







Psychological Distress, Coping Strategies, and Quality of Life in Breast Cancer Patients Under Neoadjuvant Therapy: Protocol of a Systematic Review

Cancer Control
Volume 29: 1–13
© The Author(s) 2022
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/10732748221074735
journals.sagepub.com/home/ccx


Majid Omari, MPH^{1,2,3} , Btissame Zarrouq, PhD^{1,4} , Lamiae Amaadour, MD⁵ , Zineb Benbrahim, MD⁵, Achraf El Asri, PhD¹, Nawfel Mellas, MD⁵, Karima El Rhazi, MD, PhD¹, Mohammed El Amine Ragala, PhD^{2,4} , and Karima Halim, PhD^{2,6} 

Abstract

Introduction: Women with breast cancer eligible for neoadjuvant therapy (NAT) present a disorder of biopsychosocial variables and alteration of their quality of life. They cope with this changing by adopting psychological adjustment strategies, either passive or active. This systematic review aims to investigate the psychological distress, coping strategies, and quality of life in breast cancer patients under neoadjuvant therapy.

Methods: Cochrane Library, PubMed, ScienceDirect, Scopus, Web of Science, and Wiley Online library represent the databases that were searched to identify relevant published articles until September 27, 2021. Full-text published articles, written in English and assessing the main outcomes (namely: psychological distress, coping strategies, and quality of life) in women with breast cancer under NAT will be included. Also, we will integrate papers dealing with the related bio psychosocial variables to the main variables. The paper selection, data extraction, and quality assessment of selected studies will be performed independently by two researchers, and disagreements will be resolved through discussions. We will bring together the results of all of the included studies to draw conclusions based on the body of evidence. The narrative approach will be adopted to analyze the results and conclusions extracted and we would perform quantitative groupings if we have similar data.

Ethics and dissemination: Ethical approval is not required as the proposed systematic review will not use primary data. The results of this review will be disseminated through publication in a peer-reviewed journal and conference presentation(s). PROSPERO registration number: CRD42021230300.

Keywords

Breast neoplasms, neoadjuvant therapy, psychological distress, depression, anxiety, adaptation, psychological, quality of life

¹Laboratory of Epidemiology and Research in Health Sciences, Faculty of Medicine and Pharmacy, Sidi Mohammed Ben Abdallah University, Fez, Morocco

²Laboratory of Natural Substances, Pharmacology, Environment, Modeling, Health & Quality of Life, Faculty of Sciences Dhar El Mahraz, Sidi Mohamed Ben Abdallah University, Fez, Morocco

³Department of nursing care and health techniques, oncology hospital, Hassan II University Hospital, Fez, Morocco

⁴Teacher's Training College (Ecole Normale Supérieure), Department of Biology and Geology, Sidi Mohammed Ben Abdallah University, Fez, Morocco

⁵Department of Medical Oncology, Hassan II University Hospital, Fez, Morocco

⁶Teachers Training College (Ecole Normale Supérieure), Department of Human and Social Sciences - Education Sciences, Sidi Mohamed Ben Abdallah University, Fez, Morocco

Corresponding Author:

Majid Omari, Laboratory of Natural Substances, Pharmacology, Environment, Modeling, Health & Quality of Life, Faculty of Sciences Dhar El Mahraz, Sidi Mohamed Ben Abdallah University, B.P. 1796 Fès-Atlas, 30003, Morocco.

Email: majid.omari@usmba.ac.ma



Creative Commons Non Commercial CC BY-NC: This article is distributed under the terms of the Creative Commons Attribution-NonCommercial 4.0 License (<https://creativecommons.org/licenses/by-nc/4.0/>) which permits non-commercial use, reproduction and distribution of the work without further permission provided the original work is attributed as specified on the SAGE and

Open Access pages (<https://us.sagepub.com/en-us/nam/open-access-at-sage>).

Introduction

Breast cancer (BC) is the second most common cancer all over the world with 2,088,849 new cases in 2018 and is the most common cancer in the female population with a global incidence of 46.3/100,000 women and 626,679 death cases.¹ BC is a heterogeneous disease with different molecular subtypes. It is routinely performed by immunohistochemical analyses in order to mark different subgroups and serve as biomarkers for therapeutic decisions.^{2,3}

Locally advanced breast cancer (LABC) represents a variety of tumors ranging from slow-growing cancer to rapidly proliferating and aggressive cancers.⁴ LABC is defined by the size of the tumor that exceeds 50 mm, which implies the skin of the breast/chest wall, supra/infraclavicular lymph nodes, or multiple axillary lymph nodes.⁵ This includes T3 or T4 and N2 or N3 tumors (stage IIB-T3N0 to stage III).⁶ Studies show that 4% of patients with BC have LABC in Europe, 8.5% in America,⁷ while the situation is alarming in developing countries with an incidence rate between 33% and 77%.⁴ For patients with LABC, neoadjuvant therapy (NAT) is recommended to reduce the extent of surgery and to facilitate breast-conserving surgery^{8,9} or to reduce the size of LABC previously considered unresectable.^{5,10,11}

NAT provides potential opportunities for predicting response¹² and allows rapid assessment for the development of suitable therapy for BC¹³ by seeking its benefits from the early stages of cancer. That is why the National Comprehensive Cancer Network (NCCN) BC guidelines¹⁴ recommend consideration of NAT for women with LABC as an integral part of the multi-modality approach including also surgery, radiotherapy, hormonal therapy, and/or targeted therapy.

Thereby, preoperative or NAT, initially used for LABC has become more common in patients with the BC operable, especially those with larger primary tumors.^{15,16} It is based either on cycles of neoadjuvant chemotherapy (NACT) or neoadjuvant endocrine therapy (NET).^{3,17}

NACT was introduced in BC treatment in the 1970s^{18,19} to reduce the stage of the LABC disease (inoperable) and make it operable. Anthracycline and taxane-based regimens are the standard primary NACT for LABC.¹⁴ In general, the most commonly used combination is the bi-weekly (dose-dense) or tri-weekly (doxorubicin-cyclophosphamide) combination, followed by 12 weekly paclitaxel or four tri-weekly cycles of docetaxel and its efficacy has been previously demonstrated.²⁰ For HER2-positive BC, NACT includes administration of chemotherapy with anti-HER2 monoclonal antibodies, such as trastuzumab and pertuzumab.^{3,21} While Neoadjuvant endocrine therapy (NET) may be beneficial for LABC patients with estrogen receptors (ER) positive or progesterone receptors (PR) positive since it can decrease the tumor size and improve breast-conserving surgery rates.²² Two applications of NET are possible, the first inhibits the production of estrogen used by aromatase inhibitors (AI) including letrozole, anastrozole, and exemestane, or by luteinizing hormone-

releasing hormone agonists in premenopausal women. The second approach targets the ER itself and is used by drugs such as tamoxifen or fulvestrant.^{23,24} In most cases, the administration of NET lasts 3 to 6 months.²⁵ Researchers have studied^{26,27} the efficacy of NET and found promising results in ER-positive BC patients, leading them to suggest it may be less toxic than NACT.

During the period of diagnosis and administration of CTNA, patients are often exposed to unpleasant changes and physical symptoms. They also experience discomfort²⁸⁻³² and deleterious effects on their quality of life and especially on their psychological state.³³ Among these symptoms, peripheral neuropathy can be caused by antineoplastic agents such as taxanes. It is characterized by numbness, paresthesia, and pain.³⁴⁻³⁷ Also, NACT can cause persistent pain³⁸⁻⁴⁰ which is associated with poor quality of life after treatment.⁴¹⁻⁴³ In the study of Saibil et al,⁴⁴ 87% of BC patients reported they suffered pain during anthracycline or taxane chemotherapy and 79% confirmed experiencing their worst pain during treatment with taxane. Fatigue remains a well-known side effect of chemotherapy⁴⁵ and can negatively impact multiple facets of a patient's life.⁴⁶ Several studies have shown fatigue occurs even before the start of treatment.^{47,48} Therefore, fatigue especially in association with pain or other symptoms can increase anxiety and depression.⁴⁹ Emesis is another side effect of NACT⁵⁰ and it occurs highly with the combination of doxorubicin (anthracyclines) and cyclophosphamide.⁵¹ In addition, patients who undergo NACT usually develop alopecia, which causes psychological distress and may affect the body image and quality of life.⁵² In phase II neoadjuvant trial,⁵³ the therapy with epirubicin (anthracyclines) and docetaxel (taxanes) was evaluated in patients with large, operable breast carcinoma or LABC, and with inflammatory breast carcinoma. A clinically significant proportion of patients (25%) suffered from diarrhea, 43.3% from oral mucositis, and 26.6% from emesis. Also, 80% of them developed grade 4 neutropenia, while one third suffered febrile neutropenia.

On the other side, it is well documented that cancer and its treatment are linked to alarming psychological disorders^{54,55} which may vary depending on types and combinations of therapy, dosages, and number of treatment cycles, as well as other individual correlates such as age, comorbidity, level of social support, and coping strategies.^{56,57} Psychological distress is the most prevalent in BC⁵⁸ and it negatively affects the quality of life⁵⁹ and increases the risk of mortality.^{60,61} If the psychological distress of BC patients was ignored and left untreated⁶² and was not recognized by the care team, and if no support has been provided to improve their psychological state, certain problems arise, namely, the non-compliance with treatment,^{63,64} the non-participation in therapeutic decisions, and the increase in the number of patients visits which will be stressful for the oncology team.⁶⁵ In general, psychological distress refers to anxiety and/or depression symptoms^{58,66,67} which are the most documented disorders affecting two-thirds of women with BC.⁶⁸⁻⁷⁰ Meta-analyses have found that

depression and anxiety are very common among BC patients, with a percentage of 32.2% and 41.9% 71, 72, respectively.^{71,72} There is evidence that depression and anxiety may contribute to the suffering of patients, impair their physical capacity and quality of life, affect their ability to adhere to therapy, and also lead to mortality of those patients.^{60,73}

All of these aroused physical and psychological symptoms increasingly interfere with the daily life of BC patients by limiting their social roles within the family and the community.⁷⁴ They develop negative feelings, causing poor perceptions of their self-image, disrupting their sexuality, and lowering their self-esteem. Moreover, the stigma associated with surgery can also create a great deal of stress and troubles, causing women to adopt different coping strategies.^{75,76} However, the coping strategies mobilized by the patients differ and take several forms, such as emotional expression, positive cognitive restriction, the practice of certain exercises such as yoga, acceptance of the disease, wishful thinking, religious practice, and social and family support.⁷⁷ Coping strategies used by women with cancer are important elements of psychosocial adjustment that protect patients from psychosocial distress.⁷⁸ Adjustment to neoplastic disease is an issue of coping not only with the illness itself but also with its side effects, such as pain, uncomfortable feelings, and other changes affecting the quality of life in the long term.^{79,80} In one study, it was found that BC patients on chemotherapy with a low level of anxiety tend to use a problem-solving strategy to deal with their anxiety,⁸¹ while depression symptoms increased with lowered positive reframing, higher acceptance, self-blame, and negative body image.⁸² Patients with BC who used approach-focused coping strategies, (for example, fatalism, social support, future perspective, and fighting spirit) reported fewer feelings of depression and anxiety and reported better quality of life.⁸² Positive psychological attributes (like optimism) and adaptive coping strategies such as seeking solutions to problems, seeing the positive aspects of cancer, and sharing feelings related to cancer, all help improve psychological adjustment and quality of life.⁸³ Religious coping and spirituality can also reduce depression, improve quality of life and increase feelings of control, especially if women with BC have a positive perception of God and adopt acceptance as a coping strategy.⁸⁴⁻⁸⁶

Due to the particular characteristics of the pathway of patients who are candidates for NAT that differ from other current treatment options like primary surgery and because of critical times such as the moment of diagnosis, NAT sessions and their side effects, the moments of the clinical, radiological, and histological response of NAT and to other expected steps management, namely, surgery, radiotherapy, and if necessary hormone therapy or targeted chemotherapy, it becomes relevant to explore the psychological distress, the quality of life and to study patients' attempts to adapt during this treatment.

In this regard, we believe that the establishment of a systematic review on this topic would be enriching of literature and will provide answers to the needs of these patients. Our research has shown that since the 1990s, several systematic reviews and meta-analyses have evaluated this variable in breast cancer. These reviews either looked at one of these variables^{71,72,87-93} or related to a particular type of breast cancer^{70,94-96} or a particular time of their therapy or are examined during a specific treatment modality^{64,97-101} or in breast cancer survivors.^{68,102,103} However, these studies did not examine any of these variables specifically in patients who were receiving NAT. Thus, our primary objective of the systematic review which we will carry out is to identify the best available evidence related to psychological distress, strategies adjustment, and quality of life in BC patients receiving NAT. The secondary objectives of our systematic review are (a) to explore other psychological, social aspects, and the symptoms reported by patients during neoadjuvant therapy, (b) to understand the experiences of patients and the problems they live during neoadjuvant therapy, and (c) to assess different interventions implemented to improve aforementioned variables. Thus, the results of this systematic review will assist clinicians in improving their management skills and knowledge, as well as highlight potential areas for additional strategy plans to promote the mental health of patients and their quality of life and to support them in adopting effective adjustment strategies during NAT.

Methods

This article presents a protocol of a systematic review, written according to the Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols guidelines (PRISMA-P), as shown in the PRISMA-P checklist in [supplemental file 1](#).¹⁰⁴ This protocol presents an objective and clear procedure for maximizing information extraction from articles that study psychological distress, coping strategies, and quality of life, and which have been reported separately or jointly in patients receiving neoadjuvant chemotherapy. The protocol has been registered at the International Prospective Register of Systematic Reviews (PROSPERO) under the registration number: CRD42021230300, which is available at: https://www.crd.york.ac.uk/prospero/display_record.php?RecordID=230300.

This protocol's registration in the PROSPERO database and the publication of this article will ensure transparency in the writing process for the full text of the systematic review and improve the writing of the content based on reviewers' comments.

Inclusion and Exclusion Criteria

We focus on the PICOS (population, intervention, comparison, Outcome of the included studies) as the basis for determining which studies can be grouped for synthesizing study characteristics.

Population

This review will consider studies that include women aged over 18 with breast cancer under one of two neoadjuvant treatments, either chemotherapy or endocrine therapy. Neoadjuvant chemotherapy is given to a patient with LABC, including generally T3 or T4, and N2 or N3 tumors (according to the TNM classification). For Neoadjuvant endocrine therapy, it offered for patients with strongly hormone-positive tumors.

Intervention

Studies will be included if they have assessed any intervention applied to diagnose and assess psychological distress, mobilized coping strategies, and aspects of quality of life. We are also interested to Studies which assess the other psychological and physical correlates and any intervention used to manage and prevent these different variables.

Comparison

We focus on studies that compare the changes in the outcomes studied concerning the time (T) of diagnosis of breast cancer and the different steps of administration of neoadjuvant therapy. For example: T0 corresponds to stage of diagnosis and before administration of NAT and T1 corresponds to moment after NAT and before surgery, or Tn with n corresponds to the NAT cycle number.

We also include all studies dealing with comparisons between groups of patients with breast cancer under NAT compared to patients undergoing the first surgery or compared to other cancerous pathologies treated by a NAT.

Outcomes

Following the definition of psychological distress in the NCCN¹⁰⁵ Guidelines for Managing Distress that it considers as “a multifactorial and unpleasant experience of a psychological (i.e., cognitive, behavioral, emotional), social, spiritual nature. and/or physical which may interfere with the ability to effectively cope with cancer, its physical symptoms and treatment”, We draw from this definition the main and secondary outcomes related to the psychological situation in patients with breast cancer candidates for NAT. We consider psychosocial distress, depression, anxiety, coping strategies, and quality of life in breast cancer patients ongoing NAT as the main outcomes. As regards the quality of life, we prefer to introduce above all its component dimensions, in particular the psychological, social, and physical dimensions. Moreover, we consider secondary main outcomes the following concepts: patient information and decision support, social support, physical symptoms, patient perception, and experiences.

Thus, studies will be included if they have objectively measured or explored this main or secondary outcomes, separately or jointly, in patients receiving neoadjuvant chemotherapy.

Type of Studies

Studies eligible for inclusion in this review were those using an observational study design (e.g., cross-sectional, prospective, case-control, and retrospective designs, with a quantitative and/or qualitative method) and examining the outcomes, primary and/or secondary, or the associations between them. This systematic review also will include psychological interventions, randomized controlled trials, experimental pharmacological studies that assessed and/or improved main and secondary outcomes.

Literature reviews, books, abstracts, letters, editorials, case reports, conference abstracts, abstracts of unpublished studies, grey literature will be excluded from the analysis.

Language

The systematic review will be limited to studies published in English.

Table 1 presents a summary of the PICOS elements that comprise the systematic review.

Information sources and search strategy

The following databases were searched to identify relevant articles published: Cochrane library, PubMed, ScienceDirect, Scopus, Web of Science, and Wiley Online library.

Bibliographic research was also extended to other sources and specific journals. Besides, the authors reviewed the reference lists of documents identified in certain journals (i.e., The Breast, Journal of Breast Cancer, The Lancet Oncology, J, The Breast Journal). The published articles were supplemented by a manual search of reference lists and a forward citation search using Google.

The search used Boolean operators to combine free text terms and/or Medical Subject Headings (MeSH) terms including:

- “Breast cancer”; Breast Neoplasms”;
- “neoadjuvant therapy,” “neoadjuvant,” “neo-adjuvant,” “Preoperative,” “chemotherapy,” “Primary systemic chemotherapy,” “neoadjuvant endocrine”;
- “psychological distress,” “depression,” “anxiety,” “anxiety disorders”; depressive disorder,” “Mental Disorders”;
- “Coping,” “adjustment,” “adaptation,” “mental,” “psychological,” “adaptation,” “psychological,” “behavior, coping,” “Social support,” “family support,” “Patient information,” “informational support”;
- “Quality of life,” “QOL,” “health-related quality of life,” “health-related quality of life,” “Health-related of QOL,” “HRQOL.”

The Table 2 presents the search strategies for articles published until September 27, 2021 in different databases. A total of 2.253 articles were obtained after searching the databases.

Table 1. A Summary of the PICOS Elements that Comprise the Systematic Review.

	Inclusion Criteria	Exclusion Criteria
Population	Studies that include women with breast cancer under NAT	Studies that include man with breast cancer
Interventions	<ul style="list-style-type: none"> - Studies that include any intervention applied to diagnose and assess psychological distress and mobilized coping strategies, also other psychological and physical correlates - Studies that include any intervention used to manage and prevent these different variables 	
Comparators	<ul style="list-style-type: none"> - Comparison of the changes in the variables in the different times of administration of NAT; - Comparison between groups of patients with breast cancer under NAT compared to patients undergoing the first surgery or compared to other cancerous localization treated by NAT 	
Outcomes	<p>Studies that include primary main outcomes:</p> <ul style="list-style-type: none"> - Psychological distress; - Depression; - Anxiety; - Coping strategies - Quality of life <p>Studies that include secondary main outcomes:</p> <ul style="list-style-type: none"> - Patient information; - Social support; - Cancer symptoms; - Patient perception and experiences 	
Type of studies	<p>Observational studies (cross-sectional, prospective, case-control and retrospective designs, with a quantitative and/or qualitative method) and randomized controlled trials;</p> <p>Experimental Pharmacological studies interventional studies related to the outcome will be included</p>	Literature reviews, books, abstracts, letter editorials, case reports and unpublished studies, abstracts and conference abstracts, grey literature
General	<ul style="list-style-type: none"> - Language of studies is limited to English - There will be no restrictions on the publication date of studies 	Studies not written in English

Data extraction

All articles and documents (n = 2.253) will be grouped and organized into collections using Zotero® reference management software. Each collection will have the name corresponding to each database. After all, research has been carried out, the references of each collection will be merged into a single Zotero® group which will subsequently be shared among the reviewers. We will then look for duplicates to identify them and merge them by relying on functions of the Zotero® software. We will export all the references of this group in a spreadsheet in CSV format and redefine the pre-determined fields for the bibliographic characteristics of each data. The redefinition of the fields will be limited to: Year of publication, authors, title, abstract, DOI, URL, document type. We will also add in the same spreadsheet two columns, one to show if each study will be included or not, and the other to show the reasons for the exclusions.

Two reviewers will carefully read the titles and abstracts of each document to exclude those that do not meet the criteria for inclusion (as per PICOS) and to establish a pre-final list of articles to be included.

The reviewers will proceed to read the full text of the papers selected for the pre-final list to eliminate those that do not meet

the criteria and design the final list of articles included in the systematic review. Disagreements between the two reviewers will be resolved through discussions with the other reviewers. Data extraction will be done in the same sheet.

The design of the PRISMA organization chart will be carried out based on the data extracted, specifying the number of duplicates, then analyzing the titles and summaries, as well as the full texts.

Analysis of Subgroups

Summary data for each article will be extracted into a data extraction form specifically designed for that journal. Summary tables will be created in Microsoft Office Excel for general information on the articles and information on the outcomes studied.

Among the General Information taken from each article, we will mention date and country of publication; sample size; type of study; age, ethnic origin, clinical data; NAT type and number of cycles.

Among the information related to outcomes, we will present the objectives of the study, the variables studied, the data collection instruments (questionnaire, interview, etc.), and the main results and conclusions.

Table 2. Search Strategy Until September 27, 2021.

	Research Operations in PubMed	Results
#14	#12 AND #13: (((“breast neoplasms”[MeSH Terms] OR (“breast”[All Fields] AND “neoplasms”[All Fields]) OR “breast neoplasms”[All Fields]) AND (“neoadjuvant therapy”[MeSH Terms] OR (“neoadjuvant”[All Fields] AND “therapy”[All Fields]) OR “neoadjuvant therapy”[All Fields] OR (“therapy”[All Fields] AND “neoadjuvant”[All Fields]) OR “therapy neoadjuvant”[All Fields])) AND (((((((“psychological distress”[MeSH Terms] OR (“psychological”[All Fields] AND “distress”[All Fields]) OR “psychological distress”[All Fields]) OR (“mental disorders”[MeSH Terms] OR (“mental”[All Fields] AND “disorders”[All Fields]) OR “mental disorders”[All Fields]) OR (“depressed”[All Fields] OR “depression”[MeSH Terms] OR “depression”[All Fields] OR “depressions”[All Fields] OR “depression s”[All Fields] OR “depressive disorder”[MeSH Terms] OR (“depressive”[All Fields] AND “disorder”[All Fields]) OR “depressive disorder”[All Fields] OR “depressivity”[All Fields] OR “depressive”[All Fields] OR “depressively”[All Fields] OR “depressiveness”[All Fields] OR “depressives”[All Fields])) OR (“anxiety disorders”[MeSH Terms] OR (“anxiety”[All Fields] AND “disorders”[All Fields]) OR “anxiety disorders”[All Fields]) OR (“adaptation, psychological”[MeSH Terms] OR (“adaptation”[All Fields] AND “psychological”[All Fields]) OR “psychological adaptation”[All Fields] OR (“behavior”[All Fields] AND “coping”[All Fields]) OR “behavior coping”[All Fields])) OR (“social adjustment”[MeSH Terms] OR (“social”[All Fields] AND “adjustment”[All Fields]) OR “social adjustment”[All Fields] OR (“adjustment”[All Fields] AND “social”[All Fields]) OR “adjustment social”[All Fields])) OR (“Access to Information”[Mesh]) OR (“decision support techniques”[MeSH Terms] OR (“decision”[All Fields] AND “support”[All Fields] AND “techniques”[All Fields]) OR “decision support techniques”[All Fields])) OR (“quality of life”[MeSH Terms] OR (“quality”[All Fields] AND “life”[All Fields]) OR “quality of life”[All Fields]))	325
#13	#3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #11: (((((((“psychological distress”[MeSH Terms] OR (“psychological”[All Fields] AND “distress”[All Fields]) OR “psychological distress”[All Fields]) OR (“mental disorders”[MeSH Terms] OR (“mental”[All Fields] AND “disorders”[All Fields]) OR “mental disorders”[All Fields])) OR (“depressed”[All Fields] OR “depression”[MeSH Terms] OR “depression”[All Fields] OR “depressions”[All Fields] OR “depression s”[All Fields] OR “depressive disorder”[MeSH Terms] OR (“depressive”[All Fields] AND “disorder”[All Fields]) OR “depressive disorder”[All Fields] OR “depressivity”[All Fields] OR “depressive”[All Fields] OR “depressively”[All Fields] OR “depressiveness”[All Fields] OR “depressives”[All Fields])) OR (“anxiety disorders”[MeSH Terms] OR (“anxiety”[All Fields] AND “disorders”[All Fields]) OR “anxiety disorders”[All Fields]) OR (“adaptation, psychological”[MeSH Terms] OR (“adaptation”[All Fields] AND “psychological”[All Fields]) OR “psychological adaptation”[All Fields] OR (“behavior”[All Fields] AND “coping”[All Fields]) OR “behavior coping”[All Fields])) OR (“social adjustment”[MeSH Terms] OR (“social”[All Fields] AND “adjustment”[All Fields]) OR “social adjustment”[All Fields] OR (“adjustment”[All Fields] AND “social”[All Fields]) OR “adjustment social”[All Fields])) OR (“Access to Information”[Mesh]) OR (“decision support techniques”[MeSH Terms] OR (“decision”[All Fields] AND “support”[All Fields] AND “techniques”[All Fields]) OR “decision support techniques”[All Fields])) OR (“quality of life”[MeSH Terms] OR (“quality”[All Fields] AND “life”[All Fields]) OR “quality of life”[All Fields]))	2,293,989
#12	#1 AND #2: (“breast neoplasms”[MeSH Terms] OR (“breast”[All Fields] AND “neoplasms”[All Fields]) OR “breast neoplasms”[All Fields]) AND (“neoadjuvant therapy”[MeSH Terms] OR (“neoadjuvant”[All Fields] AND “therapy”[All Fields]) OR “neoadjuvant therapy”[All Fields] OR (“therapy”[All Fields] AND “neoadjuvant”[All Fields]) OR “therapy neoadjuvant”[All Fields])	8826
#11	“Quality of life”[MeSH Terms] OR (“quality”[All Fields] AND “life”[All Fields]) OR “quality of life”[All Fields]	453,568
#10	“Decision support techniques”[MeSH Terms] OR (“decision”[All Fields] AND “support”[All Fields] AND “techniques”[All Fields]) OR “decision support techniques”[All Fields]	89,200
#9	“Access to Information”[Mesh]	7937
#8	“Social adjustment”[MeSH Terms] OR (“social”[All Fields] AND “adjustment”[All Fields]) OR “social adjustment”[All Fields] OR (“adjustment”[All Fields] AND “social”[All Fields]) OR “adjustment social”[All Fields]	43,613
#7	“Adaptation, psychological”[MeSH Terms] OR (“adaptation”[All Fields] AND “psychological”[All Fields]) OR “psychological adaptation”[All Fields] OR (“behavior”[All Fields] AND “coping”[All Fields]) OR “behavior coping”[All Fields]	147,125
#6	“Anxiety disorders”[MeSH Terms] OR (“anxiety”[All Fields] AND “disorders”[All Fields]) OR “anxiety disorders”[All Fields]	153,104
#5	“depressed”[All Fields] OR “depression”[MeSH Terms] OR “depression”[All Fields] OR “depressions”[All Fields] OR “depression s”[All Fields] OR “depressive disorder”[MeSH Terms] OR (“depressive”[All Fields] AND “disorder”[All Fields]) OR “depressive disorder”[All Fields] OR “depressivity”[All Fields] OR “depressive”[All Fields] OR “depressively”[All Fields] OR “depressiveness”[All Fields] OR “depressives”[All Fields]	552,125
#4	“mental disorders”[MeSH Terms] OR (“mental”[All Fields] AND “disorders”[All Fields]) OR “mental disorders”[All Fields]	1,365,877
#3	“psychological distress”[MeSH Terms] OR (“psychological”[All Fields] AND “distress”[All Fields]) OR “psychological distress”[All Fields]	48,499
#2	“neoadjuvant therapy”[MeSH Terms] OR (“neoadjuvant”[All Fields] AND “therapy”[All Fields]) OR “neoadjuvant therapy”[All Fields] OR (“therapy”[All Fields] AND “neoadjuvant”[All Fields]) OR “therapy neoadjuvant”[All Fields]	39,673
#1	“breast neoplasms”[MeSH Terms] OR (“breast”[All Fields] AND “neoplasms”[All Fields]) OR “breast neoplasms”[All Fields]	363,189
#12	Research operations in library Cochrane	Results
#12	#3 AND #11	31

(continued)

Table 2. (continued)

#11	#4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10	52603
#10	MeSH descriptor: [Decision support techniques] explode all	2518
#9	MeSH descriptor: [Quality of life] explode all trees	26204
#8	MeSH descriptor: [Psychological distress] explode all trees	167
#7	MeSH descriptor: [Depression] explode all trees	13147
#6	MeSH descriptor: [Anxiety disorders] explode all trees	7293
#5	MeSH descriptor: [Social support] explode all trees	3439
#4	MeSH descriptor: [Adaptation, Psychological] explode all trees	5448
#3	#1 AND #2	486
#2	MeSH descriptor: [Neoadjuvant Therapy] explode all trees	1277
#1	MeSH descriptor: [Breast Neoplasms] explode all trees	13764
Research operations in Web of science		Results
#5	#3 AND #4	708
#4	#1 AND #2	18,879
#3	TS = ("psychological distress" OR depression OR anxiety OR "anxiety disorders" OR "depressive disorder" OR "mental disorders" OR "mental health" OR "psychotherapy health" OR coping OR adjustment OR adaptation OR "mental adaptation" OR "mental adjustment" OR "Psychological adaptation" OR "psychological adjustment" OR "coping behavior" OR "social support" OR "social adjustment" OR "social adaptation" OR "family support" OR "patient information" OR "informational support" OR "aid decision" OR "decision support techniques" OR "access to information" OR "quality of life" OR "life quality" OR "health-related quality of life" OR "health-related quality of life" OR HRQOL OR QOL)	2,274,240
#2	TS = ("neoadjuvant therapy" OR neoadjuvant OR neo-adjuvant OR "preoperative chemotherapy" OR "primary systemic chemotherapy" OR "neoadjuvant endocrine" OR "neo-adjuvant endocrine")	64,025
#1	TS = (breast AND (neoplasms OR cancer))	598,822
Research operations in scopus		Results
	(TITLE-ABS-KEY ({Breast cancer} OR {Breast Neoplasms})) AND (TITLE-ABS-KEY ({neoadjuvant therapy} OR {neoadjuvant chemotherapy} OR {neo-adjuvant chemotherapy} OR {Preoperative chemotherapy} OR {Primary systemic chemotherapy} OR {neoadjuvant endocrine} OR {neo-adjuvant endocrine})) AND (TITLE-ABS-KEY ({psychological distress} OR depression OR anxiety OR {anxiety disorders} OR {depressive disorder} OR {Mental disorders} OR coping OR adjustment OR adaptation OR {adaptation psychological} OR {behavior coping} OR {social support} OR {family support} OR {Patient information} OR {informational support} OR {aid decision} OR {quality of life} OR {life quality} OR {Health-related Quality Of life} OR {Health related Quality Of life} OR {Health-related QOL} OR {Health related QOL} OR hrqol))	715
Research operations in sciencedirect		Results
	("breast neoplasms" AND ("neoadjuvant OR "neo-adjuvant")) AND ("psychological distress" OR "depression" OR "anxiety" OR "Coping" OR "adjustment" OR "quality of life")	311
Research operations in Wiley Online library		Results
	"breast OR "breast neoplasm" OR "breast cancer"" in Title and "neoadjuvant therapy" OR neoadjuvant OR "neo-adjuvant therapy" OR neo-adjuvant OR "preoperative chemotherapy" OR "primary systemic chemotherapy" OR "neoadjuvant endocrine" OR "neo-adjuvant endocrine" in Keywords and ""psychological distress" OR depression OR anxiety OR "anxiety disorders" OR "depressive disorder" OR "mental disorder" OR "mental health" OR "psychotherapy health" OR coping OR adjustment OR adaptation OR "mental adaptation" OR "mental adjustment" OR "psychological adaptation" OR "psychological adjustment" OR "coping behavior" OR "social support" OR "social adjustment" OR "social adaptation" OR "family support" OR "patient information" OR "informational support" OR "aid decision" OR "decision support techniques" OR "access to information" OR "quality of life" OR "life quality" OR "health-related quality of life" OR "health-related quality of life" OR HRQOL OR QOL" anywhere	160
Results of research in others ressources		03

By presenting the quantitative results of the included studies, we will see whether we will have the opportunity to establish a meta-analysis or not.

Discussion

The administration of NAT to women with breast cancer is an uncomfortable experience and influences the quality of life and social activities in women. However, to our knowledge, this is the first systematic review that will comprehensively assess biopsychosocial variables, coping strategies, and levels of quality of life in patients under this type of treatment. Several bibliographic databases will be systematically searched on the date of the search.

Conducting an inclusive search of major databases will maximize the coverage of original research studies on this

topic. We will undertake a narrative approach to synthesizing data. A complete analysis of the subgroups should lead to a better investigation of the variables to be studied.

Therefore, this systematic review will examine the psychological distress in patients during treatment administration and describe the degrees of depression and anxiety as well as the coping strategies they adopt. We will seek to assess their evolution from the first oncology consultations until the days following the administration of the last doses of neoadjuvant therapy.

Besides, we will analyze the adaptive role of the coping strategies mobilized by these patients and determine the biopsychosocial factors associated with the level of psychological distress and the types of coping strategies adopted.

Since the quality of life study would generally examine biological, psychological, and social aspects, we will also seek

Table 3. Quality Appraisal Checklist of a Qualitative Research.

Quality Appraisal Questions	Study Reference	Decision (Either "Yes," "No" or "Can't Tell")
1. Was there a clear statement of the aims of the research?		
2. Is a qualitative methodology appropriate?		
3. Was the research design process appropriate to address the aims of the research?		
4. Was the recruitment strategy appropriate to the aims of the research?		
5. Was the data collected in a way that addressed the research issue?		
6. Has the relationship between researcher and participants been adequately considered?		
7. Have ethical issues been taken into consideration?		
8. Was the data analysis sufficiently rigorous?		
9. Is there a clear statement of findings?		
10. How valuable is the research?		

Table 4. Qualsyst Quantitative Scoring Tool.

Questions for Quantitative Studies	Yes (2)	Partial (1)	No (0)	N/ A
1 Question/objective sufficiently described?				
2 Study design evident and appropriate?				
3 Method of subject/comparison group selection or source of information/input variables described and appropriate?				
4 Subject (and comparison group, if applicable) characteristics sufficiently described?				
5 If interventional and random allocation was possible, was it described?				
6 If interventional and blinding of investigators was possible, was it reported?				
7 If interventional and blinding of subjects was possible, was it reported?				
8 Outcome and (if applicable) exposure measure(s) well defined and robust to measurement/misclassification bias? Means of assessment reported?				
9 Sample size appropriate?				
10 Analytical methods described/justified and appropriate?				
11 Some estimate of variance is reported for the main results?				
12 Controlled for confounding?				
13 Results reported in sufficient detail?				
14 Conclusions supported by the results?				

to show those aspects of quality of life examined in the studies included in this systematic review and analyze their results.

Complete subgroup analysis should lead to a better investigation of the factors influencing the association of NAT in breast cancer with psychological distress, coping strategies, and quality of life. The results of the present study should provide a better understanding of the relationship between common mental health problems and biopsychosocial factors in these patients. This will provide a better understanding of the keys to the success of neoadjuvant therapy in breast cancer.

Quality Appraisal

Both authors used the Quallsyst tool¹⁰⁶ to assess the quality of the items included. This validated tool is used in systematic reviews since it makes it possible to evaluate the different types of studies, namely, qualitative and quantitative (Table 3 and Table 4).

Strength and Limitations of This Study

- The systematic review will produce a comprehensive assessment of the variables of psychological distress, coping strategies, and quality of life of patients with breast cancer receiving neoadjuvant chemotherapy;
- To our knowledge, no systematic review has been conducted to assess psychological aspects and the coping strategies adopted by women with breast cancer ongoing neoadjuvant therapy;
- The systematic review protocol is registered with the International Prospective Register of Systematic Reviews (PROSPERO) and is reported following Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P) statement;
- Non-English electronic databases will not be searched. This limitation may cause language bias.

Conclusion

This systematic review seeks to summarize the results of articles around psychological stress, quality of life, and coping strategies in breast cancer patients under NET. The outcomes of this systematic review will address this gap in the literature and provide insight into biopsychosocial factors of patients with advanced locally breast cancer during undergoing NET.

Moreover, these results provide an opportunity to implement specific interventions targeted at these patients such as educational and psychosocial support. Also, they would allow establishments to optimize and improve patient care during these treatments and train caregivers in best practices that function within the domain. From the synthesis of this systematic review, avenues for research on psycho-oncology in these patients could be also carried out.

Appendix

Abbreviations

BC	Breast cancer
LABC	Locally Advanced Breast Cancer
MeSH	Medical Subject Headings
NAT	Neoadjuvant therapy
NACT	Neoadjuvant chemotherapy
NET	Neoadjuvant endocrine therapy
PICOS	Population, Intervention, Comparison, Outcome, study
PROSPERO	International Prospective Register of Systematic Reviews
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PRISMA-P	Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This protocol research is supported by Moffitt Cancer Center under the NIH International Fogarty Center for the award number 5D43TW009804, PI Anna Giuliano.

Systematic Review Registration Number

International Prospective Register of Systematic Reviews (PROSPERO), registration number: CRD42021230300. Additions and possible modifications will also be recorded in PROSPERO to guarantee the criterion of transparency

ORCID iDs

Majid Omari  <https://orcid.org/0000-0002-7920-430X>

Btissame Zarrouq  <https://orcid.org/0000-0002-2996-8459>

Lamiae Amaadour  <https://orcid.org/0000-0002-8985-1447>

Mohammed El Amine Ragala  <https://orcid.org/0000-0001-5433-0804>

Karima Halim  <https://orcid.org/0000-0003-3601-6285>

Supplemental Material

Supplemental material for this article is available online.

References

1. Bray F, Ferlay J, Soerjomataram I, Siegel RL, Torre LA, Jemal A. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA A Cancer J Clin*. 2018;68(6):394-424. doi:10.3322/caac.21492.

2. Dittmer J. Breast cancer stem cells: Features, key drivers and treatment options. *Semin Cancer Biol.* 2018;53:59-74. doi:10.1016/j.semcancer.2018.07.007.
3. Hyder T, Bhattacharya S, Gade K, Nasrazadani A, Brufsky AM. Approaching neoadjuvant therapy in the management of early-stage breast cancer. *BCTT.* 2021;13:199-211. doi:10.2147/BCTT.S273058.
4. Tewari M, Krishnamurthy A, Shukla HS. Breast conservation in locally advanced breast cancer in developing countries: Wise or waste. *Surgical Oncology.* 2009;18(1):3-13. doi:10.1016/j.suronc.2008.07.004.
5. Yalcin B. Overview on locally advanced breast cancer: defining, epidemiology, and overview on neoadjuvant therapy. *Exp Oncol.* 2013;35(4):250-252.
6. Hoppe R, Phillips TL, Roach M. *Leibel and Phillips Textbook of Radiation Oncology.* 3rd ed. Amsterdam, Netherlands: Elsevier/Saunders; 2010. <https://www.sciencedirect.com/book/9781416058977/leibel-and-phillips-textbook-of-radiation-oncology>. Accessed November 1, 2020.
7. Allemani C, Sant M, Weir HK, et al. Breast cancer survival in the US and Europe: a CONCORD high-resolution study. *Int J Cancer.* 2013;132(5):1170-1181. doi:10.1002/ijc.27725.
8. Wang M, Chen H, Wu K, Ding A, Zhang M, Zhang P. Evaluation of the prognostic stage in the 8th edition of the American joint committee on cancer in locally advanced breast cancer: An analysis based on SEER 18 database. *Breast.* 2018;37:56-63. doi:10.1016/j.breast.2017.10.011.
9. Yang L, Fu B, Li Y, et al. Prediction model of the response to neoadjuvant chemotherapy in breast cancers by a Naive Bayes algorithm. *Comput Methods Progr Biomed.* 2020;192:105458. doi:10.1016/j.cmpb.2020.105458.
10. Mrkonjic M, Berman HK, Done SJ, Youngson B, Mulligan AM. Breast specimen handling and reporting in the post-neoadjuvant setting: challenges and advances. *J Clin Pathol.* 2019;72(2):120-132. doi:10.1136/jclinpath-2018-205598.
11. Viale G. Characterization and clinical impact of residual disease after neoadjuvant chemotherapy. *Breast.* 2013;22(suppl 2):S88-S91. doi:10.1016/j.breast.2013.07.016.
12. Sims AH, Bartlett JMS. Approaches towards expression profiling the response to treatment. *Breast Cancer Res.* 2008;10(6):115. doi:10.1186/bcr2196.
13. Bardia A, Baselga J. Neoadjuvant therapy as a platform for drug development and approval in breast cancer. *Clin Cancer Res.* 2013;19(23):6360-6370. doi:10.1158/1078-0432.CCR-13-0916.
14. National Comprehensive Cancer Network. *Breast Cancer Guidelines Version 7.2021;* 2021. <https://www.nccn.org/guidelines/guidelines-detail?category=1&id=1419>. Accessed September 3, 2021.
15. Rastogi P, Geyer CE, Mamounas EP, DeMichele A. Drug development: Neoadjuvant opportunities in breast cancer. *American Society of Clinical Oncology Educational Book.* 2013;33:73-79. doi:10.1200/EdBook_AM.2013.33.73.
16. Selli C, Sims AH. Neoadjuvant therapy for breast cancer as a model for translational research. *Breast Cancer.* 2019;13:1178223419829072. doi:10.1177/1178223419829072.
17. Poleszczuk J, Luddy K, Chen L, et al. Neoadjuvant radiotherapy of early-stage breast cancer and long-term disease-free survival. *Breast Cancer Res.* 2017;19(1):75. doi:10.1186/s13058-017-0870-1.
18. Asselain B, Barlow W, Bartlett J, et al. Long-term outcomes for neoadjuvant versus adjuvant chemotherapy in early breast cancer: meta-analysis of individual patient data from ten randomised trials. *Lancet Oncol.* 2018;19(1):27-39. doi:10.1016/S1470-2045(17)30777-5.
19. Rubens RD, Sexton S, Tong D, Winter PJ, Knight RK, Hayward JL. Combined chemotherapy and radiotherapy for locally advanced breast cancer. *Eur J Cancer.* 1980;16(3):351-356. doi:10.1016/0014-2964(80)90352-7.
20. Gianni L, Baselga J, Eiermann W, et al. Phase III trial evaluating the addition of paclitaxel to doxorubicin followed by cyclophosphamide, methotrexate, and fluorouracil, as adjuvant or primary systemic therapy: European cooperative trial in operable breast cancer. *J Clin Oncol.* 2009;27(15):2474-2481. doi:10.1200/JCO.2008.19.2567.
21. Gianni L, Pienkowski T, Im Y-H, et al. Efficacy and safety of neoadjuvant pertuzumab and trastuzumab in women with locally advanced, inflammatory, or early HER2-positive breast cancer (NeoSphere): a randomised multicentre, open-label, phase 2 trial. *Lancet Oncol.* 2012;13(1):25-32. doi:10.1016/S1470-2045(11)70336-9.
22. Madigan LI, Dinh P, Graham JD. Neoadjuvant endocrine therapy in locally advanced estrogen or progesterone receptor-positive breast cancer: determining the optimal endocrine agent and treatment duration in postmenopausal women—a literature review and proposed guidelines. *Breast Cancer Res.* 2020;22:77. doi:10.1186/s13058-020-01314-6.
23. Spring LM, Gupta A, Reynolds KL, et al. Neoadjuvant endocrine therapy for estrogen receptor-positive breast cancer. *JAMA Oncol.* 2016;2(11):1477-1486. doi:10.1001/jamaoncol.2016.1897.
24. Suman VJ, Ellis MJ, Ma CX. The alternate trial: assessing a biomarker driven strategy for the treatment of post-menopausal women with ER+/Her2- invasive breast cancer. *Chin Clin Oncol.* 2015;4(3):34. doi:10.3978/j.issn.2304-3865.2015.09.01.
25. Martí C, Sánchez-Méndez JI. The present and future of neoadjuvant endocrine therapy for breast cancer treatment. *Cancers.* 2021;13(11):2538. doi:10.3390/cancers13112538.
26. Llombart-Cussac A, Guerrero Á, Galán A, et al. Phase II trial with letrozole to maximum response as primary systemic therapy in postmenopausal patients with ER/PgR[+] operable breast cancer. *Clin Transl Oncol.* 2012;14(2):125-131. doi:10.1007/s12094-012-0771-9.
27. Ellis MJ, Coop A, Singh B, et al. Letrozole is more effective neoadjuvant endocrine therapy than tamoxifen for ErbB-1- and/or ErbB-2-positive, estrogen receptor-positive primary breast cancer: evidence from a phase III randomized trial. *J Clin Oncol.* 2001;19(18):3808-3816. doi:10.1200/JCO.2001.19.18.3808.
28. Fan G, Filipczak L, Chow E. Symptom clusters in cancer patients: a review of the literature. *Curr Oncol.* 2007;14(5):173-179. doi:10.3747/co.2007.145.

29. Nguyen J, Cramarossa G, Bruner D, et al. A literature review of symptom clusters in patients with breast cancer. *Expert Rev Pharmacoecon Outcomes Res.* 2011;11(5):533-539. doi:10.1586/erp.11.55.
30. Caruso R, Nanni MG, Riba MB, Sabato S, Grassi L. The burden of psychosocial morbidity related to cancer: patient and family issues. *Int Rev Psychiatr.* 2017;29(5):389-402. doi:10.1080/09540261.2017.1288090.
31. Hodgkinson K, Butow P, Hunt GE, Pendlebury S, Hobbs KM, Wain G. Breast cancer survivors' supportive care needs 2-10 years after diagnosis. *Support Care Cancer.* 2007;15(5):515-523. doi:10.1007/s00520-006-0170-2.
32. Kuo H-H, Chiu M-J, Liao W-C, Hwang S-L. Quality of sleep and related factors during chemotherapy in patients with stage I/II breast cancer. *J Formos Med Assoc.* 2006;105(1):64-69. doi:10.1016/S0929-6646(09)60110-8.
33. Berlière M, Roelants F, Watremez C, et al. The advantages of hypnosis intervention on breast cancer surgery and adjuvant therapy. *Breast.* 2018;37:114-118. doi:10.1016/j.breast.2017.10.017.
34. Swain SM, Arezzo JC. Neuropathy associated with microtubule inhibitors: diagnosis, incidence, and management. *Clin Adv Hematol Oncol.* 2008;6(6):455-467.
35. Park SB, Goldstein D, Krishnan AV, et al. Chemotherapy-induced peripheral neurotoxicity: a critical analysis. *CA A Cancer J Clin.* 2013;63(6):419-437. doi:10.3322/caac.21204.
36. Eckhoff L, Knoop A, Jensen MB, Ewertz M. Persistence of docetaxel-induced neuropathy and impact on quality of life among breast cancer survivors. *Eur J Cancer.* 2015;51(3):292-300. doi:10.1016/j.ejca.2014.11.024.
37. Hurtz H-J, Tesch H, Göhler T, et al. Persistent impairments 3 years after (neo)adjuvant chemotherapy for breast cancer: results from the MaTox project. *Breast Cancer Res Treat.* 2017;165(3):721-731. doi:10.1007/s10549-017-4365-7.
38. Gärtner R, Jensen M-B, Nielsen J, Ewertz M, Kroman N, Kehlet H. Prevalence of and factors associated with persistent pain following breast cancer surgery. *JAMA.* 2009;302(18):1985-1992. doi:10.1001/jama.2009.1568.
39. Kehlet H, Jensen TS, Woolf CJ. Persistent postsurgical pain: risk factors and prevention. *Lancet.* 2006;367(9522):1618-1625. doi:10.1016/S0140-6736(06)68700-X.
40. Jensen MP, Chang H-Y, Lai Y-H, Syrjala KL, Fann JR, Gralow JR. Pain in long-term breast cancer survivors: Frequency, severity, and impact. *Pain Med.* 2010;11(7):1099-1106. doi:10.1111/j.1526-4637.2010.00880.x.
41. Wang L, Guyatt GH, Kennedy SA, et al. Predictors of persistent pain after breast cancer surgery: a systematic review and meta-analysis of observational studies. *CMAJ (Can Med Assoc J).* 2016;188(14):E352-E361. doi:10.1503/cmaj.151276.
42. Hamood R, Hamood H, Merhasin I, Keinan-Boker L. Chronic pain and other symptoms among breast cancer survivors: prevalence, predictors, and effects on quality of life. *Breast Cancer Res Treat.* 2018;167(1):157-169. doi:10.1007/s10549-017-4485-0.
43. 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):725-746. doi:10.1016/j.jpain.2010.12.005.
44. Saibil S, Fitzgerald B, Freedman OC, et al. Incidence of taxane-induced pain and distress in patients receiving chemotherapy for early-stage breast cancer: A retrospective, outcomes-based survey. *Curr Oncol.* 2010;17(4):42-47. doi:10.3747/co.v17i4.562.
45. Biering K, Frydenberg M, Pappot H, Hjollund NH. The long-term course of fatigue following breast cancer diagnosis. *J Patient-Report Outcomes.* 2020;4(1):37. doi:10.1186/s41687-020-00187-9.
46. Berger AM, Mitchell SA, Jacobsen PB, Pirl WF. Screening, evaluation, and management of cancer-related fatigue: Ready for implementation to practice? *CA A Cancer J Clin.* 2015;65(3):190-211. doi:10.3322/caac.21268.
47. Cimprich B. Pretreatment symptom distress in women newly diagnosed with breast cancer. *Cancer Nurs.* 1999;22(3):185-194. doi:10.1097/00002820-199906000-00001.
48. Ancoli-Israel S, Liu L, Marler MR, et al. Fatigue, sleep, and circadian rhythms prior to chemotherapy for breast cancer. *Off J Multi Assoc Support Care Cancer.* 2006;14(3):201-209.
49. Stone P, Richards M, A'Hern R, Hardy J. A study to investigate the prevalence, severity and correlates of fatigue among patients with cancer in comparison with a control group of volunteers without cancer. *Ann Oncol.* 2000;11(5):561-567. doi:10.1023/a:1008331230608.
50. Grunberg SM, Warr D, Gralla RJ, et al. Evaluation of new antiemetic agents and definition of antineoplastic agent emetogenicity—state of the art. *Support Care Cancer.* 2011;19(suppl 1):S43-S47. doi:10.1007/s00520-010-1003-x.
51. Herrstedt J, Roila F, Warr D, et al. MASCC/ESMO consensus recommendations: Prevention of nausea and vomiting following high emetic risk chemotherapy. *Support Care Cancer.* 2017;25(1):277-288. doi:10.1007/s00520-016-3313-0.
52. Lemieux J, Maunsell E, Provencher L. Chemotherapy-induced alopecia and effects on quality of life among women with breast cancer: a literature review. *Psycho Oncol.* 2008;17(4):317-328. doi:10.1002/pon.1245.
53. de Matteis A, Nuzzo F, D'Aiuto G, et al. Docetaxel plus epirubicin as neoadjuvant treatment in patients with large operable or locally advanced carcinoma of the breast: a single-center, phase II study. *Cancer.* 2002;94(4):895-901. doi:10.1002/cncr.20335.abs.
54. Browall M, Brandberg Y, Nasic S, et al. A prospective exploration of symptom burden clusters in women with breast cancer during chemotherapy treatment. *Support Care Cancer.* 2017;25(5):1423-1429. doi:10.1007/s00520-016-3527-1.
55. Denieffe S, Gooney M. A meta-synthesis of women's symptoms experience and breast cancer. *Eur J Cancer Care.* 2011;20(4):424-435. doi:10.1111/j.1365-2354.2010.01223.x.
56. Gibbons A, Groarke A. Coping with chemotherapy for breast cancer: Asking women what works. *Eur J Oncol Nurs.* 2018;35:85-91. doi:10.1016/j.ejon.2018.06.003.
57. Miaskowski C, Cooper BA, Melisko M, et al. Disease and treatment characteristics do not predict symptom occurrence profiles in oncology outpatients receiving

- chemotherapy. *Cancer*. 2014;120(15):2371-2378. doi:10.1002/cncr.28699.
58. Bjerkeset E, Röhrl K, Schou-Bredal I. Symptom cluster of pain, fatigue, and psychological distress in breast cancer survivors: prevalence and characteristics. *Breast Cancer Res Treat*. 2020;180(1):63-71. doi:10.1007/s10549-020-05522-8.
 59. Kim JH, Paik H-J, Jung YJ, et al. A prospective longitudinal study about change of sleep, anxiety, depression, and quality of life in each step of breast cancer patients. *Oncology*. 2019;97(4):245-253. doi:10.1159/000500724.
 60. Shim E-J, Lee JW, Cho J, et al. Association of depression and anxiety disorder with the risk of mortality in breast cancer: A national health insurance service study in Korea. *Breast Cancer Res Treat*. 2020;179(2):491-498. doi:10.1007/s10549-019-05479-3.
 61. Linden W, Vodermaier A, Mackenzie R, Greig D. Anxiety and depression after cancer diagnosis: prevalence rates by cancer type, gender, and age. *J Affect Disord*. 2012;141(2-3):343-351. doi:10.1016/j.jad.2012.03.025.
 62. Lueboonthavatchai P. Prevalence and psychosocial factors of anxiety and depression in breast cancer patients. *J Med Assoc Thai*. 2007;90(10):2164-2174.
 63. Lin C, Clark R, Tu P, Bosworth HB, Zullig LL. Breast cancer oral anti-cancer medication adherence: a systematic review of psychosocial motivators and barriers. *Breast Cancer Res Treat*. 2017;165(2):247-260. doi:10.1007/s10549-017-4317-2.
 64. Mausbach BT, Schwab RB, Irwin SA. Depression as a predictor of adherence to adjuvant endocrine therapy (AET) in women with breast cancer: a systematic review and meta-analysis. *Breast Cancer Res Treat*. 2015;152(2):239-246. doi:10.1007/s10549-015-3471-7.
 65. Carlson LE, Bultz BD. Efficacy and medical cost offset of psychosocial interventions in cancer care: Making the case for economic analyses. *Psycho Oncol*. 2004;13(12):837-849. doi:10.1002/pon.832.
 66. Reinertsen KV, Cvancarova M, Loge JH, Edvardsen H, Wist E, Fossa SD. Predictors and course of chronic fatigue in long-term breast cancer survivors. *J Cancer Surviv*. 2010;4(4):405-414. doi:10.1007/s11764-010-0145-7.
 67. Mitchell AJ, Ferguson DW, Gill J, Paul J, Symonds P. Depression and anxiety in long-term cancer survivors compared with spouses and healthy controls: a systematic review and meta-analysis. *Lancet Oncol*. 2013;14(8):721-732. doi:10.1016/S1470-2045(13)70244-4.
 68. Maass SWMC, Roorda C, Berendsen AJ, Verhaak PFM, de Bock GH. The prevalence of long-term symptoms of depression and anxiety after breast cancer treatment: A systematic review. *Maturitas*. 2015;82(1):100-108. doi:10.1016/j.maturitas.2015.04.010.
 69. Pandey M, Sarita GP, Devi N, Thomas BC, Hussain BM, Krishnan R. Distress, anxiety, and depression in cancer patients undergoing chemotherapy. *World J Surg Oncol*. 2006;4:68. doi:10.1186/1477-7819-4-68.
 70. Reich M, Lesur A, Perdrizet-Chevallier C. Depression, quality of life and breast cancer: a review of the literature. *Breast Cancer Res Treat*. 2008;110(1):9-17. doi:10.1007/s10549-007-9706-5.
 71. Pilevarzadeh M, Amirshahi M, Afsargharehbagh R, Rafiemanesh H, Hashemi S-M, Balouchi A. Global prevalence of depression among breast cancer patients: a systematic review and meta-analysis. *Breast Cancer Res Treat*. 2019;176(3):519-533. doi:10.1007/s10549-019-05271-3.
 72. Hashemi S-M, Rafiemanesh H, Aghamohammadi T, et al. Prevalence of anxiety among breast cancer patients: a systematic review and meta-analysis. *Breast Cancer*. 2020;27(2):166-178. doi:10.1007/s12282-019-01031-9.
 73. Goodwin JS, Zhang DD, Ostir GV. Effect of depression on diagnosis, treatment, and survival of older women with breast cancer. *J Am Geriatr Soc*. 2004;52(1):106-111.
 74. Taylor-Ford M. Clinical considerations for working with patients with advanced cancer. *J Clin Psychol Med*. 2014;21(3):201-213. doi:10.1007/s10880-014-9398-z.
 75. Silva LC. Câncer de mama e sofrimento psicológico: aspectos relacionados ao feminino. *Psicol Estud*. 2008;13:231-237. doi:10.1590/S1413-73722008000200005.
 76. Alves PC, Santos MCL, Fernandes AFC. Stress and coping strategies for women diagnosed with breast cancer: a transversal study. *Online Braz J Nurs*. 2012;11(2):305-318. doi:10.5935/1676-4285.20120028.
 77. Al-Azri M, Al-Awisi H, Al-Moundhri M. Coping with a diagnosis of breast cancer-literature review and implications for developing countries. *Breast J*. 2009;15(6):615-622. doi:10.1111/j.1524-4741.2009.00812.x.
 78. NCI Dictionary of Cancer Terms - National Cancer Institute. <https://www.cancer.gov/publications/dictionaries/cancer-terms/search/psychosocial>. Accessed September 14, 2021.
 79. Juczyński Zygfryd. *Narzędzia pomiaru w promocji i psychologii zdrowia*. Wyd. 1. 188. Warszawa: Pracownia Testów Psychologicznych Polskiego Towarzystwa Psychologicznego; 2001.
 80. Kulpa M, Owczarek K, Stypuła-Ciuba B. Przystosowanie psychiczne do choroby nowotworowej a jakość życia uwarunkowana stanem zdrowia u chorych onkologicznych. *Medycyna Paliatywna*. 2013;5(3). <https://nauka.coi.pl/info/seam?id=COIc57c479c9ebb43449f108ac0ad7a487b&lang=en&cid=318367#YUuAUehKjIU>. Accessed September 22, 2021.
 81. da Silva AV, Zandonade E, Amorim MHC. Anxiety and coping in women with breast cancer in chemotherapy 1. *Rev Lat Am Enfermagem*. 2017;25:e2891. doi:10.1590/1518-8345.1722.2891.
 82. Aguado Loi CX, Baldwin JA, McDermott RJ, et al. Risk factors associated with increased depressive symptoms among Latinas diagnosed with breast cancer within 5 years of survivorship. *Psycho Oncol*. 2013;22(12):2779-2788. doi:10.1002/pon.3357.
 83. Carver CS, Smith RG, Petronis VM, Antoni MH. Quality of life among long-term survivors of breast cancer: Different types of antecedents predict different classes of outcomes. *Psycho Oncol*. 2006;15(9):749-758. doi:10.1002/pon.1006.
 84. Schreiber JA. Image of God: effect on coping and psychospiritual outcomes in early breast cancer survivors. *Oncol Nurs Forum*. 2011;38(3):293-301. doi:10.1188/11.ONF.293-301.

85. Schulz E, Holt CL, Caplan L, et al. Role of spirituality in cancer coping among African Americans: a qualitative examination. *J Cancer Surviv.* 2008;2(2):104-115. doi:10.1007/s11764-008-0050-5.
86. Wildes KA, Miller AR, de Majors SSM, Ramirez AG. The religiosity/spirituality of Latina breast cancer survivors and influence on health-related quality of life. *Psycho Oncol.* 2009; 18(8):831-840. doi:10.1002/pon.1475.
87. Carvalho AF, Hyphantis T, Sales PMG, et al. Major depressive disorder in breast cancer: a critical systematic review of pharmacological and psychotherapeutic clinical trials. *Cancer Treat Rev.* 2014;40(3):349-355. doi:10.1016/j.ctrv.2013.09.009.
88. BorjAlilu S, Kaviani A, Helmi S, Karbakhsh M, Mazaheri MA. Exploring the role of self-efficacy for coping with breast cancer: A systematic review. *Archives of Breast Cancer.* 2017;4(2): 42-57. doi:10.19187/abc.20174242-57.
89. Falagas ME, Zarkadoulia EA, Ioannidou EN, Peppas G, Christodoulou C, Rafailidis PI. The effect of psychosocial factors on breast cancer outcome: a systematic review. *Breast Cancer Res.* 2007;9(4). doi:10.1186/bcr1744.
90. Brandão T, Schulz MS, Matos PM. Psychological adjustment after breast cancer: a systematic review of longitudinal studies. *Psycho Oncol.* 2017;26(7):917-926. doi:10.1002/pon.4230.
91. Mokhatri-Hesari P, Montazeri A. Health-related quality of life in breast cancer patients: review of reviews from 2008 to 2018. *Health Qual Life Outcome.* 2020;18(1):338. doi:10.1186/s12955-020-01591-x.
92. Aizpurua-Perez I, Perez-Tejada J. Resilience in women with breast cancer: A systematic review. *Eur J Oncol Nurs.* 2020;49: 101854. doi:10.1016/j.ejon.2020.101854.
93. Irwig L, Bennetts A. Quality of life after breast conservation or mastectomy: a systematic review. *Aust N Z J Surg.* 1997;67(11): 750-754. doi:10.1111/j.1445-2197.1997.tb04573.x.
94. Nausheen B, Gidron Y, Peveler R, Moss-Morris R. Social support and cancer progression: A systematic review. *J Psychosom Res.* 2009;67(5):403-415. doi:10.1016/j.jpsychores.2008.12.012.
95. Cahir C, Guinan E, Dombrowski SU, Sharp L, Bennett K. Identifying the determinants of adjuvant hormonal therapy medication taking behaviour in women with stages I-III breast cancer: A systematic review and meta-analysis. *Patient Educ Counsel.* 2015;98(12):1524-1539. doi:10.1016/j.pec.2015.05.013.
96. Ringwald J, Wochnowski C, Bosse K, et al. Psychological distress, anxiety, and depression of cancer-affected BRCA1/2 mutation carriers: a systematic review. *J Genet Counsel.* 2016; 25(5):880-891. doi:10.1007/s10897-016-9949-6.
97. Yang Y, Wen Y, Bedi C, Humphris G. The relationship between cancer patient's fear of recurrence and chemotherapy: A systematic review and meta-analysis. *J Psychosom Res.* 2017;98: 55-63. doi:10.1016/j.jpsychores.2017.05.002.
98. Zhang C, Hu G, Biskup E, Qiu X, Zhang H, Zhang H. Depression induced by total mastectomy, breast conserving surgery and breast reconstruction: A systematic review and meta-analysis. *World J Surg.* 2018;42(7):2076-2085. doi:10.1007/s00268-018-4477-1.
99. Zehra S, Doyle F, Barry M, Walsh S, Kell MR. Health-related quality of life following breast reconstruction compared to total mastectomy and breast-conserving surgery among breast cancer survivors: a systematic review and meta-analysis. *Breast Cancer.* 2020;27(4):534-566. doi:10.1007/s12282-020-01076-1.
100. Nakamura ZM, Deal AM, Nyrop KA, et al. Serial assessment of depression and anxiety by patients and providers in women receiving chemotherapy for early breast cancer. *Oncologist.* 2020;26(2):147-156. doi:10.1002/onco.13528.
101. Liu L, Wu Y, Cong W, Hu M, Li X, Zhou C. Experience of women with breast cancer undergoing chemotherapy: a systematic review of qualitative research. *Qual Life Res.* 2021;30(5):1249-1265. doi:10.1007/s11136-020-02754-5.
102. Carreira H, Williams R, Müller M, Harewood R, Stanway S, Bhaskaran K. Associations between breast cancer survivorship and adverse mental health outcomes: A systematic review. *J Natl Cancer Inst.* 2018;110(12):1311-1327. doi:10.1093/jnci/djy177.
103. Maheu C, Singh M, Tock WL, et al. Fear of cancer recurrence, health anxiety, worry, and uncertainty: A scoping review about their conceptualization and measurement within breast cancer survivorship research. *Front Psychol.* 2021;12:644932. doi:10.3389/fpsyg.2021.644932.
104. Moher D, Shamseer L, Clarke M, et al. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. *Syst Rev.* 2015;4(1):1. doi:10.1186/2046-4053-4-1.
105. National Comprehensive Cancer Network. *Distress Management, Version 3*; 2019. <https://jnccn.org/view/journals/jnccn/17/10/article-p1229.xml>. Accessed October 20, 2019.
106. Kmet LM, Cook LS, and Lee RC. *Standard Quality Assessment Criteria for Evaluating Primary Research Papers from a Variety of Fields*. Edmonton: Alberta Heritage Foundation for Medical Research (AHFMR); 2004. <https://www.ihe.ca/publications/standard-quality-assessment-criteria-for-evaluating-primary-research-papers-from-a-variety-of-fields>.