9 (32.2)	<0.001	60.9 (31.2)	<0.001	71.5 (32.7)	<0.001	62 (29.6)	<0.001	62.7 (31.3)	<0.001
Yes	41.9 (27.1)	1	39.1 (26.1)	1	40.5 (25.8)	01	46 (28.3)	01	37.7 (25.9)	01	41 (26.3)	1
<b>Mood swings</b>												
No	58.3 (25.2)	<0.001	56.5 (27.2)	<0.001	56 (25.2)	<0.001	60 (28.9)	<0.001	56 (25)	<0.001	56 (25.9)	<0.001
Yes	37.2 (30.6)	1	34.3 (27.6)	1	36.8 (29.1)	01	40.5 (29.1)	01	32.4 (27.3)	01	36.3 (28.5)	1
<b>Breathing problems</b>												
No	49.4 (23.5)	0.133	45.2 (23.6)	0.936	47.2 (22.3)	0.37	54 (24.7)	0.47	43.8 (22)	0.70	47.9 (22.8)	0.470
Yes	43.3 (41)		44.9 (40.2)		43.7 (40.1)	6	51 (43.9)	7	42.3 (39.6)	9	45 (40.8)	
<b>Coughing</b>												
No	48.4 (26.7)	0.365	45.3 (27.2)	0.871	47.1 (26.1)	0.29	53.7 (29.7)	0.51	43.8 (25.3)	0.55	47.7 (26.6)	0.497
Yes	44.1 (40.6)		44.5 (38)		42.4 (38.2)	8	50.5 (39.1)	3	41.2 (38.9)	0	44.5 (38.8)	
<b>Anemia</b>												
No	58 (36.1)	<0.001	56 (36)	<0.001	56.3 (35.6)	<0.001	62.8 (37.1)	<0.001	54 (34.7)	<0.001	57.4 (35.7)	<0.001
Yes	42.5 (25.1)	1	39.9 (24.3)	1	41.3 (23.6)	01	48.4 (27.7)	01	38.1 (23.3)	01	42 (24.4)	1
<b>Bleeding and bruising problems</b>												

Variable	Overall quality of life and general health		Physical health		Psychological		Social relationships		Environment		Overall score	
	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p
Urine discoloration	No	48.5 (26.2)	47.8 (27.7)	0.518	48.1 (25.9)	0.19	55.1 (31.5)	0.23	45.7 (25.4)	0.10	49 (27.1)	0.191
	Yes	46.1 (34.7)	41.3 (31.8)	0.086	43.3 (32.6)	1	50.2 (31.9)	0	39.8 (32.2)	3	44.2 (32.4)	
Vaginal discharge	No	50.4 (24.7)	47.3 (25.2)	0.003	49 (24.1)	0.00	56.7 (26.4)	<0.01	45.7 (23.3)	0.00	49.8 (24.3)	0.003
	Yes	36.8 (43.2)	37.1 (41.3)	0.024	35.6 (40.9)	2	39.4 (44.3)	0.01	34.2 (41.8)	8	36.6 (42.2)	
Vaginal dryness	No	48.8 (27.3)	44.9 (26.9)	0.215	46.6 (26.2)	0.67	53.1 (29.1)	0.98	43.8 (25.1)	0.66	47.4 (26.6)	0.706
	Yes	43.5 (36.8)	45.7 (36.7)	0.852	44.8 (36)	4	53.2 (39)	3	42 (37.3)	6	45.8 (36.9)	
Urinary tract infection	No	50 (23)	47.1 (22.2)	0.137	48.1 (21.7)	0.23	55 (25.9)	0.27	44.5 (22.2)	0.46	48.9 (22.7)	0.247
	Yes	44.4 (36.7)	42.7 (36.7)	0.232	43.8 (35.8)	1	50.7 (37.8)	2	41.9 (34.9)	6	44.7 (36.1)	
Loss of libido	No	48.8 (25.3)	45.5 (25.7)	0.215	47.2 (24.7)	0.29	54.6 (27.7)	0.17	44.3 (23.4)	0.33	48.1 (25)	0.316
	Yes	43.5 (41.1)	44 (39.3)	0.736	42.9 (39.2)	5	48.4 (41.6)	8	40.3 (40.4)	9	43.8 (40.1)	
Loss of libido	No	50.4 (27.5)	46.8 (27.8)	0.016	48.6 (26.5)	0.03	57 (29)	0.00	46.5 (25.9)	0.00	49.8 (27)	0.017
	Yes	40.5 (34.4)	41.1 (33.3)	0.164	40.3	7	43.7	2	35.6	5	40.3	

Variable	Overall quality of life and general health		Physical health		Psychological		Social relationships		Environment		Overall score	
	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p
					(33.4)		(35.9)		(32.8)		(33.8)	
<b>Hematoma (blood build-up)</b>												
No	49.6 (24.7)		46.5 (25.6)		48.1 (24.1)	0.06	55.6 (26.5)	0.02	45 (23.6)	0.08	49 (24.5)	0.064
Yes	41.1 (41.9)	0.049	41 (39.4)	0.200	40.3 (39.9)	0.2	45.2 (43.5)	0.3	37.9 (39.6)	0.5	41.1 (40.7)	
<b>Seroma (fluid build-up)</b>												
No	51.7 (26.3)		48.3 (27)		49.9 (25.2)	0.00	58.8 (28.6)	<0.0	46.7 (24.8)	0.00	51.1 (26)	0.001
Yes	38 (35.3)	0.001	37.8 (33.7)	0.008	37.7 (34.5)	0.2	40.1 (34.8)	0.01	35.6 (34.5)	0.4	37.8 (34.5)	
<b>Itching</b>												
No	49.6 (25.4)		47.6 (26.6)		48.3 (25.1)	0.12	55.5 (29.2)	0.12	44.9 (24.9)	0.24	49.2 (25.9)	0.138
Yes	44.2 (36)	0.158	41.3 (33.6)	0.097	42.7 (33.9)	0.5	49.2 (35.2)	0.3	40.7 (33.3)	0.3	43.6 (34.1)	
<b>Rash</b>												
No	49.3 (30.5)		49.8 (30.1)		47.7 (29.5)	0.47	56.7 (34.1)	0.12	44.9 (28.6)	0.45	49.7 (30.3)	0.223
Yes	46.3 (29.6)	0.420	41.8 (28.8)	0.030	45.1 (28.5)	0.6	50.5 (29.7)	0.1	42.2 (28.4)	0.5	45.2 (28.7)	
<b>Hair loss</b>												
No	57.3 (32.8)	<0.001	57.1 (32.6)	<0.001	56.2 (32.6)	<0.001	64.9 (36.1)	<0.001	53.1 (30.8)	<0.001	57.7 (32.7)	<0.001
Yes	42.5 (27.2)	0.1	39 (25.9)	0.1	41.1 (25.3)	0.01	47.1 (27.4)	0.01	38.3 (25.9)	0.01	41.6 (26)	0.1
<b>Skin discoloration</b>												
No	49.4 (26.2)	0.133	45.6 (26.3)	0.733	47.5 (25.7)	0.26	54.4 (27.6)	0.30	44.1 (24.4)	0.49	48.2 (25.7)	0.342

Variable	Overall quality of life and general health		Physical health		Psychological		Social relationships		Environment		Overall score	
	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p
Yes	43.3 (37)		44.2 (36.2)		43.1 (35)		50.2 (39.6)		41.5 (36.3)		44.4 (36.6)	
Dry mouth												
No	49.1 (25.5)	0.153	45.9 (26.4)	0.485	47.1 (24.6)	0.37	55.7 (28.5)	0.03	44.7 (24.2)	0.18	48.5 (25.5)	0.184
Yes	43.1 (39.6)		43 (36.9)		43.5 (38.2)		46 (38.6)		39.4 (37.7)		43 (38)	
Mouth and throat sores (mucositis)												
No	51 (26.9)	0.007	48.1 (27.9)	0.020	49.5 (26.1)	0.00	57 (29.6)	0.00	46 (26)	0.02	50.3 (26.9)	0.010
Yes	40.3 (34.5)		39 (31.9)		39.3 (33)		44.9 (34.4)		37.7 (32.4)		40.3 (33)	
Injection site reaction												
No	53.2 (32.1)	0.005	53.1 (32.1)	<0.001	52.4 (31.4)	0.00	59.4 (35.6)	0.00	50.2 (30)	<0.001	53.6 (32)	0.001
Yes	42.8 (27.2)		38.5 (25.5)		41 (25.6)		47.9 (27.1)		37.6 (25.8)		41.6 (25.9)	
Fever												
No	51.3 (28.1)	0.018	49.9 (28.4)	0.002	50.3 (27.3)	0.00	56.5 (31.9)	0.04	47.1 (27)	0.01	51 (28.3)	0.010
Yes	42.4 (31.8)		38.5 (29.9)		40.5 (30.1)		48.4 (30.9)		38 (29.7)		41.6 (30.1)	
Dehydration												
No	48.7 (25.7)	0.241	45.9 (25.6)	0.411	46.8 (24.5)	0.49	55.7 (28)	0.01	44.4 (24)	0.22	48.3 (25.2)	0.190
Yes	43.4 (41.6)		42.3 (40.8)		43.9 (41)		43.9 (41.2)		39.3 (40.4)		42.5 (40.9)	
Appetite changes												
No	46.7 (32.1)	0.675	46.7 (31.2)	0.414	45.9	0.89	53.2	0.	44.8	0.41	47.5	0.827

Variable	Overall quality of life and general health		Physical health		Psychological		Social relationships		Environment		Overall score	
	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p
					(30.3)	6	(35.2)	97	(29.8)	6	(31.5)	
Yes	48.3 (27.9)		43.7 (27.9)		46.4 (27.5)		53 (28.1)	1	41.9 (27.2)		46.7 (27.3)	
Cold and flu symptoms												
No	49.4 (23.6)	0.146	46.1 (24.4)	0.459	47.8 (22.7)	0.17	55.9 (26.7)	0.03	44.4 (22.4)	0.34	48.7 (23.5)	0.177
Yes	43.5 (40.4)		43.1 (38.6)	<0.001	42.6 (39)	8	46.9 (40.1)	4	40.9 (38.6)	9	43.4 (39.2)	
Weight changes												
No	50.6 (25)	0.016	47 (26.2)	0.150	48.9 (24.6)	0.03	56.3 (28.8)	0.01	45.6 (23.7)	0.06	49.7 (25.3)	0.038
Yes	41.1 (37.6)		41.3 (35.3)		40.6 (35.6)	2	46.4 (36.2)	9	38.6 (36)	3	41.6 (36)	
Neuropathy												
No	52.8 (27.9)	0.003	51.8 (27.9)	<0.001	51.2 (27.4)	0.00	59.3 (32.5)	0.00	49 (26.7)	0.00	52.8 (28.2)	0.001
Yes	41.8 (31.2)		37.8 (29.6)		40.7 (29.6)	3	46.3 (29.5)	1	37.1 (29.1)	1	40.7 (29.5)	
Numbness												
No	49.6 (24.4)	0.138	46.3 (25.3)	0.399	48 (23.7)	0.16	56.1 (26)	0.03	44.7 (23.3)	0.28	48.9 (24.1)	0.161
Yes	43.8 (38.1)		43 (36.2)		42.7 (36.5)	1	47.5 (39.8)	8	40.7 (36.2)	6	43.5 (37.2)	
Runny nose												
No	46.8 (25.1)	0.467	44.2 (25.6)	0.359	45.8 (24.5)	0.73	53 (27.3)	0.94	42.6 (23.5)	0.47	46.5 (24.8)	0.580
Yes	50 (42.4)		48.2 (40)		47.3 (40.3)	2	53.3 (43.5)	8	45.6 (40.9)	4	48.9 (41.3)	
Vision and eye												

Variable	Overall quality of life and general health		Physical health		Psychological		Social relationships		Environment		Overall score	
	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p
problems												
No	48.7 (30.6)	0.241	46.4 (30.1)	0.208	47.3 (29.4)	0.255	54.7 (32)	0.12	44.4 (28.9)	0.24	48.3 (29.9)	0.203
Yes	43.4 (27.3)		40.8 (27.2)		42.3 (26.6)		47.4 (30.3)		39.5 (26.8)		42.7 (27.4)	
Hearing problems												
No	47.9 (27.8)	0.516	45.5 (27.9)	0.619	46.5 (26.7)	0.55	53.8 (30.1)	0.31	43.5 (26.6)	0.71	47.5 (27.5)	0.524
Yes	44 (44.7)		42.5 (41.5)		43.1 (43.6)		47.2 (43.3)		41.4 (42)		43.6 (42.9)	
Taste and smell changes												
No	46.8 (27.1)	0.331	44.3 (27.1)	0.252	45.3 (26)	0.19	53.2 (29.3)	0.87	42.4 (25.6)	0.16	46.4 (26.7)	0.360
Yes	52.3 (45.2)		50.6 (42.8)		52.3 (43.6)		52.3 (45.2)		49.7 (43.2)		51.4 (44)	
Insomnia (trouble sleeping)												
No	56.6 (28.8)	<0.001	55.7 (28.8)	<0.001	54.8 (27.6)	<0.001	65.2 (30.9)	<0.001	54.1 (27.6)	<0.001	57.3 (28.4)	<0.001
Yes	39.7 (28.8)	1	35.9 (27)	1	38.7 (27.9)	01	42.6 (28.6)	01	33.9 (25.8)	01	38.2 (27.3)	1
Weakness												
No	56.3 (32.6)	<0.001	55.4 (31.4)	<0.001	53.9 (31.6)	<0.001	62.5 (32.8)	<0.001	51.3 (31)	<0.001	55.9 (31.6)	<0.001
Yes	41.8 (26.7)	1	38.5 (26.3)	1	41.1 (25.8)	01	47 (29.5)	01	38.1 (25.5)	01	41.3 (26.4)	1
Delayed wound healing												
No	48.2 (29.3)	0.373	45.6 (29.1)	0.499	46.6 (28.2)	0.525	54.1 (31.4)	0.18	43.8 (27.8)	0.521	47.7 (28.8)	0.393

Variable	Overall quality of life and general health		Physical health		Psychological		Social relationships		Environment		Overall score	
	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p	Mean (SD)	p
Yes	43.2 (34.4)		41.9 (33)		43.2 (33.4)		46.2 (33.1)	2	40.3 (33.2)		43 (33.3)	
Liver problems (Hepatotoxicity)												
No	53.2 (26.5)	<0.001	49.7 (27.4)	<0.001	51.8 (25.9)	<0.001	58.9 (27.4)	<0.001	48.4 (25.5)	<0.001	52.4 (26.1)	<0.001
Yes	35.2 (33.4)		35.2 (31.8)		34.0 (31.3)		40.4 (36.6)	0.01	32.2 (31.5)	0.01	35.4 (32.8)	0.01
Scar tissue formation												
No	48.6 (29.4)	0.162	45.2 (29)	0.901	46.7 (28.6)	0.45	53.6 (31)	0.56	43.6 (28.1)	0.72	47.6 (28.9)	0.516
Yes	41.3 (32.7)		44.6 (33)		42.9 (30.7)	0	50.4 (35.6)	0.09	41.8 (30.6)	0.04	44.2 (32.3)	0.04



جامعة النجاح الوطنية  
كلية الدراسات العليا

دراسة مقطعية للأثار الجانبية المبلغ عنها ذاتيا لعلاج سرطان  
الثدي ونوعية الحياة في فلسطين

إعداد

كارين بريق

إشراف

أ.د. سائد زيود

أ.د. سماح الجابي

قدمت هذه الرسالة استكمالاً لمتطلبات الحصول على درجة الماجستير في الصيدلة السريرية، من كلية الدراسات  
العليا، في جامعة النجاح الوطنية، نابلس - فلسطين.

2025

# دراسة مقطعية لآثار الجانبية المبلغ عنها ذاتيا لعلاج سرطان الثدي ونوعية الحياة في

## فلسطين

### إعداد

كارين بريق

إشراف

أ.د. سائد زيود

أ.د. سماح الجابي

## الملخص

خلفية الدراسة: سرطان الثدي هو أكثر أنواع السرطان شيوعا بين النساء من حيث الإصابة. هدفت الدراسة إلى تحديد الآثار الجانبية لعلاج سرطان الثدي التي أبلغ عنها الفلسطينيون المصابون بسرطان الثدي ونوعية حياتهم.

منهجية الدراسة: كانت هذه الدراسة عبارة عن مسح قائم على استبيان دراسة مقطعية. أجريت الدراسة في نابلس، وهي مدينة رئيسية في شمال الضفة الغربية، فلسطين. وشارك في ذلك مستشفيان هما المستشفى الوطني ومستشفى النجاح الوطني الجامعي. تم تقسيم أداة جمع البيانات إلى قسمين متميزين. الجزء (أ) جمع البيانات التي تغطي الجنس والعمر عند التشخيص والأعراض السريرية والمضاعفات وتدبير العلاج والآثار الجانبية للعلاجات. وفي حين أن الجزء (باء) من الاستبيان يتضمن أداة تقييم نوعية الحياة، فإن الدراسة الحالية استخدمت برنامج WHOQOL-Bref (النسخة العربية) كأداة تقييم. تم إدخال البيانات وتحليلها في حزمة IBM الإحصائية للعلوم الاجتماعية (IBM SPSS) الإصدار 21.

نتائج الدراسة: شارك ما مجموعه 258 مريضة بسرطان الثدي في هذه الدراسة. بالإضافة إلى سرطان الثدي، كان لدى غالبية المرضى (80.2%) حالة مرضية مصاحبة واحدة أو أكثر. تم تشخيص أكثر من نصف المرضى (59.3%) قبل أقل من 3 سنوات. فيما يتعلق بمرحلة المرض، كان 147 مريضا (57%)

في المرحلة الأولى، و51 مريضا (19.8%) في المرحلة الثانية، و54 مريضا (20.9%) في المرحلة الثالثة، و6 مرضى (2.3%) في المرحلة الرابعة. من بين المرضى، تلقى 207 (80.2%) العلاج الكيميائي، و159 (61.6%) خضعوا لاستئصال الكتلة الورمية، و156 (60.5%) تلقوا العلاج الإشعاعي، و102 (39.5%) خضعوا لاستئصال الثدي. تم التنبؤ بالتدهور في الدرجات الإجمالية من خلال الإصابة بأمراض مصاحبة، ومرحلة متقدمة من سرطان الثدي، وتلقي استئصال الثدي، والصداع، والقيء، والاكتئاب، والقلق، وتقلب المزاج، وتقرحات الفم والحلق (التهاب الغشاء المخاطي)، والحمى، والأرق (صعوبة في النوم).

إستنتاجات الدراسة: سلطت نتائج هذه الدراسة الضوء على العبء الثقيل للمرض والآثار الضارة المرتبطة بالعلاج على نوعية حياة مرضى سرطان الثدي الذين تلقوا العلاج في فلسطين. يمكن أن يؤدي توفير تقييم شامل وتخصيص خطط الرعاية وتقليل انتشار الآثار الضارة إلى تحسين نوعية حياة ورفاهية مرضى سرطان الثدي. هناك حاجة ماسة إلى خطة رعاية شاملة متعددة التخصصات لمرضى سرطان الثدي تدمج دعم الصحة البدنية والعقلية لتحسين نوعية حياة مرضى سرطان الثدي في فلسطين.

**الكلمات المفتاحية:** سرطان الثدي، صحة المرأة، العلاج، الآثار الضارة، نوعية الحياة.