An-Najah National University

Faculty of Graduate Studies

CANCER-RELATED POST-TREATMENT PAIN AND ITS IMPACT ON TREATMENT SATISFACTION WITH MEDICATION IN BREAST CANCER PATIENTS: A CROSS-SECTIONAL STUDY FROM PALESTINE

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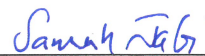
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Dedication

This thesis is dedicated to both my parents, whose love, encouragement and prays of day and night supported me through every obstacle and hurdle in my life and through my journey which made me able to get such success and honor.

Acknowledgment

I want to express my heartfelt gratitude and appreciation to everyone who assisted and supported me in making this thesis a reality.

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Finally, I want to express my gratitude to everyone who has helped me complete this research project, whether directly or indirectly.

Aiman

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Declaration

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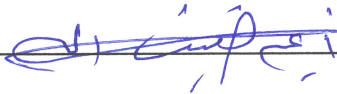
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I declare that the work provided in this thesis, unless otherwise referenced, is the researcher's own work, and has not been submitted elsewhere for any other degree or qualification.

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Abstract

Background: Pain after therapy is an important clinical problem in breast cancer patients. Unfortunately, patients with cancer have a lower quality of life due to undertreatment of post-treatment pain; therefore, improving medication management plans and palliative care became one of the most important targets of cancer therapy.

Objectives: The current study aimed to examine the impact of posttreatment pain (pain severity and interference) on medication satisfaction in patients with various stages of breast cancer in Palestine.

Methods: A correlational cross-sectional study was conducted at Al-Watani Hospital and An-Najah National University Hospital in the Nablus area. Using the Brief Pain Inventory (BPI), the intensity and interference of pain will be evaluated. Patients' satisfaction with cancer management medications will be measured using the Treatment Satisfaction Questionnaire for Medication (TSQM).

Results: Two hundred and fifty-four patients were included in this study. All were women, with a mean ± SD age of 53.1 ± 10.7 years. Patient satisfaction with medication reported was measured using the median scores of 4 domains (Effectiveness satisfaction 61.0 [50.0-72.2], Side effects satisfaction 59.4 [31.3-100.0], Convenience satisfaction 66.7 [61.1-77.8] and Global satisfaction 64.3 [50.0-78.6]). There were significant negative correlations ($p < 0.05$) between pain severity and effectiveness interference (r = -0.258, -0.319, respectively), side effects (r = -0.414, -0.514, respectively), convenience (r = -0.274, -0.307, respectively), and global satisfaction domain scores (r

= -0.293, -0.287, respectively). The regression analysis results indicated an independent association between chemotherapy use and a higher global satisfaction score ($p = 0.011$). Also, lower pain interference score ($p = 0.01$) and patients without side effects ($p = 0.47$) were independently associated with higher Effectiveness satisfaction scores. Finally, lower pain interference scores ($p < 0.001$), patients without post-treatment pain ($p = 0.034$), and patients without side effects were independently associated with higher side effects satisfaction scores. There were significant positive correlations indicated between global satisfaction score and the use of cyclophosphamide ($p = 0.018$), between effectiveness satisfaction score and the use of ($p = 0.035$), and between convenience satiasfaction score and the use of tamoxifen ($p = 0.038$). There were significant negative correlations between convenience satisfaction score and the use of adriamycin ($p = 0.005$), docetaxel ($p = 0.008$), capeciatabine ($p = 0.022$), gemcitabine ($p = 0.026$), and trastuzumab ($p = 0.002$).

Conclusions: Patients with posttreatment pain, side effects, and greater pain interference with their functioning had lower satisfaction scores. Therefore, better management of their treatment medications, side effects, and pain medications is recommended to enhance their satisfaction and quality of life.

Keywords: Breast cancer, post-treatment pain, patient satisfaction with medication, pain, cancer, BPI, TSQM, , chemotherapy, hormonal therapy, biological therapy, side effects, convenience.

Chapter One

Introduction

1.1 Background

Breast cancer is a tumor that develops in the epithelial tissue of the breast tissue, which accounts for around 10% of the total volume of the breast in women and a small percentage of men. (1). Globally, breast cancer is considered the second most common cancer and the most common malignancy among women, comprising 18% of all female cancers (1, 2). There are several treatment options for breast cancer, and these options have varying consequences and effects on patients and their life (3). Treatment for breast cancer normally begins with surgery and radiation, although it may also include chemotherapy or other pharmacological treatments, such as hormone therapy, before or after surgery (4). Pain after treatment is a serious clinical issue for breast cancer patients, and it is one of the most common sequelae, affecting 25 to 60% of survivors (5). Pain associated with therapy of body areas that lasts longer than three months after treatment is ended is referred to as post-treatment pain (6). Therefore, improving pain management plans and palliative care became one of the most important targets of cancer therapy.

In Palestine, cancer is considered the second most prevalent cause of mortality, responsible for an estimated 15.4% of all deaths in 2018, which is a high percentage (7). Also, according to Ministry of Health reports, breast cancer is the most frequent kind of cancer in Palestine and the third most common cause of cancer-related mortality (approximately 11.6%) following lung and colon cancer. (7).

1.2 Literature Review

In this chapter, the literature review on cancer-related Posttreatment Pain and its impact on Treatment Satisfaction with anticancer treatment among Breast Cancer Patients in Palestine is presented. The purpose of reviewing the literature is to obtain a complete grasp of the study issue and discover potential research areas and knowledge gaps that need to be addressed. In addition, a review of the literature can assist a researcher in unraveling scientifically relevant data from a comparable study conducted in the field, comparing previous findings, criticizing current results, and suggesting more research.

1.2.1 Breast cancer in Palestine

In 2016, 2536 new cancer cases were reported in the West Bank, an increase of 5.7% from 2400 new cases reported in 2015. While the population natural growth rate in the west bank in 2016 was 2.5%. As a result, the cancer incidence rate in the West Bank was 86.4 new cases per 100,000 persons in 2016 (8). While in 2020, there were 3191 reported new cancer cases, with an increase of 0.5% compared with 2019. The cancer incidence rate in the west bank was increased to 115.8 new cases per 100,000 persons and the breast cancer incidence rate was the highest among all types of cancers with 19.1 new breast cancer cases per 100,000 persons. Women had 1,617 new cancer cases recorded, representing 50.7 percent of all new cancer cases, while men had 1574 new cancer cases reported, representing 49.3%.

In 2020, breast cancer was the most frequently diagnosed cancer in the West Bank, accounting for 526 cases, or 16.5% of all cancer cases recorded. Furthermore, breast cancer was the first type of cancer reported in women, accounting for 32.0% of all cancer cases in Palestinian women. In addition, breast cancer, followed by colon cancer, were the leading cause of death among women (9).

1.2.2 Treatments of breast cancer

There are various ways to treat breast cancer. The tumor and some healthy tissues around it are surgically removed during an operation. During surgery, the nearby axillary lymph nodes located below the arm are also examined.

The smaller the tumor, the greater the number of surgical options open to the patient. Breast cancer surgery includes the following procedures:

Lumpectomy, which removes malignant cells and some healthy tissues and removes the entire breast, is known as a mastectomy (10, 11).

Radiotherapy uses high-energy X-rays or other particles to neutralize tumor cells. A radiotherapy protocol or schedule often includes a defined number of treatments delivered over a set time, such as five days a week for three to six weeks. Radiation therapy can help minimize the probability of a recurrence of breast cancer.

Radiotherapy can be provided before or after surgery; when it's given before surgery to minimize the size of the tumor, it's called neoadjuvant radiotherapy. In contrast, after surgery, adjuvant radiotherapy is given to eliminate the remnant cancer cells (12).

When a drug is employed to kill tumor cells, it is called systemic therapy. Medication can reach cancer cells anywhere since it circulates throughout the body. Systemic treatments are commonly administered intravenously (IV), intramuscular (IM), beneath the skin, or a capsule or pill ingestion. Chemo, hormonal, targeted, and Immunotherapies are examples of systemic treatments for breast cancer.

A single type of systemic therapy can be administered alone, or various systemic therapies can be administered simultaneously. They may also be used with surgery and/or radiation therapy (12).

Chemotherapy

The use of drugs destroys tumor cells by preventing them from growing, dividing, or increasing. Before surgery, neoadjuvant chemotherapy is used to minimize the tumor burden, make it easier to surgical removal, and minimize the recurrence likelihood. Another approach is adjuvant chemotherapy, which is administered after surgery to minimize the likelihood of recurrence.

A chemotherapy protocol, also known as a regimen or schedule, comprises several medications administered in a specific number of cycles over a set time. Several chemotherapy schedules can be administered, based on what is best for that regimen in clinical studies. For example, it could be given once, twice, three, or even four times a week. Docetaxel, paclitaxel, doxorubicin, epirubicin, pegylated liposomal doxorubicin, capecitabine, carboplatin, cisplatin, cyclophosphamide, eribulin, fluorouracil (5-FU), methotrexate, gemcitabine, paclitaxel, Ixabepilone, and vinorelbine are some examples (12).

The following medications or combinations of agents may be used as adjuvant treatment for early-stage and locally progressed breast cancer:

  –   Adriamycin and Cyclophosphamide (AC)

- Epirubicin and Cyclophosphamide (EC)

- AC or EC followed by Paclitaxel or Docetaxel (T), or the reverse.

- Cyclophosphamide, Adriamycin, and 5-fluorouracil (CAF)

- Cyclophosphamide, Epirubicin, and 5-fluorouracil (CEF)

- Cyclophosphamide, Methotrexate, and 5-fluorouracil (CMF)

- Docetaxel, Adriamycin, and Cyclophosphamide (TAC)

- Docetaxel and Cyclophosphamide (TC) (12).

Hormonal Therapy

Hormonal therapy works successfully for most tumors that have estrogen or progesterone receptors. Hormone therapy for breast cancer is not the same as menopause hormone therapy (MHT). MHT is also known as postmenopausal hormone therapy or hormone replacement therapy (HRT). 'Antihormone' or "anti-estrogen" therapy describes breast cancer hormone treatments. They either prevent hormones from functioning or decrease their levels in the system.

Hormonal therapy can be used to minimize the size of a tumor, simplify surgery, and reduce the likelihood of recurrence before surgery. This is called neoadjuvant hormonal therapy. It is normally prescribed for at least 3 to 6 months before the operation and resumed after that. However, it could be administered just after operation to decrease the likelihood of recurrence. Adjuvant hormonal therapy is the term for this. Tamoxifen and aromatase inhibitors are examples of hormonal treatment (anastrozole, exemestane, letrozole) (12).

Targeted Therapy

The therapy that focuses on proteins, genes, and the environment of tissue that contributes to the growth and survival of tumors, is called targeted therapy. These treatments are significantly more targeted and act differently than chemotherapy. This treatment inhibits cancer cell growth and spreads while protecting healthy cells. However, the targets are not the same for all cancers. Therefore, to choose the best

effective and suitable therapy, a set of tests may be done to determine the tumor's proteins, genes, and other components. Furthermore, new knowledge regarding distinct molecular targets and new drugs focused against them is still being acquired through studies.

Hormonal therapy was the first FDA-approved targeted therapy for breast cancer. The use of HER2-targeted drugs to treat HER2-positive breast cancer was then approved (12). Several drugs have distinct regimens and targets, such as Trastuzumab, pertuzumab, trastuzumab, hyaluronidase, neratinib, ado-trastuzumab emtansine, olaparib, alpelisib, lapatinib, tucatinib (10-12).

1.2.3 Pain

Pain receptors are found in the skin, joints, and many internal organs. When these receptors are exposed to mechanical, thermal, or chemical stimuli processed into an electrical signal and produce the feeling of pain, the other cause of pain is damage to the nervous system. Also, pain can occur without tissue damage, called psychogenic pain. Pain is considered a complex phenomenon influenced by the severity of the stimuli, the individual's vulnerability to pain, and the individual's tolerance to pain (13).

From a neurological point of view, there are three forms of pain. The first one is called nociceptive pain, it's caused by the perception of noxious stimuli. It is a protective physiological response to prevent or minimize contact with damaging stimuli. The second type is called inflammatory pain. It occurs after tissue damage or infection by activating the immune system. This type of pain assists in the healing process of the injury by preventing movement and physical contact. Moreover, it is considered a protective and adaptive response. Finally, pathological pain includes dysfunctional and neuropathic pain, which results from a nervous system malfunction (14).

Enormous inter-individual variability affects the pain experience. Multiple biological and psychosocial factors interact in complex ways and give these individual variances in pain. Age, sex, and ethnicity are easily examined personal variables linked to pain. Similarly, genetic, psychosocial, and neuropsychological factors contribute to individual variations in the pain experience. These variables result in huge differences in reporting the pain after exposure to the same stimuli in people. In addition, these differences are

found in response to the treatment. Understanding these variables' combined influences is critical to providing optimal pain treatment (15).

Based on the WHO ladder of pain relief, treatments are classified as mild, moderate, or severe, with minor pain managed with non-opioid medicines including paracetamol, nonsteroidal anti-inflammatory drugs, or OTC medications. Small doses of opioids may be administered for moderate pain, whereas larger doses are recommended for severe pain. Alternative therapies, such as neuropsychologic therapy and acupuncture, should be coupled with medications (16).

Common pain relievers like paracetamol, nonsteroidal anti-inflammatory drugs, and opioids are often inadequate in treating neuropathic pain, necessitating adjuvant therapy. Tramadol's efficacy in treating neuropathic pain has not been shown. Nociceptive pain is more likely to be relieved by traditional pain medications (17-19).

Pregabalin and gabapentin are neuropathic pain medications that disrupt neurotransmitter release by binding to the calcium channel's alpha-2 delta subunit. They boost the inhibitory neurotransmitter gamma-aminobutyric acid's activity (GABA). Pregabalin is gradually increased to a maximum daily dose of 600 mg, while gabapentin is started at small doses and subsequently increased to 3600 mg per day. The activity begins 2 - 4 hours after ingestion and lasts for 6 hours. These medicines are generally used long-term to treat persistent neuropathic pain.

Amitriptyline, nortriptyline, imipramine, clomipramine, and other tricyclic antidepressants (TCAs) are examples of drugs used for pain. The mechanism of analgesia is assumed to be the suppression of norepinephrine and serotonin reuptake. They do, however, cause severe anticholinergic adverse effects such as mouth dryness, dry nose, impaired vision, urine retention, and constipation.

Duloxetine is a serotonin and norepinephrine reuptake inhibitor (SNRI) given to treat neuropathic pain acts by inhibiting the reuptake of norepinephrine and serotonin. Dizziness, anxiety, aggravated depression, and erectile dysfunction are among the adverse effects, and it has significantly lower side effects than TCAs.

It is more convenient to use intravenous medicines in the emergency room. Ketamine is an anesthetic agent used to relieve persistent pain that is difficult to manage by producing dissociative status (20).

Seldom, pain is affecting a superficial area; medication administered topically over the painful region may relieve pain sensation or pain superficially at the skin's or peripheral nervous system's level. Compared to oral formulations, topical medicines have less systemic adverse effects and drug-drug interactions; they also escape first-pass metabolism and the impact on stomach acidity, and they can become customized to a patient's specific needs.

Local anesthetic Lidocaine can be used. NSAIDs can be applied locally and also orally. Capsaicin is a topical pain medication that blocks the pain signal's transmission stage. It is manufactured from the active substance in chili pepper and can be given to treat nociceptive discomfort or peripheral neuropathy. Despite the numerous pain-management alternatives available, opioid analgesics, particularly codeine, continue a cornerstone of cancer pain management.; Since the 1950s, morphine has been utilized to relieve cancer pain. Opioids function, according to studies, with over 95% of patients with moderate to severe cancer pain who are treated with opioids experiencing pain relief (11).

In the emergency department, short-acting opioids like morphine, hydrocodone, oxymorphone, oxycodone, tramadol, tapentadol, codeine, and hydromorphone are helpful. Fentanyl, hydromorphone, buprenorphine, tapentadol, and methadone in prolonged-release forms, as well as prolonged-release morphine, tramadol, and oxycodone, should not be administered in emergencies (21).

1.2.4 Pain in breast cancer

Several studies have reported high numbers of undertreated pain cases among breast cancer patients, largely to the underestimation of their pain by health care professionals (22-24). Factors thought to contribute to either case include lack of pain assessment instrument used, difficulty in communication and listening skills, inadequate knowledge on pain management, insufficient patient education of analgesic use, differences in ethnicity, culture, and religion, problems with faith and mutual advocacy within the

team, and finally due of the constant touch with suffering, anguish, and deaths, there is a chance of burnout (25-27).

Pain after breast cancer treatment

In recent years, breast cancer survival has improved substantially, so the sequelae of the treatment, such as pain, paresthesia, and strange sensations, were commonly reported (28). Pain and functional compromise are the expected effect after breast cancer treatment. The onset can be sudden or take up to 24 months (29). If possible, treatment complications such as persistent pain should be recognized to offer the appropriate treatment (30).

Constant pain could debilitate the affected patient by declining physical and emotional well-being, and it decreases the quality of life by causing anxiety and depressive symptoms. However, the exact mechanism of post-breast cancer treatment pain development remains uncertain and is likely multifactorial and involves physical, social, psychological, and spiritual components (30).

Several factors play a role in precipitating post-treatment pain after breast cancer treatment, such as age, operation type, tumor size, number of lymph nodes involved, lymph nodes removed, surgery complications, patient's immediate postoperative pain intensity, number of months since the operation, the number of analgesic doses, adjuvant chemotherapy, radiation, and endocrine treatment (31).

Pain after breast cancer treatment could be due to direct nerve fiber damage during surgery, as well as adjuvant chemo or radiation therapy. Moreover, it has a high prevalence after mastectomy (30). Young patients who undergo surgical intervention, especially with axillary lymph node dissection (ALND) or radiation therapy, are more susceptible to persistent pain (32). It may induce severe painful skin injury during radiation therapy at the radiation site, leading to brachial or cervical plexopathy later on. In addition, sensory symptoms such as paresthesia, tingling, dysesthesia, edema, and weakness of the arm can develop when the nerve plexus is affected (33).

Patients who have had a mastectomy can experience persistent neuropathic pain, such as intercostobrachial neuropathy, phantom breast pain, scare pain, neuroma pain, or pain caused by nerve damage elsewhere (33).

Neuropathic pain after chemotherapy occurs due to sensory neuron degeneration. Furthermore, patients may experience arthralgias due to estrogen deficiency caused by aromatase inhibitors (32).

In order to treat pain in cancer patients, a thorough pain assessment is essential, as well as a full patient evaluation that includes a psychosocial examination. The pain management approach should be individualized to the patients depending on the etiology of pain. The pharmacotherapy approach is the main treatment of cancer pain. It follows the sequential order, starting with non-opioid agents such as paracetamol, ibuprofen, and weak opioids, e.g., codeine and tramadol. If sufficient analgesia is not obtained, opioids with high potency such as oxycodone and morphine can be administered (34).

Adjuvant medication like antidepressants, anticonvulsants, corticosteroids, and local anesthetics agents are used for various forms of pain (35). In addition, non-pharmacological therapies could be helpful in the treatment of multifactorial pain post-breast cancer therapy; these approaches include Genetic, music, scrambler therapy, yoga, and acupuncture (12, 32).

1.2.5 Treatment satisfaction with medication in breast cancer patients

Satisfaction is the reporting of patient outcomes. Patient satisfaction is a composite of patient values and perceptions and is not a rigid term (36). Perspectives and knowledge are their perceptions, whereas their values are their goals or expectations. As a result, individual variety is important because standards and viewpoints range greatly, and what one person finds acceptable may not be accepted by another. Various authors defined satisfaction differently; some defined it as attitudes (37), while others defined it as emotions and feelings. Yet others defined it as how closely the healthcare service met the patient's expectations (38).

Views are considered important to judge the quality of health care. Therefore, patient satisfaction surveys became more popular, especially with patient-centered care that emerged in the past two decades (38). Healthcare institutions used patient satisfaction surveys to assess their quality (39). Despite this, few studies discuss the uses or consequences. How therapy was administered and the results have an impact on your

satisfaction. As a result, physicians' healthcare delivery plays a critical role in meeting patient expectations (40). Eye contact, smiling, addressing people by name, conveying concern with words, showing respect, and encouraging patients to explain their problems are stated in certain publications that doctors must care for to maintain and keep patients satisfied. Patients should also be informed and explained because this improves compliance. After all, individuals are less anxious when they understand what is going on (41, 42).

As previously indicated, satisfaction varies from person to person. Many studies overlook the importance of patients' perceptions due to their subjectivity and unreliability. Therefore, it is impractical to use them to assess healthcare quality.

To assess or evaluate patient views and satisfaction with medical services or illness management, quantitative and qualitative methodologies can be utilized.

In the quantitative technique, a questionnaire method examines various criteria to analyze patient satisfaction and perceptions. Data could be obtained through patient reporting, interviews, or other methods (43). Regarding its validity and reliability, this method has the drawback of not obtaining a comprehensive picture of the patients' responses. Furthermore, because many disorders lack a disease-specific survey to assess medical care-related life quality or patient-reported consequences, researchers and doctors must rely on generic surveys to obtain information from the patients.

The qualitative methods, on the other side, opens up and allows the patient to report freely; it overcomes the readability problem of questionnaires, the analysis of the specific scope of questions, and it examines in-depth meanings and behaviors by patients that can be investigated to generate a deep view of patient perceptions and satisfaction toward their illness.

The CTSQ (Cancer Therapy Satisfaction Questionnaire) was created as part of research to examine the issues faced by cancer patients during the evaluation of anticancer management in terms of satisfaction and expectations. The CTSQ consists of 21 items and evaluates seven domains. Anticipation of cancer therapy, Concerns about adverse effects, Compliance with oral cancer treatment, Suitability, Satisfaction with cancer treatment, Discontinuation of cancer treatment, and Explanations of poor adherence.

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The CTSQ was developed in a multicultural setting, with comprehensive interviews with 70 cancer patients of various types and stages, seven physicians (from the community and academic settings), four nurses, and focus groups with 14 nurses (hospital and community settings), accompanied by content validation test in 30 patients and re-test in another 10 patients. Because it addresses both physicians' and patients' complaints, the CTSQ is a great communication method. Furthermore, the CTSQ may meet some of the demands of medical authorities, who constantly seek knowledge of the bargains patients make when deciding whether or not to undergo treatment. Finally, it was created to be useful in a variety of cancer settings to measure the satisfaction of the cancer patient with their treatment (44).

Using a national panel study of chronic disease, researchers developed the Treatment Satisfaction Questionnaire for Medication (TSQM), a generic measurement of treatment satisfaction. TSQM is a sound and accurate measure of patient satisfaction with the essential elements. The TSQM may effectively determine patient medication adherence between different medications and patient populations according to data. TSQM covers a wide range of topics, including (1) adverse effects, (2) alleviation of symptoms, (3) convenience, (4) effectiveness, (5) daily impact, and (6) tolerability/acceptability (45).

Validation research shows that the TSQM is a psychometric sound tool that captures significant aspects of patients' experience with medication. The broad nature of the instrument, when used correctly, can be used to evaluate and compare patient satisfaction with different types and forms. Furthermore, TSQM could help us better understand the decisions and attitudes. Therefore, TSQM is a good candidate for the data collection tool of the current study.

The PTSS (Pain Treatment Satisfaction Scale) was created and evaluated to assess patient satisfaction for people receiving treatment for acute or chronic pain. PTSS consists of multiitem domains including thirty-nine measures divided into five categories: information (5 elements); medical management (8 elements); impact of current pain medicine (8 elements); satisfaction with pain medicine which is made up of two subclass medicine properties (3 elements) and effectiveness (3 elements); and adverse effects (12 elements). The PTSS is a reliable, comprehensive tool for assessing patient satisfaction with pain therapy built on separate modules with good psychometric

performance (46). However, PTSS is about patients' pain medication; the current study aims to assess patient satisfaction towards the cancer medication in relation to their post-treatment pain, not just pain medications. Hence, this tool is not a good candidate for being a data collection instrument for the current study.

1.3 Definition of terms

Posttreatment pain: pain associated with the treatment of body areas that lasts more than 3 months after the therapy is finished (6).

Breast cancer: a disease characterized by abnormal cell growth in the breast tissue (47).

Patients' satisfaction with medication: the patients' perception of the process of taking the drug and the side effects related to the drug.

Chemotherapy: cytotoxic chemical substances intended to treat cancer (48).

Radiotherapy (Radiation therapy): the utilization of radiation in high doses to kill tumor cells (49).

Hormonal therapy: the use or manipulation of hormones to stop or inhibit the development of tumor cells (50).

Targeted therapy: type of cancer treatment that targets the cancer cells at molecular levels, such as targeting specific genes and proteins involved in cancer cell growth and survival (51).

Biological therapy: a sort of treatment intended to boost, manipulate, or restore the immune system's capacity against cancer cells (52).

Quality of life: according to WHO, quality of life is an individual's sense of their place in life concerning their objectives, expectations, standards, and concerns in the context of the culture and value systems in which they live (53).

Body mass index (BMI): a body fat measurement based on height and weight, it's calculated by dividing body mass (kg) by the square of the body height (m) , and is expressed in units of kg/m² (54).

In general, many articles talk about posttreatment pain and its association with satisfaction with medication among breast cancer patients. However, in Palestine there are no papers related to this topic.

1.4 Research Questions

- How are satisfied breast cancer patients with their anticancer medications?

- What is the relationship between posttreatment pain and patients' satisfaction with anticnacer medications among breast cancer patients?

- Is there a relationship between the medication used and patient satisfaction?

- Is there a correlation between patients' sociodemographic data and patient satisfaction with medication?

- Is there a link between patient's clinical data and patient satisfaction with medication?

1.5 Objectives of the Study

1.1.1   General Objectives

The study investigates posttreatment pain and how it affects treatment satisfaction with anticancer drugs among Palestinian breast cancer patients.

1.5.1 Specific Objectives

- Explore the anticancer drugs used among breast cancer patients in Palestine.

- Identify post-treatment pain and its management in breast cancer patients in Palestine.

- Assess the satisfaction of patients with their breast cancer treatment medications.

- Assess post-treatment pain and its impact on treatment satisfaction in breast cancer patients.

- Determine whether the occurrence of side effects impacted the satisfaction with disease management.

1.6 Significance of the Study

Patients with breast cancer need to receive the best quality of health care. Therefore, this study sheds light on post-treatment pain associated with breast cancer treatment medications and assesses their impact on patient satisfaction with these medications. As a result, this study will help healthcare providers and policy makers understand how patients feel about these medications and how much they affect their quality of life, which will help them provide the optimum quality of healthcare.

In addition, it will help healthcare providers and patients plan and develop effective pain control strategies and provide better health and pain relief to breast cancer patients. This will also aid in the development of a comprehensive system to deal with existing and future patients, allowing us to assist in the alleviation of their suffering.

Chapter Two
Methodology

2.1 Study design

A cross-sectional study used validated and standardized evaluation surveys in breast cancer.

2.2 Study setting

This research was conducted in Al-Watani Hospital and An-Najah National University Hospital (NNUH), Nablus, West Bank, Northern Palestine. They are the principal referral hospitals for the Northern West Bank-Palestine areas, receiving most patients with breast cancer.

2.3 Study population

Breast cancer patients who are being treated at Al-Watani Hospital and An-Najah National University Hospital.

2.4 Sampling procedure and sample size calculation

According to medical records from both hospitals, in 2020, roughly 747 breast cancer patients were in these two institutions in a single year.
Both institutions gave a list of breast cancer patients' names to evaluate their comfort and recruit them for this study.

For sample size calculation, the Raosoft® sample size calculating tool (an automated software program: http://www.raosoft.com/samplesize.html) was employed. Assuming that 50% of breast cancer women are satisfied with their pain management medication, the maximum sample size was calculated. The sample size was determined to be 254 women with a 5% margin of error in a 95% confidence interval.

Non-probability convenient sample collection method was used to enroll the patients from the medical records obtained from the two hospitals, as mentioned earlier. The selected pateints were interviewed on their follow up and asked to fill out the questionnaire while they were waiting in waiting room in the oncology outpatient clinic

at the two hospitals. Patients' clinical records from both hospitals' computer systems were utilized to obtain clinical data.

2.5 Inclusion and exclusion criteria

Women aged 18 and up who have been treated for breast cancer for at least 12 months before the beginning of our trial and who agreed to participate were recruited. Women with a significant psychiatric disease or who are in an extremely unwell state are the only ones who are not eligible.

2.6 Data collection instrument

A standardized and validated assessment tool was used to gather data from the patients included in the trial. The data collection tool comprises three sections: socio-demographic and clinical data form, brief pain inventory (BPI), and treatment satisfaction questionnaire for medications (TSQM). The data collection form was tested on 20 patients to see how well they understood it, how long it took them to finish it and to assess its comprehension. The results of the pilot study were not included in the final study.

2.6.1 Socio-demographic and Clinical Characteristics Form

This form is intended to collect the socio-demographic information of the breast cancer patients, including age, marital status, residence, educational level, family income per month, and body mass index (BMI).

In addition, the form involves clinical data on breast cancer such as breast cancer type, stage, diagnosis date, and forms of treatment the patient underwent.

The form is shown in Appendix I.

2.6.2 Brief Pain Inventory Scale (BPI)

Brief Pain Inventory scale (BPI) is a well-known pain-measuring scale to assess pain and discomfort (55). BPI was used to quantify the severity of pain and pain interfering with normal functioning. The worst pain in the last 24 hours, the least pain in the last 24 hours, the average pain in the last 24 hours, and the pain right now are all utilized to determine pain severity. Pain interference with general activity, walking abilities, mood, normal work, sleep, relationships with others, and pleasure of life are assessed using

seven questions. This scale also assesses the location of the pain, the pain alleviation of medications, and the percentage of pain relief. Four pain severity elements are used to get the pain severity score. Each item was given a number between 0 and 10, and the total of these values resulted in a final pain intensity score with the lowest value of 0 and the highest value of 40.

Furthermore, a total of the seven components of pain interference was used to calculate the pain interference score. Each item is given a score ranging from 0 to 10, with 0 being the lowest and 70 being the most. The Arabic Brief Pain Inventory (BPI) was used in this study with permission from the University of Texas Department of Symptom Research. Appendix II consists of the BPI form. The reliability value for this subscale was good (Cronbach's alpha = 0.921).

2.6.3 Treatment Satisfaction Questionnaire for Medication (TSQM 1.4)

The Treatment Satisfaction Questionnaire for Medication (TSQM 1.4) Arabic Version evaluates the satisfaction of patients with pain management medications, which the researchers obtained from Quintiles Strategic Research Services.

The questionnaire involves 14 questions, each bundle of questions intended to collect information about certain domains.

Effectiveness domain (questions 1–3), Adverse Effects domain (questions 4–8), Convenience domain (questions 9–11), and Global Satisfaction domain (questions 12–14) are the four dimensions of the TSQM 1.4.

In TSQM 1.4, domain scores range from 0-100, with higher scores indicating greater satisfaction. There are recommended and validated instructions to calculate and interpret the results obtained from each participant to determine the level of satisfaction. The method to calculate the results is as below:

Effectiveness= ([(Q1 + Q2 + Q3) – 3] divided by 18) * 100

Side Effects= If Question 4 is answered 'No' then score = 100

Otherwise, side effects= ([(Q5 + Q6 + Q7 + Q8) – 4] divided by 16) * 100

Convenience= ([(Q9 + Q10 + Q11) – 3] divided by 18) * 100

Global satisfaction: ([(Q12 + Q13 + Q14)) - 3] divided by 14) * 100

The reliability value for this subscale was good (Cronbach's alpha = 0.927).

2.7 Ethical considerations

Institutional Review Board (IRB) and local health authorities approved all parts of the study protocol, including access to and use of patient clinical data. The obtained information was only utilized for clinical research; information was confidential and was not used for any purpose other than this study. An informed consent was obtained from all participants that confirmed data privacy, and all data will be kept safe and used only for research purposes.

2.8 Statistical analysis

The Statistical Package for Social Sciences program (SPSS) version 21 was used to enter and analyze the data. Continuous data were presented as means and standard deviations (SD), while categorical variables were presented as frequencies and percentages. The medians (lower-upper quartiles) if they were not normally distributed variables. The Kolmogorov-Smirnov test was used to determine the normality of the variables. As applicable, the exact chi-square or Fisher tests were used to examine significance between categorical variables. In addition, the Kruskal-Wallis test or the Mann-Whitney test was performed to evaluate differences in a mean between nonparametric categories. The threshold for significance was set at a p-value of less than 0.05.

2.9 Study budget

This is a non-funded research project.

Chapter Three

Results

The current study interviewed breast cancer patients in Al-Watani Hospital and An-Najah National University Hospital in Nablus, Palestine. This section provides the findings obtained from the data collected and analyzed based on the study's objectives.

3.1 Sociodemographic characteristics

This study surveyed 280 patients with breast cancer. In total, 254 patients with a mean age of 53.1 ± 10.7 years were recruited for our study with a response rate of 91.4%. Eighty-eight patients (34.4%) were 50-59 years old. One hundred and twenty-four (48.4%) participants lived in villages and 221 (86.3%) were married. The majority of the participants were housewives (67.6%) and 89 (34.8%) with secondary education levels. More than half of the participants (58.6%) were from families with low-income levels, 193 (75.4%) were non-smokers, and the majority of the patients were overweight and obese (41.8% & 38.3%, respectively). Participants' socio-demographic data are listed in table 1.

Table 1

Sociodemographic characteristics of participants

Variables	Frequency (%)
Gender	
Female	254 (100%)
Age category	
< 40 years old	24 (9.4)
40-49 years	74 (29.1)
50-59 years	88 (34.6)
≥ 60 years old	68 (26.8)
Residency	
City	112 (44.1)
Village	123 (48.4)
Palestinian Refugee's camp	19 (7.5)
Marital status	
Single	35 (13.8)
Married	219 (86.2)
Educational Level	
Elementary	18 (7.1)
Preparatory	45 (17.7)
Secondary	89 (35.0)
Diploma	35 (13.8)
Bachelor's degree	50 (19.7)
Uneducated	17 (6.7)
Occupational status	
Private employee	23 (9.1)
Government employee	32 (12.6)
Housewife	171 (67.3)
Unemployed	28 (11.0)
Income level	
Low (< 500 JD)	149 (58.7)
Moderate (500 -1000 JD)	97 (38.2)
High (> 1000 JD)	8 (3.1)
BMI Categories	
Underweight ≤18.5	4 (1.6)
Normal weight = 18.5–24.9	47 (18.5)
Overweight = 25–29.9	105 (41.3)
Obesity ≥ 30	98 (38.6)
Smoking	
Smoker	28 (11.0)
Non-Smoker	191 (75.2)
Ex-Smoker	35 (13.8)
Total	254

3.2 Clinical Characteristics

Upon asking patients about their pain after breast cancer treatment, the patients answered the questions displayed in table 2.

Of the participants, 144 (56.3%) patients generally had post-treatment pain and 131 (51.2%) had post-treatment pain on the day of the interview, as illustrated in Figure 1.

Figure 1

Breast cancer patients with posttreatment pain
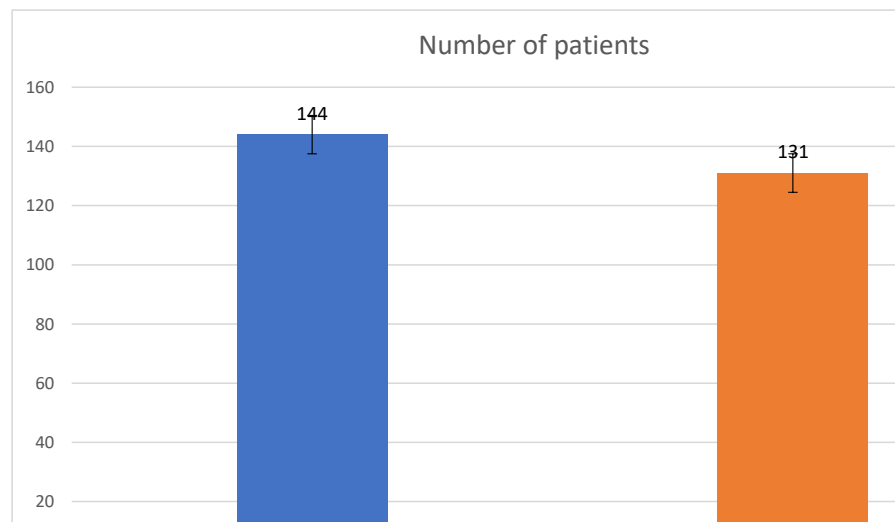
Breast cancer status was collected from the medical records of each patient included in the study presented in Table 2. The most common histopathological form of breast cancer among patients was invasive ductal carcinoma (IDC); 239 (93.4%) patients had IDC compared to other breast cancer, such as invasive lobular carcinoma (ILC), in situ (DCIS), and lobular ductal carcinoma (LDC).

Regarding the status of breast cancer treatment, 222 (91.3%) patients had received their last treatment during the last three months before the interview, 99 (39.0%) patients were in stage 3 before getting their last treatment, and 146 (57.5%) patients were at cancer-free state when interviewed.

When it comes to breast cancer therapy, 218 (85.8%) patients had received chemotherapy, 207 (81.5%) patients had taken hormonal therapy, 205 (80.8%) patients had performed breast surgery, 99 (39.0%) patients had radiation, 64 (25.2%) patients had biological therapy, and only 15 (5.9%) patients had used targeted therapy.

Cyclophosphamide, adriamycin, paclitaxel, tamoxifen, and letrozole were the most commonly used breast cancer treatment medications.

In terms of pain after breast cancer treatment, 111 (67.3%) patients had used pain medications to relieve post-treatment pain, and 163 (64.2) patients used paracetamol.

Table 2

Patients' clinical data

Variables	Freq. (%)
Type of Breast Cancer	
Invasive Ductal Carcinoma	237 (93.3)
Invasive Lobular Carcinoma	11 (4.3)
Ductal Carcinoma in Situ	4 (1.6)
Lobular Carcinoma in Situ	2 (0.8)
Stage of Cancer	
Stage 1	36 (14.2)
Stage 2	65 (25.6)
Stage 3	99 (39.0)
Stage 4	54 (21.3)
Current condition	
Cancer-free	146 (57.5)
The tumor returned	20 (7.9)
Active and receiving treatment	88 (34.6)
The last time received treatment	
0-3 months	232 (91.3)
3-12 months	9 (3.5)
1-2 years	4 (1.6)
> 2 years	9 (3.5)
Treatment type used	
Surgery	205 (80.8)
Radiotherapy	99 (39.0)
Hormonal therapy	207 (81.5)
Chemotherapy	218 (85.8)
Biological therapy	64 (25.2)
Targeted therapy	15 (5.9)
Pain Medication	
Opioid	36 (14.2)
Paracetamol Tab	163 (64.2)
NSAIDs	33 (13.0)
Total patients use pain meds	171 (67.3)
Non-Pharmaological pain releif use	
Not used	233 (91.7)
Used	21 (8.3)
Total number of medications	
1-3 Medications	77 (30.3)
4-6 Medications	158 (62.2)
≥ 7 Medications	19 (7.5)
Total	**254**

3.3 Brief pain inventory

The patients were asked to fill out the Brief Pain Inventory questionnaire (appendix II) to assess the pain and its impact on functioning. The results are shown in Table 3 and Table 4. The pain severity score median was 7.0 (0.0-20.3), and the pain interference score median was 26.0 (5.75-42.0).

Table 3

Brief Pain Inventory - Pain severity scores

Pain severity scores	Min. – Max.	Mean	Std. Deviation	Median [Q1-Q3]
Worst severity of pain in the last 24 hours	0.0-10.0	4.0945	4.01171	4.0 [0.0-8.0]
Leas pain severity in the last 24 hours	0.0-10.0	1.3858	2.11917	0.0 [0.0-2.25]
Average of pain in the last 24 hours	0.0-10.0	2.8386	3.26702	1.0 [0.0-5.0]
Pain severity Now	0.0-10.0	2.1181	2.99569	0.0 [0.0-4.0]

Table 4

Brief Pain Inventory – Pain interference score

Interference	Min. – Max.	Mean	Std. Deviation	Median [Q1-Q3]
General energy	0.0-10.0	4.3	3.6	5.0 [0.0-7.0]
Mood	0.0-10.0	4.4	3.7	5.0 [0.0-8.0]
Walking ability	0.0-10.0	4.2	3.6	4.0 [0.0-8.0]
Work	0.0-10.0	3.7	3.6	3.0 [0.0-7.0]
Relationships	0.0-10.0	2.5	3.3	0.0 [0.0-5.0]
Sleep	0.0-10.0	4.0	3.7	4.0 [0.0-8.0]
Enjoying life	0.0-10.0	3.2	3.7	2.0 [0.0-6.0]

Upon reporting the pain of the body parts in BPI, the lower limbs were the most common location of pain location reported by the patients involving the knees (31.5%), feet 18.9%, legs (13%), thighs (8.7%), and followed by the upper limbs (right upper 18.1%, left upper 16.1%) and back (16.5%). Pain locations are reported in Table 5.

Table 5

Pain locations

Pain location	Freq. (%) N=254
Head	8 (3.1)
Neck	7 (2.9)
Right breast	16 (6.3)
Left breast	13 (5.1)
Back	42 (16.5)
Right upper limb	46 (18.1)
Left upper limb	41 (16.1)
Abdomen	12 (4.7)
All Joints	6 (2.4)
Thighs	22 (8.7)
Knees	80 (31.5)
Legs	33 (13)
Feet	48 (18.9)
Ankles	7 (2.9)
Total of patients who had post-treatment pain	147 (57.9)

Patients who were taking analgesics were asked how much relief (out of 100) they had after taking pain killer, the median was 60 (IQR: 30-100). As shown in Table 6 eighty (31.5) patients had full relief, fourty four (17.3) patients had good relief, fourty seven (18.5) patients had moderate relief, thirty four (13.9) patients had mild relief, and fourty nine (19.3) patients had no relief.

Table 6

Pain relief after taking painkiller (out of 100)

Relief (out of 100)	Freq. (%)
No relief (0%)	49 (19.3)
Mild relief (10-40%)	34 (13.9)
Moderate relief (50-60%)	47 (18.5)
Good relief (70-90%)	44 (17.3)
Full relief (100%)	80 (31.5)
Total	**254 (100)**

3.4 Satisfaction towards breast cancer treatment

The satisfaction of patients with medications used to treat breast cancer was investigated using the Treatment Satisfaction Questionnaire for Medication (TSQM). The results of the questions are present in Table 6. The scores were analyzed then based on the recommendations by the score inventor as described earlier in the methods section 2.7.

From the findings obtained from TSQM, it was deemed that the satisfaction level of the patients is high. The questions are classified into the following domains: effectiveness, side effects, convenience, and global satisfaction. The median satisfaction scores for each domain were global satisfaction domain 64.3 (50.0-78.6), effectiveness domain 61.0 (50.0-72.2), side effects domain 59.4 (31.3-100.0) and convenience domain 66.7 (61.1-77.8). The higher the score of the domain, the more satisfaction level. Appendix E.1 reports the results obtained from the TSQM surveys filled out by breast cancer patients at Al-Watani Hospital and An-Najah National University Hospital.

Question 4 in TSQM asked patients whether they had side effects or not; the results are shown in Figure 2.

Figure 2

Presence of side effects among breast cancer patients
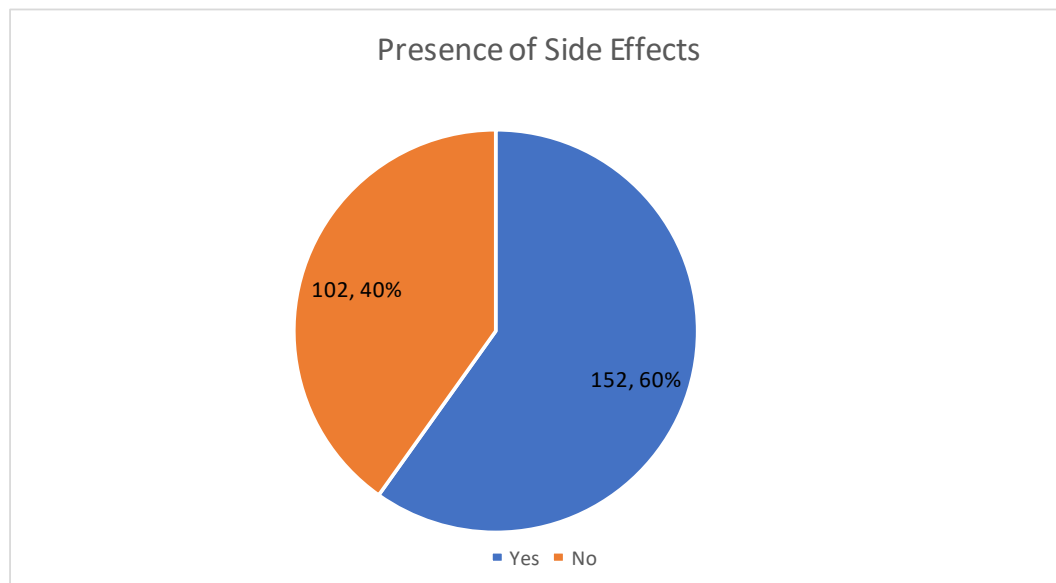
3.4.1 Association of satisfaction with treatment and post-treatment pain

The satisfaction towards medications used to treat breast cancer was analyzed to determine whether there is an association with post-treatment pain. The results of global satisfaction score correlations are shown in appendix E.2.

There was a negative association between the global satisfaction domain and the presence of post-treatment pain ($p < 0.001$). Furthermore, significant differences and negative correlations were found between global satisfaction and posttreatment pain on the day of interview ($p = 0.001$), pain medication ($p < 0.001$), paracetamol use ($p < 0.001$), and presence of side effects ($p = 0.003$). While the only significant positive correlation with global satisfaction was the exposure to chemotherapy ($p = 0.007$)

Regarding the Effectiveness satisfaction domain in TSQM, as shown in appendix E.3 there were significant differences and negative correlations with the presence of post-treatment pain ($p = 0.001$), post-treatment pain on the day of interview ($p = 0.002$), surgery ($p = 0.002$), paracetamol use ($p < 0.001$), and the presence of side effects ($p < 0.001$). In other words, satisfaction based on the effectiveness of treatment was associated with post-treatment pain, surgery, and side effects of drugs.

Appendix E.4 shows the correlations of the side effects satisfaction domain score, there were significant differences in relation to the age ($p = 0.009$), smoking status ($p = 0.029$), post-treatment pain ($p < 0.001$), post-treatment pain in the day of interview ($p < 0.001$), pain medication use ($p < 0.001$), paracetamol use ($p < 0.001$), and the presence of side effects ($p < 0.001$).

As shown in appendix E.5, there were significant variations in patients' Convenience satisfaction domain score in the context of the presence of post-treatment pain ($p < 0.001$), stage of cancer ($p = 0.001$), current condition ($p < 0.001$), post-treatment pain in the day of interview ($p < 0.001$), hormonal therapy exposure ($p = 0.001$), biological therapy exposure ($p = 0.001$), pain medication use ($p < 0.001$), opioid use ($p < 0.001$), paracetamol use ($p < 0.001$), Non-pharmacological pain relief measures ($p = 0.007$), and the presence of side effects ($p = 0.001$).

3.4.2 Correlation between breast cancer treatment medications and patients' satisfaction with medication (TSQM)

The satisfaction towards medications used to treat breast cancer was analyzed to determine whether there is an association with the type of medication used. The results of global satisfaction score correlations with medications are shown in appendix E.6.

There was a single significant difference with positive association between the global satisfaction domain and the use of cyclophosphamide ($p = 0.018$).

Regarding the Effectiveness satisfaction domain in TSQM, as shown in appendix E.7 there were significant differences and positive correlations with the use of paclitaxel ($p = 0.035$) and pertuzumab ($p = 0.025$), while goserelin ($p = 0.046$) was negatively associated with effectiveness satisfaction score.

Appendix E.8 shows the correlations of the side effects satisfaction domain score with breast cancer treatment medications, there were no significant differences with any medication.

As shown in appendix E.9, there were significant variations with negative correlations in patients' Convenience satisfaction domain score in relation to the use of anastrozole ($p = 0.004$), adriamycin ($p = 0.005$), docetaxel ($p = 0.008$), capecitabine ($p = 0.022$), gemcitabine ($p = 0.026$), trastuzumab ($p = 0.002$), and lapatinib ($p = 0.012$). Finally, there ware a single significant difference with positive correlation in patients' Convenience satisfaction domain score in relation to the use of tamoxifen ($p = 0.038$).

3.4.3 Correlation between BPI and TSQM

The findings of the Brief pain inventory and the Treatment satisfaction questionnaire for the medication were analyzed to study their correlation. The domains of each questionnaire were studied against each other, as shown in Table 7.

Pain severity had a significantly negative correlation with global satisfaction towards treatment (r = -0.293, $p < 0.001$). Furthermore, global satisfaction was negatively correlated with pain interference of pain (r = -0.287, $p < 0.05$). Furthermore, the effectiveness, side effects, and convenience domains of TSQM were negatively correlated with pain severity and pain interference score ($p < 0.05$). In other words, the

lower the pain severity, the higher the satisfaction; the lower the pain interference, the higher satisfaction of patients towards the treatment.

Table 7

Correlation between TSQM domains and BPI domains

N=254		Pain Severity score	Pain interference score
Global Satisfaction score	Pearson correlation	-.293	-.287
	p-value	0.000	0.000
Effectiveness satisfaction score	Pearson correlation	-.258	-.319
	p-value	0.000	0.000
Side effects satisfaction score	Pearson correlation	-.414	-.514
	p-value	0.000	0.000
Convenience score	Pearson correlation	-.274	-.307
	p-value	0.000	0.000

*Pearson correlation

3.5 Multivariate linear regression analysis of TSQM

In order to understand the relationship between variables, regression analysis was undertaken. We determined which variable had the exact correlation by using the TSQM domain scores as dependent variables and the rest of the variables correlated with each domain as independent variables.

Regression analysis showed that the patients who had received chemotherapy were independently associated with higher global satisfaction scores (p = 0.011). Furthermore, patients with lower pain interference scores (p = 0.01) and patients who did not experience side effects (p = 0.47) were independently associated with higher effectiveness satisfaction scores.

Furthermore, patients with lower Pain interference scores (p < 0.001), patients who did not experience post-treatment pain (p = 0.034), and patients who did not experience side effects were independently associated with higher Side effects satisfaction scores. Tables 8, 9, and 10 summarize the significantly correlated parameters with each satisfaction domain.

Table 8

Global satisfaction score correlations*

Variables	Unstandardized coefficients (B)	S.E	Standardized coefficient (Beta)	*p value*	Lower Bound	Upper Bound	Tolerance
Global Satisfaction score							
Pain Severity score	-.339	.181	-.186	0.062	-.695	.017	.359
Pain interference score	-.134	.081	-.135	0.102	-.294	.027	.521
Post-treatment pain	1.373	3.778	.033	0.717	-6.069	8.815	.433
Post-treatment pain today	-2.698	4.102	-.065	0.511	-10.777	5.381	.362
Use of pain medication	3.011	7.698	.068	0.696	-12.152	18.173	.117
Presence of side effects	2.083	2.968	.049	0.483	-3.762	7.928	.718
Chemotherapy	9.220	3.588	.155	**0.011**	2.153	16.287	.970
Paracetamol	-5.781	7.288	-.134	0.428	-20.137	8.575	.124

*Linear Regression

Table 9

Effectiveness satisfaction score correlations*

Variables	Unstandardized coefficients (B)	S.E	Standardized coefficient (Beta)	*p value*	Lower Bound	Upper Bound	Tolerance
Pain Severity score	-.133	.143	-.092	.353	-.416	.149	.362
Pain interference score	-.169	.065	-.215	**.010**	-.297	-.042	.522
Post-treatment pain	1.089	3.008	.033	.718	-4.836	7.014	.434
Post-treatment pain today	-1.989	3.267	-.060	.543	-8.424	4.446	.362
Use of pain medication	8.416	6.133	.239	.171	-3.664	20.496	.117
Presence of side effects	4.711	2.361	.140	**.047**	.061	9.362	.720
Paracetamol	-8.533	5.785	-.248	.142	-19.927	2.862	.125

*Linear Regression

Table 10

Side effects satisfaction score correlations

Variables	Unstandardized coefficients (B)	S.E	Standardized coefficient (Beta)	p value	Lower Bound	Upper Bound	Tolerance
Pain Severity score	-.153	.151	-.048	0.312	-.449	.144	.357
Pain interference score	-.280	.068	-.164	**0.000**	-.415	-.146	.511
Post-treatment pain	6.723	3.151	.093	**0.034**	.517	12.929	.430
Post-treatment pain today	-4.008	3.417	-.056	0.242	-10.738	2.723	.359
Use of pain medication	12.449	6.406	.163	0.053	-.170	25.068	.116
Presence of side effects	58.159	2.513	.795	**0.000**	53.209	63.108	.691
Age category	-2.213	1.146	-.058	0.055	-4.470	.045	.895
Smoking	.347	2.086	.005	0.868	-3.762	4.455	.974
Paracetamol	-10.836	6.048	-.145	0.074	-22.749	1.078	.125

*Linear Regression

Chapter Three
Discussion

4.1   Overview

The current study investigated posttreatment cancer pain and how it affects treatment satisfaction with anticancer drug treatment among Palestinian breast cancer patients. The patients were surveyed using a brief pain inventory score to determine their pain severity and interference with functioning. Also, a treatment satisfaction questionnaire for medication was used to explore the participants' satisfaction with breast cancer treatment. Finally, the findings were analyzed to determine the correlation between variables.

4.2 Anticancer drugs used among breast cancer patients in Palestine

The patients who participated in this study mostly had surgery as a treatment method for their case. The use of anticancer drugs, including chemotherapy, hormonal therapy, biological therapy, and targeted therapy, was not the most prevalent method of treating this condition in Palestine.

This may be due to the rapid and huge change in breast cancer treatment in recent years (56), the fact that surgery is recommended and associated with better survival rates in the early stages (57), and anticancer drugs are expensive (58). Patients with breast cancer cannot afford to pay that treatment costs (59). Furthermore, most Palestinian citizens do not have medical insurance (60). The Palestinian government provides insurance to Palestinians, but this insurance coverage is limited for certain drugs (61). Hence, using surgery as a treatment can be considered a cheaper resort than medications for a certain period. This opens an area of investigation to compare the cost-effectiveness of surgery versus the use of anticancer drugs in the Palestinian population and the factors influencing these decisions.

Cancer treatment is increasing in Palestinian hospitals with time; nonetheless, services including palliative care, targeted therapy, bone-marrow transplantation, and targeted therapy are still restricted. In addition, the shortage of specialized physicians and the availability of medications, chemotherapy, and radiation therapy are issues limiting the full oncological care of patients with breast cancer (62).

4.3 Post-treatment pain in breast cancer patients in Palestine

Despite the findings that most patients underwent surgeries as a treatment for breast cancer, many patients use medications to treat breast cancer. As this study aimed to investigate the pain experienced after breast cancer, the study used the Brief Pain Inventory scale to shed light on this area.

Pain is a distressing experience that is the most frequent symptomatic reason for seeking medical help. The definition of pain states that it is a subjective and highly personal feeling that poses difficulties for researchers and physicians. Due to the subjective nature of pain and the lack of direct measurement, the evaluation must be based on the person's self-report and behavior to provide a window into their experience (13).

The pain experience negatively affects daily activity, social and family relationships, sleeping, work, and mental health, resulting in poor quality of life. These complications emphasize the importance of adopting a multidisciplinary approach to improve treatment (63). In addition, effective communication between the patient and the health care provider is essential to improve pain control. This will help in the precise assessment of pain intensity and education of the patients about medication and non-pharmacological intervention for pain relief (64).

The patients in the current study reported low levels of pain after breast cancer, in which the pain had a median of 7 (0.0-23.3) and the interference of the pain interference had a median of 26 (5.57-42.0). This suggests that the pain severity post-treatment was not that severe. By delving into the findings obtained from each score element, it is found that the patients had a mean of 4 out of 10 as the worst pain severity post-treatment. This indicates that the patients following treatment feel pain, but its severity is not remarkable. In addition, most of the patients did not feel pain during the interview or the last 24 hours.

In addition, when asked about the average pain score in the last 24 hours, the mean score was 2.8 out of 10. This double confirms that the pain is present, but it is not troublesome.

To investigate the interference of pain post-treatment of breast cancer treatment, patients filled the Brief Pain Inventory scale, the findings presented in the results

chapter. The findings show that pain interferes mostly with the mood of the patients, with a mean score of 4.4 out of 10. This was followed by interference with walking ability with a mean score of 4.2 out of 10. This may be linked with the locations of pain that the patients reported. Upon questioning patients about their pain locations, they mostly reported lower extremities (31.5%).

A systematic review published in The Breast journal in 2018, the review evaluated the prevalence and severity of persistent pain after breast cancer treatment (65). It found that the prevalence of pain among this population was 21.8%. However, the current study did not aim to calculate the prevalence of pain post-treatment. Nonetheless, all participants reported the presence of pain. This pain did not have high severity scores, yet the mere presence of pain needs to be taken seriously and investigate the factors influencing the pain to take measures to treat and prevent this pain.

Patients were asked how they manage their pain and what painkillers they use. The majority of them reported the use of pain medications (67.3%), and almost all of them used paracetamol to relieve their pain (64.2%), while only 36 (14.2%) patients used opioids. This is maybe related to the reported pain levels in our study, and the fact that paracetamol is the first choice in treating mild pain.

In general, intravenous, oral, and topical medicines are among the pain-relieving alternatives available to cancer patients. However, the right pain treatment should target as many nociceptive and neuropathic pain components as appropriate, which typically necessitates a combination of treatments.

One of the most severe and feared consequences of cancer is pain. Stress, anxiety, and depression are all factors that could contribute to increased pain and acute pain episodes, leading to additional medical appointments and costs.

Approximately 50% of cancer patients on active therapy experience pain, while up to 90% of patients with advanced cancer experience pain. Despite advances in pain medicines, therapies, and specialist training, effective pain management remains difficult for the cancer population. Patients with acute pain commonly visit primary care and emergency rooms, and the providing care for these patients rests on them (66).

The WHO created a three-step analgesic stairway for cancer pain treatment in 1986, with the intention of providing recommendations for the effective treatment of cancer-related pain, which was widely considered significantly undertreated and without a standard of care (67, 68).

All cancer patients should have a complete medical history and physical examination, as the most common cause of pain is non-malignant, even in the presence of cancer. Appropriate therapies can be identified once the etiology and cause of pain have been determined.

4.4 Satisfaction of patients towards breast cancer treatment

The satisfaction of patients towards the treatment was explored using TSQM; the TSQM, as stated earlier, is a validated tool to determine the satisfaction of patients. The findings of the current study established a high level of satisfaction towards treatment by the participants. The patients scored high scores in all domains, and the higher the score, the better satisfaction. These results align with Eljedi and Nofal's (2014) study (69); their study investigated the quality of life of breast cancer patients in Palestine. According to the WHOQOL-BREF subscale evaluation, unemployment, poor educational status, low family income, surgical intervention, and hormonal treatment were linked to a worse quality of life score. Age, marital status, chemotherapy, radiation, and a combination of all forms of treatment, on the other hand, did not affect QOL. Compared to this study, the treatment methods did not impact the satisfaction of the patients, except for the use of chemotherapy which where associated with better global satisfaction among patients. This association between patient satisfaction and chemotherapy was also emphasized by Stylianou *et al* (2021) (70). As mentioned in the literature review, satisfaction is linked to the quality of life.

There were positive correlations between the global satisfaction domain and the use of cyclophosphamide ($p = 0.018$), between the effectiveness satisfaction domain and the use paclitaxel ($p = 0.046$), and negative between the convenience satisfaction and the use of adriamycin ($p = 0.005$), docetaxel ($p = 0.008$), capecitabine ($p = 0.022$), and gemcitabine ($p = 0.026$). The use of chemotherapy appears to be linked with higher global and effectiveness satisfaction and lower convenience satisfaction among patients. Several studies have found a link between chemotherapy and increased quality of life in

people with solid tumors (71, 72) and sometimes the chemotherapy use was linked with lower quality of life in cancer patients (73-76). This is maybe because of the ability of adjuvant chemotherapy to decrease the risk of recurrence by 30% at 10 years (77), the side effects, long cycles sessions, and inconveniences related to chemotherapy, and the possibility of that the acute burden of chemotherapy the patients experience is mostly in the early stages of chemotherapy cycles (71, 78, 79).

The use of tamoxifen was correlated with higher convenience satisfaction ($p = 0.038$) which aligns with the high tamoxifen adherence reported in the literature (80, 81). This is maybe because it's taken orally, once daily, and patients doesn't need to go to the clinic to have their dose. In contrast, trastuzumab use were correlated with lower convenience satisfaction among patients ($p = 0.002$). This might be because its side effects and the infusion reactions caused by trastuzumab when it's given intravenously. Many studies have shown that the subcutaneous (SC) route of administration of trastuzumab is safer than the intravenous (IV) form and related to fewer side effects (82-84). Moreover, Rojas *et al.* recommended the use of subcutaneous (SC) form of trastuzumab rather than the intravenous (IV) form because it's more cost-effective and have a substantial financial influence on public and private healthcare systems (85). However, the only available form of trastuzumab in the Palestinian hospitals is the intravenous (IV) form.

4.5 Post-treatment pain and satisfaction towards breast cancer treatment

The satisfaction towards treatment has been investigated concerning the post-treatment pain. In which, the pain following treatment of breast cancer had an impact on the satisfaction or not, and to what extent this pain had affected the patients' satisfaction. In order to answer these questions, a correlation analysis was undertaken between TSQM and BPI.

There was a correlation between the side effects satisfaction domain and the presence of post-treatment pain ($p = 0.034$). Experiencing pain following breast cancer treatment is linked to patients' level of satisfaction with breast cancer, which affects their quality of life. Many studies pointed to the correlation between post-treatment pain and patients' quality of life (86, 87). The significant impact of post-treatment pain, pain severity, and

interference on patients' quality of life are also emphasized by Abu Farha *et al.* (2017) (86).

The presence of side effects was also correlated with the Effectiveness satisfaction domain ($p = 0.047$), and side effects satisfaction domain ($p < 0.001$); this indicates that the satisfaction of patients with breast cancer is affected by whether they have side effects or not.

These findings are consistent with the literature, as some studies concluded that treatment side effects in breast cancer patients might directly impact their quality of life (88, 89). For instance, Visser *et al*. (2018) noticed that patients with higher feelings about side effects score were associated with better satisfaction with treatment in lung cancer (89). Also, Lam *et al.* (2018) found that patient satisfaction was good and did not significantly decrease over time (88). Similarly, according to the current findings, patient demographic characteristics had no impact on patient satisfaction in Lim *et al.* (88).

The TSQM has a question considered a filter question, question 4; this question asks the patients whether they feel side effects or not and the side effects they experience. Most of the patients experienced side effects, which interfered with the patients' satisfaction.

4.6 Limitations

The current study is of certain limitations, and the study was a cross-sectional study; thus, the results are difficult to be generalized. In addition, although the sample size in this study was substantial, the survey approach has drawbacks since questionnaire responses may not accurately reflect the patient's status.

The self-reported questionnaire can bias the relationship under investigation; as this study is investigating pain and satisfaction, the patients might have exaggerated their responses. In addition, as this study was conducted in two hospitals of one city in the West Bank in Palestine, it may not accurately reflect the pain and satisfaction of breast cancer patients in Palestine or other countries.

More prospective future research needs to be undertaken to build upon the results obtained from the current study.

4.7 Conclusions

Patients' demographic and clinical characteristics had no impact on patients' satisfaction. Also, patients had a high level of satisfaction with medications and low levels of pain severity and pain interference on their functioning. However, the current study detected a set of significant related factors that should be taken into account while managing breast cancer patients' treatment medications, side effects, and pain management medications. Patients given chemotherapy appeared to have higher global satisfaction with their medications. Also, Patients who had lower pain interference with their functioning, and patients without side effects, appeared to be more satisfied with the effectiveness of their medication. Finally, patients who had post-treatment pain experienced side effects or had higher pain interference with their functioning had a lower side effects satisfaction with their medications.

4.8 Recommendations

Although breast cancer patients had low pain intensity and interference levels, this study confirms the association of this undertreated pain and the presence of unresolved side effects, with fewer patients' satisfaction with medications. Therefore, further investigation should be performed to shed light on the causes of pain undertreatment among breast cancer patients. This will help health care providers and decision-makers to take actions on the ground to alleviate patients suffering.

In order to optimize the quality of health care, clinical pharmacists are needed to take care of treatment plans and decisions. Interventions of clinical pharmacists in this area will improve the expected outcomes by the patients, in which the patients with breast cancer will have high levels of satisfaction towards their drug therapy since the drug regimen they are receiving is tailored to their case according to the clinical pharmacists thorough clinical care.

Clinical pharmacists' fundamental role in the care of breast cancer patients involves medication adherence, bridging the gap between health care professions, understanding patient's needs, all of which will provide a better quality of life.

In addition, side effects of medications are managed creatively by the clinical pharmacists' interventions, either by avoiding them or treating them.

Hence, establishing the role of clinical pharmacists in managing posttreatment pain among breast cancer patients is considered one of the cornerstones of the current study. This study needs to guide policymakers in Palestine to implement the role of clinical pharmacists in the management of cancer and deliver the optimum cancer care quality.

References

[1] Stewart BW, Kleihues P, Kleihues P, Cancer IAfRo, cancer Cidrsl, Staff IAfRoC, et al. World Cancer Report: IARC Press; 2003.

[2] Peretti-Watel P, Bendiane MK, Spica L, Rey D. Pain narratives in breast cancer survivors. Pain Res Treat. 2012;2012:153060.

[3] Diaconu C, Pantis C, Cirimbei C, Bordea C, Gruia MI, Blidaru A. Pain-associated biomarkers in breast cancer. J Med Life. 2015;8(1):32-6.

[4] Groenvold M. Health-related quality of life in early breast cancer. Dan Med Bull. 2010;57(9):B4184.

[5] Andersen KG, Kehlet H. Persistent pain after breast cancer treatment: a critical review of risk factors and strategies for prevention. J Pain. 2011;12(7):725-46.

[6] Gulluoglu BM, Cingi A, Cakir T, Gercek A, Barlas A, Eti Z. Factors related to post-treatment chronic pain in breast cancer survivors: the interference of pain with life functions. Int J Fertil Womens Med. 2006;51(2):75-82.

[7] Ministry of Health PHIC. Health Status, Palestine, 2018. 2019.

[8] Ministry of Health PHICHS, Palestine. Health Annual Report 201 :6Palestine. 2017 July 2017.

[9] Ministry of Health PHICHS, Palestine. Health Annual Report 2020: Palestine. 2021.

[10] Waks AG, Winer EP. Breast Cancer Treatment: A Review. Jama. 2019;321(3):288-300.

[11] Ripamonti C, Santini D, Maranzano E, Berti M, Roila F. Management of cancer pain: ESMO clinical practice guidelines. Annals of oncology. 2012;23:vii139-vii54.

[12] Cancer.net. Breast Cancer: Types of Treatment [Available from: https://www.cancer.net/cancer-types/breast-cancer/types-treatment.

[13] Swieboda P, Filip R, Prystupa A, Drozd M. Assessment of pain: types, mechanism and treatment. Ann Agric Environ Med. 2013;Spec no. 1:2-7.

[14] Woolf CJ. What is this thing called pain? J Clin Invest. 2010;120(11):3742-4.

[15] Fillingim RB. Individual differences in pain: understanding the mosaic that makes pain personal. Pain. 2017;158 Suppl 1(Suppl 1):S11-s8.

[16] (WHO) WHO. Cancer pain relief: with a guide to opioid availability. 2nd ed. ed. Geneva1996.

[17] Oosterling A, te Boveldt N, Verhagen C, van der Graaf WT ,Van Ham M, Van der Drift M, et al. Neuropathic pain components in patients with cancer: prevalence, treatment, and interference with daily activities. Pain Practice. 2016;16(4):413-21.

[18] Baron R, Binder A, Wasner G. Neuropathic pain: diagnosis, pathophysiological mechanisms, and treatment. The Lancet Neurology. 2010;9(8):807-19.

[19] Hollingshead J, Dühmke R, Cornblath D. Tramadol for neuropathic pain. The Cochrane database of systematic reviews. 2006(3):CD003726-CD.

[20] Green SM, Roback MG, Kennedy RM ,Krauss B. Clinical practice guideline for emergency department ketamine dissociative sedation: 2011 update. Ann Emerg Med. 2011;57(5):449-61.

[21] Portenoy RK, Lesage P. Management of cancer pain. The Lancet. 1999;353(9165):1695-700.

[22] Von Roenn JH, Cleeland CS, Gonin R, Hatfield AK, Pandya KJ. Physician attitudes and practice in cancer pain management. A survey from the Eastern Cooperative Oncology Group. Ann Intern Med. 1993;119(2):121-6.

[23] Foley KM. The treatment of cancer pain. N Engl J Med. 1985.95-84:(2)313;

[24] Cleeland CS, Cleeland LM, Dar R, Rinehardt LC. Factors influencing physician management of cancer pain. Cancer. 1986;58(3):796-800.

[25] Antón A, Montalar J, Carulla J, Jara C, Batista N, Camps C, et al. Pain in clinical oncology: patient satisfaction with management of cancer pain. Eur J Pain. 2012;16(3):381-9.

[26] Yun YH, Heo DS, Lee IG, Jeong HS, Kim HJ, Kim SY, et al. Multicenter study of pain and its management in patients with advanced cancer in Korea. J Pain Symptom Manage. 2003;25.7-430:(5)

[27] Prandi C, Garrino L, Mastromarino P, Torino F, Vellone E, Peruselli C, et al. Barriers in the management of cancer-related pain and strategies to overcome them: findings of a qualitative research involving physicians and nurses in Italy. Ann Ist Super Sanita. 2015;51(1):71-8.

[28] Tasmuth T, von Smitten K, Hietanen P, Kataja M, Kalso E. Pain and other symptoms after different treatment modalities of breast cancer. Ann Oncol. 1995;6(5):453-9.

[29] Cooney MA, Culleton-Quinn E, Stokes E. Current knowledge of pain after breast cancer treatment: a systematic review. Pain Manag Nurs. 2013;14(2):110-23.

[30] Juhl AA, Christiansen P, Damsgaard TE. Persistent Pain after Breast Cancer Treatment: A Questionnaire-Based Study on the Prevalence, Associated Treatment Variables, and Pain Type. J Breast Cancer. 2016;19(4):447-54.

[31] Tasmuth T, Kataja M, Blomqvist C, von Smitten K, Kalso E. Treatment-related factors predisposing to chronic pain in patients with breast cancer--a multivariate approach. Acta Oncol. 1997;36(6):625-30.

[32] Satija A, Ahmed SM, Gupta R, Ahmed A, Rana SP, Singh SP, et al. Breast cancer pain management - a review of current & novel therapies. Indian J Med Res. 2014;139(2):216-25.

[33] Jung BF, Ahrendt GM, Oaklander AL, Dworkin RH. Neuropathic pain following breast cancer surgery: proposed classification and research update. Pain. 2003;104(1-2):1-13.

[34] WHO. Cancer pain relief: with a guide to opioid availability: World Health Organization; 1996.

[35] Institute NC. Pharmacologic Management [Available from: https://www.cancer.gov/about-cancer/treatment/side-effects/pain/pain-hp-pdq#section/all.

[36] Kravitz R. Patient satisfaction with health care. Journal of general internal medicine. 1998;13(4):280-2.

[37] Bjertnaes OA, Sjetne IS, Iversen HH. Overall patient satisfaction with hospitals: effects of patient-reported experiences and fulfilment of expectations. BMJ Qual Saf. 2012;21(1):39-46.

[38] Al-Abri R, Al-Balushi A. Patient satisfaction survey as a tool towards quality improvement. Oman medical journal. 2014;29(1):3.

[39] Marley KA, Collier DA, Meyer Goldstein S. The role of clinical and process quality in achieving patient satisfaction in hospitals. Decision Sciences. 2004;35(3):349-69.

[40] Patrick DL, Scrivens E, Charlton JR. Disability and patient satisfaction with medical care. Medical Care. 1983:1062-75.

[41] Pol L. Service Quality Improvement, the Customer Satisfaction Strategy for Health Care. Marketing Health Services. 1994;14(2):45.

[42] Prakash B. Patient satisfaction. Journal of Cutaneous and Aesthetic Surgery. 2010;3(3):151.

[43] Urden LD. Patient satisfaction measurement: current issues and implications. Professional case management. 2002;7(5):194-200.

[44] Abetz L, Coombs JH, Keininger DL, Earle CC, Wade C, Bury-Maynard D, et al. Development of the cancer therapy satisfaction questionnaire: item generation and content validity testing. Elsevier; 2005.

[45] Atkinson MJ, Sinha A, Hass SL, Colman SS, Kumar RN, Brod M, et al. Validation of a general measure of treatment satisfaction ,the Treatment Satisfaction Questionnaire for Medication (TSQM), using a national panel study of chronic disease. Health and quality of life outcomes. 2004;2(1):1-13.

[46] Evans CJ, Trudeau E, Mertzanis P, Marquis P, Peña BM, Wong J, et al. Development and validation of the Pain Treatment Satisfaction Scale (PTSS): a patient satisfaction questionnaire for use in patients with chronic or acute pain. Pain. 2004;112(3):254-66.

[47] Institute NC. Breast Cancer [Available from: https://www.cancer.gov/types/breast.

[48] Institute NC. Chemotherapy [Available from: https://www.cancer.gov/about-cancer/treatment/types/chemotherapy.

[49] institute NC. Radiation therapy [Available from: https://www.cancer.gov/about-cancer/treatment/types/radiation-therapy.

[50] Institute   NC.   [Available   from: https://www.cancer.gov/about-cancer/treatment/types/hormone-therapy#HHTWAC.

[51] Institute   NC.   Targeted   therapy   [Available   from: https://www.cancer.gov/publications/dictionaries/cancer-terms/def/targeted-therapy.

[52] Tinoco G, Warsch S, Glück S, Avancha K, Montero AJ. Treating breast cancer in the 21st century: emerging biological therapies. J Cancer. 2013;4(2):117-32.

[53] Organization WH. WHOQOL: Measuring Quality of Life [Available from: https://www.who.int/toolkits/whoqol.

[54] Organization   WH.   Body   mass   index   [Available   from: https://www.euro.who.int/en/health-topics/disease-prevention/nutrition/a-healthy-lifestyle/body-mass-index-bmi#:~:text=BMI%2C%20formerly%20called%20the%20Quetelet,have%20a%20BMI%20of%2022.9.

[55]   Morisky DE, Green LW, Levine DM. Concurrent and predictive validity of a self-reported measure of medication adherence. Med Care. 1986;24(1):67-74.

[56]   Riis M. Modern surgical treatment of breast cancer. Ann Med Surg (Lond). 2020;56:95-107.

[57]   ASCO ASoCO. Breast cancer treatment guidelines [Available from: https://www.asco.org/practice-patients/guidelines/breast-cancer.

[58]   Berghuis AMS KH, Terstappen LWMM, Sleijfer S, IJzerman MJ. Estimating The Drug Treatment Cost of Breast Cancer. Value in health. 2017.

[59]   Morrar R, Jabr S, Ghandour R, Abu-Rmeileh NM, Forgione DA, Younis M. Identifying healthcare cost drivers in Palestine. Int J Health Plann Manage. 2021;36(3):911-24.

[60]   Abu-Zaineh M, Mataria A, Luchini S, Moatti JP. Equity in health care finance in Palestine: the triple effects revealed. J Health Econ. 2009;28(6):1071-80.

[61]   Mataria A, Khatib R, Donaldson C, Bossert T, Hunter DJ, Alsayed F, et al. The health-care system: an assessment and reform agenda. Lancet. 2009;373(9670):1207-17.

[62]   Kharroubi AT ,Abu Seir RY. Cancer Care in Palestine. In: Silbermann M, editor. Cancer Care in Countries and Societies in Transition: Individualized Care in Focus. Cham: Springer International Publishing; 2016. p. 77-97.

[63]   McCarberg BH, Nicholson BD, Todd KH, Palmer T ,Penles L. The impact of pain on quality of life and the unmet needs of pain management: results from pain sufferers and physicians participating in an Internet survey. Am J Ther. 2008;15(4):312-20.

[64]   Mistiaen P, van Osch M, van Vliet L, Howick J, Bishop FL, Di Blasi Z, et al. The effect of patient-practitioner communication on pain: a systematic review. Eur J Pain. 2016;20(5):675-88.

[65] Wang K, Yee C, Tam S, Drost L, Chan S, Zaki P, et al. Prevalence of pain in patients with breast cancer post-treatment: A systematic review. Breast. 2018;42:113-27.

[66] Barclay S, Todd C, Grande G, Lipscombe J. Controlling Cancer Pain in Primary Care: The Prescribing Habits and Knowledge Base of General Practitioners. Journal of Pain and Symptom Management. 2002;23.92-383:(5)

[67] Stjernswärd J. WHO cancer pain relief programme. Cancer surveys. 1988;7(1):195-208.

[68] Jadad AR, Browman GP. The WHO analgesic ladder for cancer pain management: stepping up the quality of its evaluation. Jama. 1995;274(23):1870-3.

[69] Nofal A. Health-Related Quality of Life and its Influencing Factors among Breast Cancer Patients in Palestine. Journal of Women's Health, Issues & Care. 2014;03.

[70] Stylianou C, Kalemikerakis I, Vastardi M, Kavga A, Margari N, Dokoutsidou E, et al. Assessment of oncology patients' satisfaction from intravenous chemotherapy. J buon. 2021;26(5):2176-82.

[71] Heydarnejad MS, Hassanpour DA, Solati DK. Factors affecting quality of life in cancer patients undergoing chemotherapy. Afr Health Sci. 2011;11(2):266-70.

[72] .72   Dehkordi A, Heydarnejad MS, Fatehi D. Quality of Life in Cancer Patients undergoing Chemotherapy. Oman Med J. 2009;24(3):204-7.

[73] Lewandowska A, Rudzki G, Lewandowski T, Próchnicki M, Rudzki S, Laskowska B, et al. Quality of Life of Cancer Patients Treated with Chemotherapy. Int J Environ Res Public Health. 2020;17.(19)

[74] Tabata A, Kanai M, Horimatsu T, Tsuboyama T, Matsushima K, Kato T. Changes in upper extremity function, ADL, and HRQoL in colorectal cancer patients after the first chemotherapy cycle with oxaliplatin: a prospective single-center observational study. Supportive Care in Cancer. 2018;26(7):2397-405.

[75] Kayl AE, Meyers CA. Side-effects of chemotherapy and quality of life in ovarian and breast cancer patients. Curr Opin Obstet Gynecol. 2006;18(1):24-8.

[76] Tajima T, Tokuda Y, Okumura T, Kubota M, Mitomi T. [Chemotherapy for patients with recurrent breast cancer and quality of life]. Gan To Kagaku Ryoho. 1995;22 Suppl 1:16-21.

[77] Anampa J, Makower D, Sparano JA. Progress in adjuvant chemotherapy for breast cancer: an overview. BMC Medicine. 2015;13(1):195.

[78] Chen ML, Yu CT, Yang CH. Sleep disturbances and quality of life in lung cancer patients undergoing chemotherapy. Lung Cancer. 2008;62(3):391-400.

[79] Taira N, Sawaki M, Uemura Y, Saito T, Baba S, Kobayashi K, et al. Health-Related Quality of Life With Trastuzumab Monotherapy Versus Trastuzumab Plus Standard Chemotherapy as Adjuvant Therapy in Older Patients With HER2-Positive Breast Cancer. J Clin Oncol. 2021;39(22):2452-62.

[80] McCowan C, Shearer J, Donnan PT, Dewar JA, Crilly M, Thompson AM, et al. Cohort study examining tamoxifen adherence and its relationship to mortality in women with breast cancer. British Journal of Cancer. 2008;99(11):1763-8.

[81] Kahn KL, Schneider EC ,Malin JL, Adams JL, Epstein AM. Patient Centered Experiences in Breast Cancer: Predicting Long-Term Adherence to Tamoxifen Use. Medical Care. 2007;45(5):431-9.

[82] Wynne C, Harvey V, Schwabe C, Waaka D, McIntyre C, Bittner B. Comparison of Subcutaneous and Intravenous Administration of Trastuzumab: A Phase I/Ib Trial in Healthy Male Volunteers and Patients With HER2-Positive Breast Cancer. The Journal of Clinical Pharmacology. 2013;53(2):192-201.

[83] Locke KW, Maneval DC, LaBarre MJ. ENHANZE(®) drug delivery technology: a novel approach to subcutaneous administration using recombinant human hyaluronidase PH20. Drug Deliv. 2019;26(1):98-106.

[84] Jackisch C, Stroyakovskiy D, Pivot X, Ahn JS, Melichar B, Chen SC, et al. Subcutaneous vs Intravenous Trastuzumab for Patients With ERBB2-Positive

Early Breast Cancer: Final Analysis of the HannaH Phase 3 Randomized Clinical Trial. JAMA Oncol. 2019;5(5):e190339.

[85] Rojas L, Muñiz S, Medina L, Peña J, Acevedo F, Pinto MP, et al. Cost-minimization analysis of subcutaneous versus intravenous trastuzumab administration in Chilean patients with HER2-positive early breast cancer. PLoS One. 2020;15(2):e0227961.

[86] Abu Farha NH, Khatib MT, Salameh H, Zyoud SH. 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 Pac Fam Med. 2017;16:7.

[87] Esnaola NF, Cantor SB, Johnson ML, Mirza AN, Miller AR, Curley SA, et al. Pain and Quality of Life After Treatment in Patients With Locally Recurrent Rectal Cancer. Journal of Clinical Oncology. 2002;20(21):4361-7.

[88] Lam WWT, Kwong A, Suen D, Tsang J, Soong I, Yau TK, et al. Factors predicting patient satisfaction in women with advanced breast cancer: a prospective study. BMC Cancer.162:(1)18;2018 .

[89] Visser S, de Mol M, Cheung K, van Toor JJ, van Walree NC, Stricker BH, et al. Treatment Satisfaction of Patients With Advanced Non-Small-cell Lung Cancer Receiving Platinum-based Chemotherapy: Results From a Prospective Cohort Study (PERSONAL). Clin Lung Cancer. 2018;19(4):e503-e16.

Appendices

Appendix A

Sociodemographic and clinical data form

Socio-demographic Data

Age (year) _____

Residency City □ Village □ Palestinian refugee's camp □

Marital status Single □ Married □

Educational level Elementary □ Preparatory □ Secondary □ Diploma □

Bachelor's degree □ Uneducated □

Occupational status Private employee □ Government employee □ Housewife □

Income level Low (less than 500 JD) □ Moderate (500 JD–1000 JD) □ High

(more than 1000 JD) □

Body mass index _____

Patient Clinical Data

Type of breast cancer: Invasive ductal carcinoma □ Invasive lobular carcinoma □

Ductal carcinoma in situ □

Stage of cancer: Stage 1 □ Stage 2 □ Stage 3 □ Stage 4 □
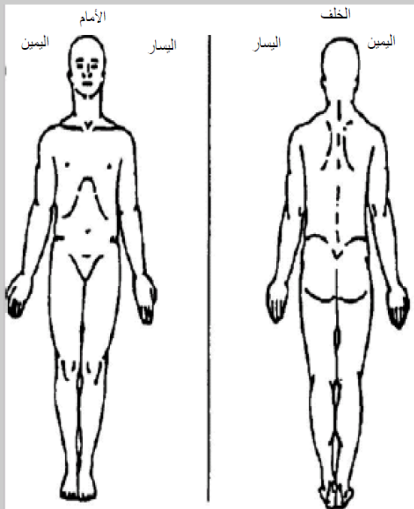
Current condition: Cancer-free □ The tumor returned □ Active and receiving

treatment □

Last time received treatment: 0–3 months □ 3–12 months □ 1–2 years □ More

than 2 years □

Post-treatment pain Yes □ No □

Appendix B

Brief Pain Inventory

<div dir="rtl">

قائمة مختصرة بالألم (استمارة مختصرة)

التاريخ: _ _ _ _ / _ _ _ _ / _ _ _ _   الوقت _ _ _ _ _ _ _ _

الاسم: _

الأخير   الأول   الأوسط

1. خلال حياتنا، يعاني معظمنا من بعض الآلام بين الحين والآخر (كالصداع البسيط أو التواءات العضلات والمفاصل أو ألم الأسنان). هل تعاني اليوم من ألم يختلف عن هذه الأنواع من الآلام العادية؟

1. نعم   2. لا

2. في المخطط التالي، ظلّل مواضع الألم الذي تشعر به، ضع علامة × في المواضع الأشد ألمًا.

الأمام   الخلف

اليمين   اليسار | اليسار   اليمين

3. من فضلك، ضع دائرة حول الرقم الذي يصف ألمك في **أسوأ** حالاته خلال الأربع والعشرين ساعة الماضية.

10   9   8   7   6   5   4   3   2   1   0

أسوأ ما يمكن تصوره من الألم   لا يوجد ألم

4. من فضلك ضع دائرة حول الرقم الذي يصف ألمك في **أخف** حالاته خلال الأربع والعشرين ساعة الماضية.

10   9   8   7   6   5   4   3   2   1   0

أسوأ ما يمكن تصوره من الألم   لا يوجد ألم

5. من فضلك ضع دائرة حول الرقم الذي يصف ألمك في **مُعظم** الأوقات في الأربع والعشرين ساعة الماضية.

10   9   8   7   6   5   4   3   2   1   0

أسوأ ما يمكن تصوره من الألم   لا يوجد ألم

6. من فضلك حدد درجة ألمك بوضع دائرة حول الرقم الذي يصف مستوى ألمك **الآن**.

10   9   8   7   6   5   4   3   2   1   0

أسوأ ما يمكن تصوره من الألم   لا يوجد ألم

صفحة 1 من 2

</div>

الوقت _ _ _ _ _ التاريخ: _ _ _ _ / _ _ _ _ / _ _ _ _

الاسم: _ _ _ _ _ _ _ _ _ _ _ _   _ _ _ _ _ _ _ _ _ _ _   _ _ _ _ _ _ _ _ _ _ _

الأوسط   الأول   الأخير

7.   ما هي أنواع العلاج أو الأدوية التي لمعالجة الألم؟

8.   خلال الأربع والعشرين ساعة الماضية، إلى أي مدى أراحك العلاج أو الأدوية التي أعطيت لك، من فضلك ضع دائرة حول النسبة المئوية التي توضح الارتياح:

100%   90%   80%   70%   60%   50%   40%   30%   20%   10%   0%

ارتياح كامل   لم يحصل
                                                                      أي ارتياح

9.   ضع دائرة حول الرقم الذي يصف مدى الإعاقة أو العرقلة التي سببها لك الألم خلال الأربع والعشرين ساعة الماضية في النواحي التالية:

أ.   النشاط العام

10   9   8   7   6   5   4   3   2   1   0
إعاقة   لا إعاقة
كاملة

ب.   المزاج

10   9   8   7   6   5   4   3   2   1   0
إعاقة   لا إعاقة
كاملة

ج.   القدرة على المشي

10   9   8   7   6   5   4   3   2   1   0
إعاقة   لا إعاقة
كاملة

د.   العمل العادي (يشمل ذلك العمل خارج المنزل والعمل المنزلي)

10   9   8   7   6   5   4   3   2   1   0
إعاقة   لا إعاقة
كاملة

هـ   العلاقات مع الناس الآخرين

10   9   8   7   6   5   4   3   2   1   0
إعاقة   لا إعاقة
كاملة

ف.   النوم

10   9   8   7   6   5   4   3   2   1   0
إعاقة   لا إعاقة
كاملة

ز.   الاستمتاع بالحياة

10   9   8   7   6   5   4   3   2   1   0
إعاقة   لا إعاقة
كاملة

Appendix C

TSQM 1.4 (Arabic Version)

TSQM (نسخة 1.4)

استبانة حول الرضا عن المعالجة بالدواء

الإرشادات: نرجو تخصيص بعض الوقت للتفكير بمستوى رضاك أو عدم رضاك عن الدواء الذي تتناوله في هذه التجربة الطبية. يهمنا معرفة تقييمك لفعالية الدواء وأعراضه الجانبية ومدى سهولة استخدامه على مدى فترة الأسبوعين إلى الثلاثة أسابيع الماضية، أو منذ المرة الأخيرة التي استخدمته فيها. لكل سؤال، الرجاء وضع علامة صح بجانب الإجابة الأكثر تعبيراً عن تجربتك الخاصة مع الدواء.

1. ما مدى رضاك أو عدم رضاك عن قدرة الدواء على الوقاية من حالتك المرضية أو على علاجها؟

1 □ غير راضٍ الى أقصى الحدود

2 □ غير راضٍ جداً

3 □ غير راضٍ

4 □ راضٍ الى حد ما

5 □ راضٍ

6 □ راضٍ جداً

7 □ راضٍ الى أقصى الحدود

2. ما مدى رضاك أو عدم رضاك عن طريقة تخفيف الدواء للأعراض التي تعاني منها؟

1 □ غير راضٍ الى أقصى الحدود

2 □ غير راضٍ جداً

3 □ غير راضٍ

4 □ راضٍ الى حد ما

5 □ راضٍ

6 □ راضٍ جداً

7 □ راضٍ الى أقصى الحدود

3. ما مدى رضاك أو عدم رضاك عن الفترة الزمنية التي يستغرقها الدواء ليبدأ مفعوله؟

1 □ غير راضٍ الى أقصى الحدود

2 □ غير راضٍ جداً

3 □ غير راضٍ

4 □ راضٍ الى حد ما

5 □ راضٍ

6 □ راضٍ جداً

7 □ راضٍ الى أقصى الحدود

4. هل تعاني من أية أعراض جانبية نتيجة لتناولك الدواء؟

1 □ نعم

0 □ لا (إن كانت إجابتك لا، فالرجاء الإنتقال إلى السؤال رقم 9)

5. ما مدى تضايقك من الأعراض الجانبية للدواء الذي تتناوله لعلاج حالتك؟

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☐ 1 متضايق لأقصى الحدود

☐ 2 متضايق جداً

☐ 3 متضايق إلى حد ما

☐ 4 متضايق قليلاً

☐ 5 غير متضايق بتاتاً

6. إلى أي درجة تؤثر الأعراض الجانبية على صحتك البدنية وقدراتك الجسدية (أي القوة ومستويات الطاقة ... إلخ)؟

☐ 1 إلى حد كبير

☐ 2 إلى حد ملحوظ

☐ 3 بعض الشيء

☐ 4 إلى حد ضئيل

☐ 5 أبداً

7. إلى أي درجة تؤثر الأعراض الجانبية على قدرتك العقلية (أي القدرة على التفكير بصفاء والبقاء مستيقظاً ... إلخ) ؟

☐ 1 إلى حد كبير

☐ 2 إلى حد ملحوظ

☐ 3 بعض الشيء

☐ 4 إلى حد ضئيل

☐ 5 أبداً

8. إلى أية درجة أثرت الأعراض الجانبية للدواء على رضاك العام عنه؟

☐ 1 إلى حد كبير

☐ 2 إلى حد ملحوظ

☐ 3 بعض الشيء

☐ 4 إلى حد ضئيل

☐ 5 أبداً

9. ما مدى سهولة أو صعوبة إستخدام الدواء بشكله الحالي؟

☐ 1 صعب الى أقصى الحدود

☐ 2 صعب جداً

☐ 3 صعب

☐ 4 سهل بعض الشيء

☐ 5 سهل

☐ 6 سهل جداً

☐ 7 سهل إلى أقصى الحدود

10. ما مدى سهولة أو صعوبة تنظيم الوقت لإستخدام الدواء في كل مرة؟

☐ 1 صعب إلى أقصى الحدود

☐ 2 صعب جداً

☐ 3 صعب

☐ 4 سهل إلى حد ما

5 □ سهل

6 □ سهل جداً

7 □ سهل إلى أقصى الحدود

11. ما مدى مناسبة أو عدم مناسبة تناول الدواء حسب الإرشادات؟

1 □ غير مناسب بتاتاً

2 □ غير مناسب جداً

3 □ غير مناسب

4 □ مناسب إلى حد ما

5 □ مناسب

6 □ مناسب جداً

7 □ مناسب إلى أقصى الحدود

12. بشكل عام، إلى أي حد أنت واثق من أن تناول هذا الدواء مفيدٌ لك؟

1 □ غير متأكد بتاتاً

2 □ متأكد قليلاً

3 □ متأكد إلى حد ما

4 □ متأكد جداً

5 □ متأكد إلى أقصى الحدود

13. إلى أي حد أنت متأكد من أن إيجابيات الدواء الذي تتناوله تفوق سلبياته؟

1 □ غير متأكد بتاتاً

2 □ متأكد قليلاً

3 □ متأكد إلى حد ما

4 □ متأكد جداً

5 □ متأكد إلى أقصى الحدود

14. إذا أخذنا جميع الأمور بعين الإعتبار، ما مدى رضاك أو عدم رضاك عن هذا الدواء؟

1 □ غير راضٍ إلى أقصى الحدود

2 □ غير راضٍ جداً

3 □ غير راضٍ

4 □ راضٍ إلى حد ما

5 □ راضٍ

6 □ راضٍ جداً

7 □ راضٍ إلى أقصى الحدود

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Appendix D
IRB approval

An-Najah
National University
Health Faculty of medicine&
Sciences
IRB

جامعة النجاح
الوطنية
كلية الطب وعلوم الصحة
لجنة اخلاقيات البحث العلمي

Ref: F.M. August /2020/2
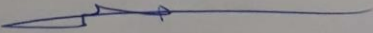
IRB Approval Letter

Study Title:

"Cancer-Related Post-Treatment Pain and Its Impact on Treatment Satisfaction with Medication in Breast Cancer Patients: A Cross Sectional Study from Palestine."

Submitted by:
Sa'ed H. Zyoud; Aiman Daifallah; Samah W. Al-Jabi; Husam Salameh

Date Approved:
4th August   2020

Your Study Title **"Cancer-Related Post-Treatment Pain and Its Impact on Treatment Satisfaction with Medication in Breast Cancer Patients: A Cross Sectional Study from Palestine."** was reviewed by An-Najah National University IRB committee and was approved on 4th August   2020.

Hasan Fitian, MD,

IRB Committee Chairman
An-Najah National University

IRB

Appendix E

Tables of Study

E.1

Treatment satisfaction questionnaire for medication (TSQM) domains

Effectiveness satisfaction domain	Frequency	Percent
Q1: satisfaction with prevention / treatment		
Extremely Dissatisfied	6	2.4
Very Dissatisfied	5	2.0
Dissatisfied	14	5.5
Somewhat Satisfied	54	21.3
Satisfied	87	34.3
Very Satisfied	72	28.3
Extremely Satisfied	16	6.3
Q2: satisfaction with symptoms relief		
Extremely Dissatisfied	6	2.4
Very Dissatisfied	5	2.0
Dissatisfied	16	6.3
Somewhat Satisfied	95	37.4
Satisfied	79	31.1
Very Satisfied	42	16.5
Extremely Satisfied	11	4.3
Q3: Satisfaction with time to start working		
Extremely Dissatisfied	3	1.2
Very Dissatisfied	24	9.4
Dissatisfied	34	13.4
Somewhat Satisfied	65	25.6
Satisfied	90	35.4
Very Satisfied	33	13.0
Extremely Satisfied	5	2.0
Side effects satisfaction domain	Frequency	Percent
Q5: Bother from side effects		
Extremely Bothersome	46	18.1
Very Bothersome	47	18.5
Somewhat Bothersome	43	16.9
A Little Bothersome	14	5.5
Not at All Bothersome	2	0.8
No answer	102	40.2
Q6: Impact of side effects on the body		
A Great Deal	59	23.2
Quite a Bit	52	20.5

	Frequency	Percent
Somewhat	24	9.4
Minimally	8	3.1
Not at All	9	3.5
No answer	102	40.2
Q7: Impact of side effects on the cognition		
A Great Deal	32	12.6
Quite a Bit	38	15
Somewhat	29	11.4
Minimally	20	7.9
Not at All	33	13
No answer	102	40.2
Q8: Impact of side effects on medication satisfaction		
A Great Deal	37	14.6
Quite a Bit	40	15.7
Somewhat	33	13
Minimally	23	9.1
Not at All	19	7.5
No answer	102	40.2
Convenience satisfaction Domain	Frequency	Percent
Q9: How easy to use the medication		
Very Difficult	13	5.1
Difficult	28	11
Somewhat Easy	26	10.2
Easy	96	37.8
Very Easy	73	28.7
Extremely Easy	18	7.1
Q10: Easy to organize the frequency of drug administration		
Extremely Difficult	1	0.4
Very Difficult	5	2
Difficult	22	8.7
Somewhat Easy	32	12.6
Easy	87	34.3
Very Easy	87	34.3
Extremely Easy	20	7.9
Q11: Intake Convenience		
Extremely Inconvenient	1	.4
Very Inconvenient	1	.4
Inconvenient	5	2.0
Somewhat Convenient	27	10.6
Convenient	157	61.8
Very Convenient	49	19.3
Extremely Convenient	14	5.5

Global Satisfaction Domain	Frequency	Percent
Q12: Confidence in benefits of medications		
Not at All Confident	13	5.1
A Little Confident	21	8.3
Somewhat Confident	77	30.3
Very Confident	109	42.9
Extremely Confident	34	13.4
Q13: Balance between advantages and bad disadvantages		
Not at All Certain	14	5.5
A Little Certain	28	11
Somewhat Certain	78	30.7
Very Certain	99	39
Extremely Certain	35	13.8
Q14: Overall medication satisfaction		
Extremely Dissatisfied	9	3.5
Very Dissatisfied	6	2.4
Dissatisfied	9	3.5
Somewhat Satisfied	58	22.8
Satisfied	94	37
Very Satisfied	66	26
Extremely Satisfied	12	4.7

E.2

Global Satisfaction score correlations

Variables	N	Median [IQR]	Mean Rank	*p*-value
Gender				
Male	1	Constant	195.50	0.350
Female	253	64.3 [50.0-78.6]	127.23	
Age category				
< 40 years old	24	60.7 [44.6-85.7]	130.42	
40-49 years	74	64.3 [50.0-78.6]	125.82	0.993
50-59 years	88	64.3 [50.0-78.6]	128.35	
≥60 years old	68	71.4 [50.0-78.6]	127.20	
Residency				
City	112	64.3 [50.0-78.6]	128.11	
Village	123	71.4 [50.0-78.6]	129.04	0.696
Palestinian Refugee's camp	19	64.3 [50.0-78.6]	113.89	
Marital status				
Single	35	71.4 [50.0-85.7]	137.49	0.383
Married	219	64.3 [50.0-78.6]	125.90	
Educational Level				
Elementary	18	67.9 [35.7-78.6]	124.86	
Preparatory	45	71.4 [57.4-78.6]	141.96	
Secondary	89	64.3 [50.0-78.6]	122.09	0.506
Diploma	35	71.4 [57.1-85.7]	139.51	
Bachelor's degree	50	64.3 [50.0-71.4]	116.80	
Uneducated	17	71.4 [50.0-78.6]	127.09	
Occupational status				
Private employee	23	64.3 [42.9-85.7]	132.48	
Government employee	32	67.9 [57.1-76.8]	133.00	0.448
Housewife	171	64.3 [50.0-78.6]	129.20	
Unemployed	28	57.1 [42.9-76.8]	106.71	
Income level				
Low (< 500 JD)	149	64.3 [50.0-78.6]	130.26	0.370
Moderate (500 -1000 JD)	97	64.3 [50.0-78.6]	126.06	
High (> 1000 JD)	8	53.6 [39.3-64.3]	93.50	
BMI Categories				
Underweight	4	78.6 [71.4-91.1]	194.13	
Normal weight	47	71.4 [50.0-78.6]	134.82	0.243
Overweight	105	64.3 [50.0-78.6]	125.26	
Obesity	98	64.3 [50.0-73.2]	123.67	
Smoking				
Smoker	28	64.3 [44.6-85.7]	127.55	0.581
Non-Smoker	191	64.3 [50.0-78.6]	125.33	
Ex-smoker	35	71.4 [57.1-78.6]	139.30	
Post-treatment pain				
Yes	144	57.1 [50.0-71.4]	112.43	0.000
No	110	71.4 [57.1-78.6]	147.22	

Type of Breast Cancer				
Invasive Ductal Carcinoma	237	64.3 [50.0-78.6]	127.26	
Invasive Lobular Carcinoma	11	71.4 [35.7-78.6]	126.59	0.481
Ductal Carcinoma in Situ	4	60.7 [35.7-75.0]	106.75	
Lobular Carcinoma in Situ	2	85.7	203.00	
Stage of Cancer				
Stage 1	36	64.3 [50.0-78.6]	127.90	
Stage 2	65	64.3 [42.9-78.6]	123.30	0.935
Stage 3	99	64.3 [57.1-78.6]	130.74	
Stage 4	54	64.3 [50.0-78.6]	126.35	
Current condition				
Cancer-free	146	67.9 [50.0-78.6]	131.84	
The tumor returned	20	60.7 [50.0-78.6]	120.33	0.543
Active and receiving treatment	88	64.3 [50.0-78.6]	121.93	
The last time received treatment				
0-3 months	232	64.3 [50.0-78.6]	127.55	
3-12 months	9	57.1 [35.7-78.6]	108.17	0.796
1-2 years	4	71.4 [32.1-83.9]	138.75	
> 2 years	9	71.4 [57.1-75.0]	140.67	
Post-treatment pain today?				
Yes	131	57.1 [50.0-71.4]	113.11	0.001
No	123	71.4 [57.1-78.6]	142.83	
Treatment type used				
Surgery				
Not done	49	71.4 [57.1-78.6]	140.97	0.150
Done	205	64.3 [50.0-78.6]	124.28	
Radiotherapy				
Not given	155	64.3 [50.0-78.6]	131.17	0.315
Given	99	64.3 [50.0-78.6]	121.75	
Hormonal therapy				
Not given	47	64.3 [57.2-78.6]	133.02	0.565
Given	207	64.3 [50.0-78.6]	126.25	
Chemotherapy				
Not given	36	57.1 [42.9-71.4]	96.89	0.007
Given	218	64.3 [50.0-78.6]	132.56	
Biological therapy				
Not given	190	64.3 [50.0-78.6]	125.24	0.394
Given	64	64.3 [57.1-78.6]	134.22	
Targeted therapy				
Not given	239	64.3 [50.0-78.6]	127.01	0.669
Given	15	64.3 [50.0-85.7]	135.30	
Pain medication use				
Do not use	83	71.4 [57.1-85.7]	155.32	0.000

Use	171	57.1 [50.0-71.4]	114.04	
Opioid use				
Not used	218	64.3 [50.0-78.6]	128.58	0.563
Used	36	64.3 [50.0-78.6]	120.99	
Paracetamol use				
Not used	91	71.4 [57.1-85.7]	154.52	0.000
Used	163	57.1 [50.0-71.4]	112.14	
NSAIDs use				
Not used	221	64.3 [50.0-78.6]	128.51	0.568
Used	33	64.3 [50.0-75.0]	120.74	
Non-Pharmaological pain releif use				0.694
Not used	233	64.3 [50.0-78.6]	128.04	
Used	21	71.4 [46.4-78.6]	121.50	
Total number of medications				
1-3 Medications	77	57.1 [46.4-78.6]	114.56	0.090
4-6 Medications	158	71.4 [55.4-78.6]	135.32	
≥7 Medications	19	64.3 [50.0-71.4]	114.89	
Side effects				
Yes	152	60.7 [44.6-78.6]	116.45	0.003
No	102	71.4 [57.1-78.6]	143.97	
Total	254			

*Mann-Whitney U and Kruskal-Wallis H

E.3

Effectivness Satisfaction score correlations

Variables	N	Median [IQR]	Mean Rank	P value
Gender				
Male	1	Constant	234.50	0.142
Female	253	61.1 [50.0-72.2]	127.08	
Age category				
Less than 40 years old	24	61.1 [50.0-72.2]	130.81	
40-49 years	74	58.3 [50.0-66.7]	114.58	0.213
50-59 years	88	63.9 [50.0-72.2]	138.72	
More than 60 years old	68	61.1 [50.0-66.7]	125.87	
Residency				
City	112	61.1 [50.0-72.2]	129.67	
Village	123	61.1 [50.0-72.2]	126.33	0.892
Palestinian Refugee's camp	19	61.1 [44.4-72.2]	122.26	
Marital status				
Single	35	66.7 [50.0-72.2]	136.44	0.435
Married	219	61.1 [50.0-72.2]	126.07	
Educational Level				
Elementary	18	58.3 [50.0-69.4]	119.33	
Preparatory	45	66.7 [50.0-83.3]	141.98	
Secondary	89	61.1 [50.0-72.2]	125.35	0.608
Diploma	35	66.7 [50.0-72.2]	135.06	
Bachelor's degree	50	61.1 [50.0-68.1]	116.46	
Uneducated	17	61.1 [47.2-66.7]	125.97	
Occupational status				
Private employee	23	66.7 [55.6-72.2]	142.22	
Government employee	32	66.7 [51.4-72.2]	144.80	0.203
Housewife	171	61.1 [50.0-72.2]	125.23	
Unemployed	28	55.6 [50.0-66.7]	109.52	
Income level				
Low (less than 500 JD)	149	61.1 [50.0-72.2]	130.53	
Moderate (500 -1000 JD)	97	61.1 [50.0-72.2]	125.64	0.358
High (more than 1000 JD)	8	52.8 [25.0-69.4]	93.56	
BMI Categories				
Underweight = <18.5	4	66.7 [52.8-80.6]	154.75	
Normal weight = 18.5–24.9	47	61.1 [50.0-72.2]	129.19	0.548
Overweight = 25–29.9	105	61.1 [50.0-72.2]	132.63	
Obesity = BMI of 30 or greater	98	61.1 [50.0-72.2]	120.08	
Smoking				0.514

Smoker	28	55.6 [44.4-72.2]	115.59	
Non-smoker	191	61.1 [50.0-72.2]	127.52	
X-smoker	35	66.7 [50.0-72.2]	136.91	
Post-treatment pain				
Yes	144	55.6 [50.0-72.2]	113.89	**0.001**
No	110	71.4 [57.1-78.6]	145.31	
Type of Breast Cancer				
Invasive Ductal Carcinoma	237	61.1 [50.0-72.2]	128.49	
Invasive Lobular Carcinoma	11	55.6 [44.4-61.1]	92.55	0.215
Ductal Carcinoma in Situ	4	58.3 [51.4-77.8]	129.50	
Lobular Carcinoma in Situ	2	75.0	198.50	
Stage of Cancer				
Stage 1	36	61.1 [50.0-72.2]	134.32	
Stage 2	65	61.1 [50.0-72.2]	125.82	0.767
Stage 3	99	61.1 [50.0-72.2]	130.42	
Stage 4	54	61.1 [50.0-72.2]	119.61	
Current condition				
Cancer-free	146	61.1 [50.0-72.2]	133.25	
The tumor returned	20	58.3 [37.5-70.8]	105.63	0.218
Active and receiving treatment	88	61.1 [50.0-72.2]	122.94	
Last time received treatment				
0-3 months	232	61.1 [50.0-72.2]	127.14	0.129
3-12 months	9	50.0 [41.7-61.1]	89.89	
1-2 years	4	75.0 [58.3-87.5]	185.13	
More than 2 years	9	66.7 [58.3-72.2]	148.89	
Post-treatment pain today?				
Yes	131	55.6 [50.0-72.2]	113.83	**0.002**
No	123	66.7 [55.6-72.2]	142.06	
Treatment type used				
Surgery				
Not done	49	66.7 [61.1-77.8]	156.55	**0.002**
Done	205	61.1 [50.0-72.2]	120.56	
Radiotherapy				
Not given	155	61.1 [50.0-72.2]	133.29	0.114
Given	99	61.1 [50.0-72.2]	118.44	
Hormonal therapy				
Not given	47	66.7 [50.0-72.2]	141.72	0.139
Given	207	61.1 [50.0-72.2]	124.27	
Chemotherapy				
Not given	36	61.1 [50.0-70.8]	115.86	0.301
Given	218	61.1 [50.0-72.2]	129.42	
Biological therapy				0.613
Not given	190	61.1 [50.0-72.2]	126.16	

Given	64	61.1 [50.0-72.2]	131.49	
Targeted therapy				
Not given	239	61.1 [50.0-72.2]	127.14	0.756
Given	15	61.1 [50.0-77.8]	133.17	
Pain medication use				
Don't use	83	66.7 [55.6-72.2]	148.19	**0.002**
Use	171	61.1 [50.0-72.2]	117.46	
Opioid use				
Not used	218	61.1 [50.0-72.2]	130.90	0.067
Used	36	55.6 [44.4-66.7]	106.89	
Paracetamol use				
Not used	91	66.7 [55.6-72.2]	149.73	**0.000**
Used	163	55.6 [50.0-66.7]	115.09	
NSAIDs use				
Not used	221	61.1 [50.0-72.2]	128.92	0.422
Used	33	61.1 [50.0-72.2]	117.98	
Non-Pharma use				
Not used	233	61.1 [50.0-72.2]	128.30	0.559
Used	21	61.1 [50.0-72.2]	118.60	
Total number of medications				
1-3 Medications	77	61.1 [50.0-72.2]	126.78	0.792
4-6 Medications	158	61.1 [50.0-72.2]	129.10	
More than or equal to 7 Medications	19	61.1 [50.0-66.7]	117.13	
Side effects				
Yes	152	55.6 [50.0-66.7]	111.91	**0.000**
No	102	66.7 [55.6-72.2]	150.74	
Total	**254**			

Mann-Whitney U and Kruskal-Wallis H

E.4

Side effects satisfaction score correlations

Variables	N	Median [IQR]	Mean Rank	*p*-value
Gender				0.401
Male	1	Constant	68.00	
Female	253	62.5 [31.25-100.0]	127.74	
Age category				**0.009**
< 40 years old	24	50.0 [28.1-93.8]	115.73	
40-49 years	74	50.0 [25.0-100.0]	113.11	
50-59 years	88	56.3 [31.3-100.0]	124.46	
≥ 60 years old	68	100.0 [34.4-100.0]	151.25	
Residency				0.509
City	112	56.25 [31.3-100.0]	126.21	
Village	123	68.75 [31.3-100.0]	131.17	
Palestinian Refugee's camp	19	43.75 [12.5-100.0]	111.37	
Marital status				0.594
Single	35	68.75 [31.3-100.0]	133.43	
Married	219	56.25 [31.3-100.0]	126.55	
Educational Level				0.167
Elementary	18	65.6 [32.8-100.0]	130.11	
Preparatory	45	100.0 [40.6-100.0]	149.09	
Secondary	89	50.0 [25.0-100.0]	120.16	
Diploma	35	56.25 [18.8-100.0]	118.84	
Bachelor's degree	50	50.0 [31.3-100.0]	119.20	
Uneducated	17	100.0 [34.4-100.0]	148.26	
Occupational status				0.429
Private employee	23	75.0 [37.5-100.0]	137.72	
Government employee	32	56.3 [43.8-100.0]	129.31	
Housewife	171	56.3 [25.0-100.0]	123.02	
Unemployed	28	90.6 [37.5-100.0]	144.39	
Income level				0.515
Low	149	81.3 [28.1-100.0]	131.71	
Moderate	97	56.3 [31.3-100.0]	121.05	
High	8	53.1 [31.3-100.0]	127.31	
BMI Categories				0.252
Underweight	4	50.0 [31.3-87.5]	119.13	
Normal weight	47	81.3 [43.8-100.0]	140.31	
Overweight	105	68.8 [31.3-100.0]	131.80	
Obesity	98	50.0 [25.0-100.0]	117.09	
Smoker				**0.029**
Yes	28	40.6 [12.5-76.6]	94.71	
No	191	68.8 [31.3-100.0]	132.71	
X-Smoker	35	56.3 [25.0-100.0]	125.29	
Post-treatment pain				**0.000**
Yes	144	37.5 [18.8-68.8]	95.44	
No	110	100.0 [62.5-100.0]	169.47	

Type of Breast Cancer				0.751
Invasive Ductal Carcinoma	237	56.3 [31.3-100.0]	126.79	
Invasive Lobular Carcinoma	11	68.8 [25.0-100.0]	126.00	
Ductal Carcinoma in Situ	4	100.0 [39.1-100.0]	162.63	
Lobular Carcinoma in Situ	2	71.9	149.75	
Stage of Cancer				0.947
Stage 1	36	59.4 [21.9-100.0]	124.47	
Stage 2	65	62.5 [25.0-100.0]	124.68	
Stage 3	99	62.5 [31.3-100.0]	130.67	
Stage 4	54	56.3 [37.5-100.0]	127.09	
Current condition				0.391
Cancer-free	146	62.5 [25.0-100.0]	127.73	
The tumor returned	20	37.5 [12.5-100.0]	107.58	
Active and receiving treatment	88	56.3 [37.5-100.0]	131.64	
The last time received treatment				0.223
0-3 months	232	59.4 [31.3-100.0]	127.38	
3-12 months	9	37.5 [25.0-59.4]	91.89	
1-2 years	4	100.0 [48.4-100.0]	169.25	
> 2 years	9	100.0 [18.8-100.0]	147.72	
Post-treatment pain today?				**0.000**
Yes	131	37.5 [18.8-68.8]	97.69	
No	123	100.0 [56.3-100.0]	159.25	
Treatment type used **Surgery**				0.053
Not done	49	100.0 [40.6-100.0]	145.08	
Done	205	56.3 [25.0-100.0]	123.30	
Radiotherapy				0.690
Not given	155	62.5 [31.3-100.0]	128.92	
Given	99	56.3 [31.3-100.0]	125.28	
Hormonal therapy				0.319
Not given	47	68.8 [37.5-100.0]	136.80	
Given	207	56.3 [25.0-100.0]	125.39	
Chemotherapy				0.869
Not given	36	65.6 [25.0-100.0]	129.31	
Given	218	56.3 [31.3-100.0]	127.20	
Biological therapy				0.596
Not given	190	68.8 [25.0-100.0]	128.87	
Given	64	53.1 [37.5-100.0]	123.44	
Targeted therapy				0.605
Not given	239	62.5 [31.3-100.0]	128.08	
Given	15	43.8 [31.3-100.0]	118.30	
Pain medication use				
Do not use	83	100.0 [62.5-100.0]	165.77	**0.000**
Use	171	43.8 [25.0-100.0]	108.92	
Opioid use				0.055

Not used	218	65.6 [31.3-100.0]	130.98	
Used	36	43.8 [25.0-100.0]	106.44	
Paracetamol use				**0.000**
Not used	91	100 [56.3-100.0]	160.81	
Used	163	43.8 [25.0-100.0]	108.90	
NSAIDs use				0.363
Not used	221	62.5 [31.3-100.0]	129.06	
Used	33	50.0 [25.0-100.0]	117.03	
Non-Pharmaological pain releif use				0.102
Not used	233	62.5 [31.3-100.0]	129.69	
Used	21	37.5 [25.0-84.4]	103.24	
Total number of medications				0.304
1-3 Medications	77	75.0 [31.3-100.0]	133.79	
4-6 Medications	158	56.3 [31.3-100.0]	127.03	
≥7 Medications	19	43.8 [25.0-100.0]	105.87	
Side effects				**0.000**
Yes	152	37.5 [18.8-50.0]	76.84	
No	102	100.0	203.00	
Total	**254**			

*Mann-Whitney U and Kruskal-Wallis H

E.5

Convenience satisfaction score correlations

Variables	N	Median [IQR]	Mean Rank	*p*-value
Gender				0.116
Male	1	Constant	13.50	
Female	253	66.7 [61.1-77.8]	127.95	
Age category				0.539
< 40 years	24	66.7 [50.0-72.2]	107.69	
40-49 years	74	66.7 [61.1-77.8]	126.47	
50-59 years	88	66.7 [56.9-77.8]	131.01	
≥60 years	68	66.7 [61.1-77.8]	131.07	
Residency				0.445
City	112	66.7 [61.1-77.8]	133.63	
Village	123	66.7 [55.6-77.8]	121.60	
Palestinian Refugee's camp	19	66.7 [61.1-77.8]	129.55	
Marital status				0.466
Single	35	66.7 [66.7-83.3]	135.83	
Married	219	66.7 [61.1-77.8]	126.17	
Educational Level				0.703
Elementary	18	66.7 [50.0-79.2]	121.22	
Preparatory	45	72.2 [63.9-83.3]	142.08	
Secondary	89	66.7 [58.3-77.8]	121.39	
Diploma	35	66.7 [55.6-77.8]	122.86	
Bachelor's degree	50	69.4 [61.1-77.8]	132.22	
Uneducated	17	66.7 [61.1-77.8]	123.21	
Occupational status				0.359
Private employee	23	72.2 [66.7-83.3]	145.46	
Government employee	32	72.2 [56.9-77.8]	138.91	
Housewife	171	66.7 [61.1-77.8]	125.00	
Unemployed	28	66.7 [45.8-77.8]	114.98	
Income level				0.461
Low	149	66.7 [61.1-77.8]	132.15	
Moderate	97	66.7 [55.6-77.8]	121.46	
High	8	66.7 [50.0-72.2]	114.13	
BMI Categories				0.459
Underweight	4	75.0 [51.4-94.4]	154.00	
Normal weight	47	72.2 [61.1-83.3]	139.78	
Overweight	105	66.7 [61.1-77.8]	126.77	
Obesity	98	66.7 [59.7-77.8]	121.31	
Smoking				0.232
Smoker	28	72.2 [62.5-87.5]	148.07	
Non-Smoker	191	66.7 [61.1-77.8]	123.64	
X-Smoker	35	66.7 [61.1-83.3]	132.11	
Post-treatment pain				**0.000**
Yes	144	66.7 [55.6-72.2]	107.47	
No	110	75.0 [66.7-83.3]	153.72	
Type of Breast Cancer				0.194

Invasive Ductal Carcinoma	237	66.7 [61.1-77.8]	126.19	
Invasive Lobular Carcinoma	11	72.2 [61.1-77.8]	126.86	
Ductal Carcinoma in Situ	4	72.2 [66.7-81.9]	155.25	
Lobular Carcinoma in Situ	2	88.9	231.00	
Stage of Cancer				**0.001**
Stage 1	36	77.8 [66.7-83.3]	156.08	
Stage 2	65	72.2 [61.1-83.3]	144.71	
Stage 3	99	66.7 [61.1-77.8]	119.82	
Stage 4	54	66.7 [55.6-72.2]1	101.81	
Current condition				**0.000**
Cancer-free	146	72.2 [66.7-83.3]	146.27	
The tumor returned	20	66.7 [47.2-66.7]	84.73	
Active and receiving treatment	88	66.7 [55.6-72.2]	106.09	
The last time received treatment				0.670
0-3 months	232	66.7 [61.1-77.8]	128.90	
3-12 months	9	66.7 [47.2-77.8]	109.72	
1-2 years	4	69.4 [62.5-80.6]	137.00	
> 2 years	9	66.7 [50.0-72.2]	105.00	
Post-treatment pain today?				**0.000**
Yes	131	66.7 [55.6-72.2]	107.08	
No	123	72.2 [66.7-83.3]	149.25	
Treatment type used Surgery				0.445
Not done	49	66.7 [58.3-77.8]	120.37	
Done	205	66.7 [61.1-77.8]	129.20	
Radiotherapy				0.774
Not given	155	66.7 [61.1-77.8]	126.45	
Given	99	66.7 [61.1-77.8]	129.14	
Hormonal therapy				**0.001**
Not given	47	66.7 [50.0-66.7]	96.94	
Given	207	66.7 [61.1-77.8]	134.44	
Chemotherapy				0.128
Not given	36	72.2 [66.7-77.8]	144.57	
Given	218	66.7 [61.1-77.8]	124.68	
Biological therapy				**0.001**
Not given	190	72.2 [61.1-77.8]	135.94	
Given	64	66.7 [55.6-72.2]	102.45	
Targeted therapy				0.263
Not given	239	66.7 [61.1-77.8]	128.78	
Given	15	66.7 [44.4-77.8]	107.10	
Pain medication use				**0.000**
Do not use	83	77.8 [66.7-83.3]	163.78	
Use	171	66.7 [55.6-72.2]	109.89	
Opioid use				**0.000**
Not used	218	66.7 [61.1-77.8]	134.01	
Used	36	63.9 [50.0-66.7]	88.10	
Paracetamol use				**0.000**

Not used	91	77.8 [66.7-83.3]	159.11	
Used	163	66.7 [55.6-77.8]	109.85	
NSAIDs use				0.182
Not used	221	66.7 [61.1-77.8]	129.86	
Used	33	66.7 [52.8-72.2]	111.73	
Non-Pharmaological pain releif use				**0.007**
Not used	233	66.7 [61.1-77.8]	131.21	
Used	21	61.1 [50.0-69.4]	86.38	
Total number of medications				0.168
1-3 Medications	77	66.7 [61.1-77.8]	136.62	
4-6 Medications	158	66.7 [61.1-77.8]	126.10	
≥7 Medications	19	66.7 [50.0-72.2]	102.21	
Side effects				**0.001**
Yes	152	66.7 [51.4-77.8]	115.60	
No	102	69.4 [66.7-83.3]	145.24	
Total	**254**			

Mann-Whitney U and Kruskal-Wallis H

E.6

Global satisfaction score correlations with medications

Variables	N	Median [IQS]	Mean Rank	*P value*
Letrozole				0.831
Not given	140	64.3 [50.0-78.6]	126.62	
Given	114	64.3 [50.0-78.6]	128.58	
Tamoxifen				0.128
Not given	141	71.4 [50.0-78.6]	133.74	
Given	113	64.3 [50.0-78.6]	119.72	
Goserelin				0.546
Not given	218	64.3 [50.0-78.6]	128.62	
Given	36	60.7 [50.0-71.4]	120.69	
Exemestane				0.944
Not given	219	64.3 [50.0-78.6]	127.37	
Given	35	64.3 [50.0-78.6]	128.30	
Fulvestrant				0.832
Not given	248	64.3 [50.0-78.6]	127.35	
Given	6	71.4 [46.4-78.6]	133.75	
Leuprolide				0.229
Not given	253	64.3 [50.0-78.6]	127.85	
Given	1	64.3 [50.0-78.6]	40.00	
Anastrozole				0.387
Not given	247	64.3 [50.0-78.6]	128.17	
Given	7	57.1 [35.7-78.6]	104.00	
Adriamycin				0.221
Not given	113	64.3 [50.0-78.6]	121.24	
Given	141	64.3 [50.0-78.6]	132.51	
Cyclophosphamide				**0.018**
Not given	72	57.1 [44.6-78.6]	110.25	
Given	182	71.4 [57.1-78.6]	134.32	
Paclitaxel				0.058
Not given	118	60.7 [50.0-78.6]	118.19	
Given	136	67.9 [57.1-78.6]	135.58	
Docetaxel				0.131
Not given	221	64.3 [50.0-78.6]	130.17	
Given	33	57.1 [46.4-75.0]	109.59	
Carboplatin				0.773
Not given	246	64.3 [50.0-78.6]	127.74	
Given	8	60.7 [51.8-78.6]	120.19	
Capecitabine				0.138
Not given	226	64.3 [50.0-78.6]	129.89	
Given	28	60.7 [44.6-76.8]	108.21	
Gemcitabine				0.166
Not given	240	64.3 [50.0-78.6]	129.03	
Given	14	57.1 [35.7-73.2]	101.25	
Vinorelbine				0.522
Not given	245	64.3 [50.0-78.6]	128.06	

Given	9	64.3 [25.0-78.6]	112.22	
Fluorouracil				0.423
Not given	220	64.3 [50.0-78.6]	126.06	
Given	34	71.4 [57.1-78.6]	136.84	
Methotrexate				0.361
Not given	228	64.3 [50.0-78.6]	126.09	
Given	26	71.4 [55.4-78.6]	139.88	
Epirubicin				0.987
Not given	247	64.3 [50.0-78.6]	127.49	
Given	7	71.4 [42.9-71.4]	127.93	
Oxaliplatin				0.178
Not given	253	64.3 [50.0-78.6]	127.11	
Given	1	64.3 [50.0-78.6]	225.50	
Trastuzumab				0.371
Not given	195	64.3 [50.0-78.6]	125.25	
Given	59	64.3 [57.1-78.6]	134.95	
Pertuzumab				0.198
Not given	249	64.3 [50.0-78.6]	126.66	
Given	5	78.6 [57.1-89.3]	169.10	
Bevacizumab				0.350
Not given	253	64.3 [50.0-78.6]	127.23	
Given	1	64.3 [50.0-78.6]	195.50	
Palbociclib				0.942
Not given	250	64.3 [50.0-78.6]	127.54	
Given	4	64.3 [41.1-82.1]	124.88	
Ribociclib				0.631
Not given	253	64.3 [50.0-78.6]	127.64	
Given	1	64.3 [50.0-78.6]	92.50	
Lapatinib				0.841
Not given	250	64.3 [50.0-78.6]	127.62	
Given	4	60.7 [46.4-80.4]	120.25	
Everolimus				0.910
Not given	247	64.3 [50.0-78.6]	127.41	
Given	7	71.4 [42.9-78.6]	130.57	
Total	**254**			

E.7

Effectivness satisfaction score correlations with medications

Variables	N	Median [IQS]	Mean Rank	P value
Letrozole				0.865
Not given	140	61.1 [50.0-72.2]	128.20	
Given	114	61.1 [50.0-72.2]	126.64	
Tamoxifen				0.055
Not given	141	61.1 [50.0-72.2]	135.37	
Given	113	61.1 [50.0-66.7]	117.69	
Goserelin				**0.046**
Not given	218	61.1 [50.0-72.2]	131.21	
Given	36	55.6 [45.8-65.3]	105.01	
Exemestane				0.652
Not given	219	61.1 [50.0-72.2]	128.32	
Given	35	61.1 [50.0-66.7]	122.34	
Fulvestrant				0.311
Not given	248	61.1 [50.0-72.2]	128.22	
Given	6	55.6 [37.5-66.7]	97.67	
Leuprolide				0.660
Not given	253	61.1 [50.0-72.2]	127.63	
Given	1		95.50	
Anastrozole				0.925
Not given	247	61.1 [50.0-72.2]	127.57	
Given	7	66.7 [38.9-66.7]	124.93	
Adriamycin				0.711
Not given	113	61.1 [50.0-72.2]	125.61	
Given	141	61.1 [50.0-72.2]	129.02	
Cyclophosphamide				0.325
Not given	72	61.1 [50.0-66.7]	120.34	
Given	182	61.1 [50.0-72.2]	130.33	
Paclitaxel				**0.035**
Not given	118	61.1 [50.0-66.7]	117.16	
Given	136	61.1 [50.0-72.2]	136.47	
Docetaxel				0.092
Not given	221	61.1 [50.0-72.2]	130.48	
Given	33	55.6 [50.0-66.7]	107.53	
Carboplatin				0.532
Not given	246	61.1 [50.0-72.2]	126.98	
Given	8	61.1 [51.4-87.5]	143.38	
Capecitabine				0.261
Not given	226	61.1 [50.0-72.2]	129.31	
Given	28	58.3 [50.0-66.7]	112.88	
Gemcitabine				0.071
Not given	240	61.1 [50.0-72.2]	129.50	
Given	14	52.8 [43.1-61.1]	93.25	
Vinorelbine				0.771
Not given	245	61.1 [50.0-72.2]	127.76	

Given	9	61.1 [50.0-66.7]	120.56	
Fluorouracil				0.222
Not given	220	61.1 [50.0-72.2]	129.70	
Given	34	55.6 [50.0-66.7]	113.28	
Methotrexate				0.693
Not given	228	61.1 [50.0-72.2]	128.11	
Given	26	58.3 [50.0-72.2]	122.15	
Epirubicin				0.887
Not given	247	61.1 [50.0-72.2]	127.39	
Given	7	61.1 [50.0-66.7]	131.36	
Oxaliplatin				0.343
Not given	253	61.1 [50.0-72.2]	127.23	
Given	1	61.1 [50.0-72.2]	196.50	
Trastuzumab				0.237
Not given	195	61.1 [50.0-72.2]	124.53	
Given	59	61.1 [50.0-72.2]	137.33	
Pertuzumab				**0.025**
Not given	249	61.1 [50.0-72.2]	126.04	
Given	5	72.2 [69.4-80.6]	200.00	
Bevacizumab				0.098
Not given	253	61.1 [50.0-72.2]	127.02	
Given	1	61.1 [50.0-72.2]	248.00	
Palbociclib				0.583
Not given	250	61.1 [50.0-72.2]	127.18	
Given	4	63.9 [51.4-80.6]	147.38	
Ribociclib				0.124
Not given	253	61.1 [50.0-72.2]	127.94	
Given	1	61.1 [50.0-72.2]	15.50	
Lapatinib				0.956
Not given	250	61.1 [50.0-72.2]	127.53	
Given	4	58.3 [51.4-73.6]	125.50	
Everolimus				0.946
Not given	247	61.1 [50.0-72.2]	127.45	
Given	7	61.1 [50.0-77.8]	129.36	
Total	**254**			

*Mann-Whitney U

E.8

Side effects satisfaction score correlations with medications

Variables	N	Median [IQS]	Mean Rank	*P value*
Letrozole				0.935
Not given	140	59.4 [31.3-100.0]	127.83	
Given	114	62.5 [25.0-100.0]	127.10	
Tamoxifen				0.089
Not given	141	75.0 [31.3-100.0]	134.27	
Given	113	56.3 [25.0-100.0]	119.06	
Goserelin				0.146
Not given	218	62.5 [31.3-100.0]	130.13	
Given	36	50.0 [18.8-100.0]	111.58	
Exemestane				0.101
Not given	219	62.5 [31.3-100.0]	130.42	
Given	35	43.8 [25.0-100.0]	109.23	
Fulvestrant				0.947
Not given	248	62.5 [31.3-100.0]	127.45	
Given	6	53.1 [40.6-100.0]	129.42	
Leuprolide				0.525
Not given	253	62.5 [31.3-100.0]	127.68	
Given	1		82.50	
Anastrozole				0.140
Not given	247	56.3 [31.3-100.0]	126.39	
Given	7	100.0 [56.25-100.0]	166.50	
Adriamycin				0.151
Not given	113	75.0 [31.3-100.0]	134.63	
Given	141	50.0 [31.3-100.0]	121.78	
Cyclophosphamide				0.324
Not given	72	71.9 [31.3-100.0]	134.47	
Given	182	56.3 [31.3-100.0]	124.74	
Paclitaxel				0.608
Not given	118	68.8 [31.3-100.0]	129.95	
Given	136	56.3 [31.3-100.0]	125.38	
Docetaxel				0.160
Not given	221	62.5 [31.3-100.0]	129.92	
Given	33	43.8 [31.3-100.0]	111.30	
Carboplatin				0.658
Not given	246	56.3 [31.3-100.0]	127.14	
Given	8	81.3 [23.4-100.0]	138.44	
Capecitabine				0.801
Not given	226	62.5 [31.3-100.0]	127.89	
Given	28	50.0 [32.8-100.0]	124.32	
Gemcitabine				0.473
Not given	240	62.5 [31.3-100.0]	128.27	
Given	14	46.9 [25.0-100.0]	114.29	
Vinorelbine				0.969
Not given	245	62.5 [31.3-100.0]	127.47	

Given	9	43.8 [31.3-100.0]	128.39	
Fluorouracil				0.333
Not given	220	56.3 [31.3-100.0]	125.81	
Given	34	100.0 [23.4-100.0]	138.46	
Methotrexate				0.395
Not given	228	56.3 [31.3-100.0]	126.22	
Given	26	100.0 [17.2-100.0]	138.71	
Epirubicin				0.938
Not given	247	62.5 [31.3-100.0]	127.56	
Given	7	50.0 [31.3-100.0]	125.43	
Oxaliplatin				0.286
Not given	253	56.3 [31.3-100.0]	127.20	
Given	1		203.00	
Trastuzumab				0.394
Not given	195	68.8 [31.3-100.0]	129.59	
Given	59	50.0 [37.5-100.0]	120.60	
Pertuzumab				0.617
Not given	249	56.3 [31.3-100.0]	127.18	
Given	5	62.5 [40.6-100.0]	143.20	
Bevacizumab				0.286
Not given	253	62.3 [31.3-100.0]	127.20	
Given	1		203.00	
Palbociclib				0.904
Not given	250	59.4 [31.3-100.0]	127.43	
Given	4	53.1 [43.8-90.6]	131.75	
Ribociclib				0.286
Not given	253	56.3 [31.3-100.0]	127.20	
Given	1	61.1 [50.0-72.2]	203.00	
Lapatinib				0.532
Not given	250	59.4 [31.3-100.0]	127.85	
Given	4	53.1 [28.1-78.1]	105.50	
Everolimus				0.499
Not given	247	62.5 [31.3-100.0]	128.01	
Given	7	31.3 [25.0-100.0]	109.64	
Total	**254**			

Mann-Whitney U

E.9

Convenience satisfaction score correlations with medications

Variables	N	Median [IQS]	Mean Rank	*p value*
Letrozole				0.094
Not given	140	66.7 [55.6-77.8]	120.60	
Given	114	66.7 [61.1-77.8]	135.98	
Tamoxifen				**0.038**
Not given	141	66.7 [55.6-77.8]	119.03	
Given	113	72.2 [63.9-77.8]	138.07	
Goserelin				0.796
Not given	218	66.7 [61.1-77.8]	127.98	
Given	36	66.7 [55.6-77.8]	124.60	
Exemestane				0.564
Not given	219	66.7 [61.1-77.8]	128.55	
Given	35	66.7 [55.6-77.8]	120.91	
Fulvestrant				0.186
Not given	248	66.7 [61.1-77.8]	128.44	
Given	6	63.9 [54.2-68.1]	88.67	
Leuprolide				0.295
Not given	253	66.7 [61.1-77.8]	127.80	
Given	1		51.50	
Anastrozole				**0.004**
Not given	247	66.7 [61.1-77.8]	129.70	
Given	7	55.6 [33.3-61.1]	49.79	
Adriamycin				**0.005**
Not given	113	72.2 [66.7-77.8]	141.86	
Given	141	66.7 [55.6-77.8]	115.99	
Cyclophosphamide				0.568
Not given	72	66.7 [61.1-77.8]	131.65	
Given	182	66.7 [61.1-77.8]	125.86	
Paclitaxel				0.140
Not given	118	69.4 [61.1-77.8]	134.73	
Given	136	66.7 [61.1-77.8]	121.22	
Docetaxel				**0.008**
Not given	221	66.7 [61.1-77.8]	132.16	
Given	33	66.7 [50.0-69.4]	96.32	
Carboplatin				0.337
Not given	246	66.7 [61.1-77.8]	128.29	
Given	8	63.9 [51.4-79.2]	103.19	
Capecitabine				**0.022**
Not given	226	66.7 [61.1-77.8]	131.19	
Given	28	63.9 [50.0-72.2]	97.71	
Gemcitabine				**0.026**
Not given	240	66.7 [61.1-77.8]	129.95	
Given	14	61.1 [50.0-66.7]	85.46	
Vinorelbine				0.142
Not given	245	66.7 [61.1-77.8]	128.78	

Given	9	61.1 [52.8-72.2]	92.56	
Fluorouracil				0.069
Not given	220	66.7 [61.1-77.8]	124.24	
Given	34	72.2 [66.7-83.3]	148.59	
Methotrexate				0.053
Not given	228	66.7 [61.1-77.8]	124.52	
Given	26	75.0 [66.7-83.3]	153.62	
Epirubicin				0.327
Not given	247	66.7 [61.1-77.8]	128.25	
Given	7	66.7 [61.1-66.7]	100.93	
Oxaliplatin				0.432
Not given	253	66.7 [61.1-77.8]	127.27	
Given	1		184.50	
Trastuzumab				**0.002**
Not given	195	72.2 [61.1-77.8]	135.14	
Given	59	66.7 [55.6-72.2]	102.25	
Pertuzumab				0.899
Not given	249	66.7 [61.1-77.8]	127.42	
Given	5	72.2 [55.6-77.8]	131.60	
Bevacizumab				0.220
Not given	253	66.7 [61.1-77.8]	127.15	
Given	1		216.50	
Palbociclib				0.852
Not given	250	66.7 [61.1-77.8]	127.61	
Given	4	66.7 [61.1-77.8]	120.75	
Ribociclib				0.295
Not given	253	66.7 [61.1-77.8]	127.80	
Given	1		51.50	
Lapatinib				**0.012**
Not given	250	66.7 [61.1-77.8]	128.95	
Given	4	47.2 [40.3-58.3]	36.75	
Everolimus				0.580
Not given	247	66.7 [61.1-77.8]	127.93	
Given	7	61.1 [55.6-77.8]	112.50	
Total	**254**			

*Mann-Whitney U

E.10

convenience satisfaction score correlations

Variables	Unstandardized coefficients (B)	S.E	Standardized coefficient (Beta)	P value	Lower Bound	Upper Bound	Tolerance
Pain Severity score	-.006	.132	-.004	0.963	-.266	.254	.358
Pain interference score	-.088	.060	-.119	0.144	-.207	.030	.505
Post-treatment pain	2.248	2.794	.072	0.422	-3.256	7.753	.421
Post-treatment pain today	-.113	3.062	-.004	0.970	-6.145	5.918	.344
Use of pain medication	-5.108	5.693	-.154	0.371	-16.324	6.107	.113
Presence of side effects	1.455	2.206	.046	0.510	-2.891	5.801	.689
Use on non-pharma pain relief	-5.423	3.401	-.096	0.112	-12.122	1.277	.919
Cancer stage	-2.190	1.142	-.136	0.056	-4.440	.060	.666
Current condition	-.524	1.258	-.031	0.677	-3.002	1.954	.586
Hormonal	3.703	2.616	.093	0.158	-1.451	8.857	.781
Biological	-.461	2.331	-.013	0.844	-5.053	4.132	.787
Paracetamol	.616	5.373	.019	0.909	-9.969	11.201	.121
Opioid use	-2.446	2.935	-.055	0.405	-8.227	3.335	.769

Linear Regression

جامعــــة النجاح الوطنية

كليـــة الدراســـات العليـــا

الآلم المرتبط بعلاج السرطان وتأثيره على الرضى عن علاج مرضى
سرطان الثدي: دراسة مقطعية من فلسطين

إعداد

أيمن حسين محمد ضيف الله

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الملخص

مقدمة: آلام ما بعد العلاج المرتبط بالسرطان من أهم المشاكل التي تواجه مرضى سرطان الثدي. يستخدم في علاج مرض السرطان العديد من الأدوية والتي تختلف من حيث الفعالية والأعراض الجانبية التي تؤثر بها على المرضى. لسوء الحظ مرضى السرطان يعانون من جودة حياة منخفضة نتيجة عدم معالجة الألم المرتبط بهذه الأدوية. هذه الدراسة سوف تقوم بتقييم قدرة هذه الأدوية على إرضاء مرضى السرطان من ناحية أمانها وفعاليتها.

الهدف: بحث أثر الألم المرتبط بعلاج السرطان (شدته واعاقته) على رضى المرضى عن العلاج في مختلف مراحل المرض.

المنهجية: دراسة مقطعية تمت في مستشفى الوطني الحكومي ومستشفى النجاح الجامعي في مدينة نابلس. تم قياس شدة الألم ودرجة اعاقته عن طريق أداة (قائمة مختصرة بالألم) BPI، كما وتم تقييم رضى المرضى عن العلاج باستخدام (إستبيان حول الرضى عن المعالجة بالدواء) TSQM.

نتائج: تم مقابلة 254 مريض في هذه الدراسة، كلهم من النساء مع معدل أعمار وانحراف معياري 53.1 ± 10.7 سنوات. تم قياس رضا المرضى عن الأدوية المُبلغ عنها باستخدام الدرجات الوسيطة لـ 4 مجالات (الرضى عن الفعالية 61.0 [50.0-72.2]، الرضى عن الآثار الجانبية 59.4 [31.3-

ب

100.0]، الرضى عن الراحة 66.7 [77.8-61.1]، الرضى الكلي 64.3 [50.0-78.6]). كانت هناك ارتباطات سلبية معتبرة (0.05> p) بين شدة الألم والرضى عن الفعالية (0.258- = r، 0.319- على التوالي) والآثار الجانبية (0.414- = r، 0.514- على التوالي) والراحة (0.274- = r، - 0.307، على التوالي)، والرضى الكلي (0.293- = r، 0.287- ، على التوالي). أشارت نتائج تحليل الانحدار إلى وجود ارتباط مستقل بين استخدام العلاج الكيميائي ودرجة الرضى الكلية المرتفعة (القيمة الاحتمالية = 0.011). أيضًا ، ارتبط انخفاض درجة اعاقة الألم (القيمة الاحتمالية = 0.01) والمرضى الذين لم يعانوا آثار جانبية (القيمة الاحتمالية = 0.47) بشكل مستقل بدرجات رضى أعلى عن الفعالية. أخيرًا، ارتبطت درجات اعاقة الألم المنخفضة (القيمة الاحتمالية <0.001)، والمرضى الذين لا يعانون من آلام ما بعد العلاج (القيمة الاحتمالية = 0.034)، والمرضى الذين لم يعانوا من آثار جانبية، بشكل مستقل بدرجات رضى أعلى عن الآثار الجانبية.

الخلاصة: المرضى الذين عانوا من آلام ما بعد العلاج، والآثار الجانبية، واعاقة عالية من الألم مع وظائفهم كان لديهم درجات رضى أقل عن العلاج. يوصى بإدارة أفضل لأدوية العلاج والآثار الجانبية وأدوية تخفيف الألم لتعزيز رضاهم وجودة حياتهم.

كلمات مفتاحية: سرطان الثدي، الآلام المرتبطة بعلاج السرطان، رضى المرضى عن العلاج، ألم، سرطان، قائمة مختصرة بالألم، استبيان عن الرضى عن المعالجة بالدواء.