

Assessment of Pain and Associated Factors in Female Patients Undergoing Surgical Treatment for Breast Cancer: Cross-Sectional Study

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Avaliação da Dor e Fatores Associados em Pacientes Submetidas ao Tratamento Cirúrgico de Câncer de Mama: Estudo Transversal
Evaluación del Dolor y Factores Asociados en Pacientes Sometidas a Tratamiento Quirúrgico por Cáncer de Mama: Estudio Transversal

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ABSTRACT

Introduction: Pain is a common complication following surgical treatment for breast cancer. This symptom may result from a combination of biological, psychological, and social factors, thereby requiring a comprehensive, multidimensional approach to assessment and management. The functional impact of postoperative pain is considerable, as it can interfere with activities of daily living and compromise limb mobility. **Objective:** To verify the prevalence of pain, characterize it and analyze the factors associated with its intensity in patients undergoing breast cancer surgical treatment. **Method:** Cross-sectional study conducted between March 2021 and March 2022, in Belém, Pará, Brazil. A structured questionnaire was used to collect sociodemographic, clinical, and lifestyle data from patients in the postoperative period of breast cancer surgery. Pain was qualitatively assessed using the McGill Pain Questionnaire. Multiple linear regression was performed to identify factors associated with pain intensity, using the general pain index from the McGill instrument as the dependent variable. A 5% significance level was adopted for all statistics. **Results:** Forty-eight patients post-breast cancer surgery were included, the mean age was 53.64 ± 11.64 years, 85% had undergone chemotherapy, 58.3%, mastectomy and 62.5% were feeling pain at the time of the evaluation. Pain intensity was negatively associated with alcohol consumption ($p = 0.04$) and positively associated with physical inactivity ($p = 0.02$), presence of comorbidities ($p = 0.02$), lymph node positivity ($p = 0.03$), and postoperative duration ($p = 0.03$). **Conclusion:** It was observed that most patients presented acute and moderate pain in the postoperative period and its intensity was associated with lifestyle, clinical and surgical characteristics.

Key words: Breast Neoplasms; Pain, Postoperative; Pain Measurement; Risk Factors.

RESUMO

Introdução: A dor é uma complicação frequente após a cirurgia para o tratamento de câncer de mama e pode surgir por fatores biológicos, psicológicos e sociais, exigindo avaliação e tratamento multidimensionais. Seu impacto funcional é significativo, afetando as atividades diárias e a mobilidade dos membros. **Objetivo:** Verificar a prevalência de dor, caracterizá-la e analisar os fatores associados à sua intensidade em pacientes submetidas a tratamento cirúrgico para câncer de mama. **Método:** Estudo transversal realizado entre março de 2021 e março de 2022, em Belém, Pará, Brasil. Um questionário estruturado foi utilizado para coletar dados sociodemográficos, clínicos e de estilo de vida de pacientes no período pós-operatório de cirurgia para câncer de mama. A dor foi avaliada qualitativamente por meio do Questionário de Dor de McGill. Foi realizada regressão linear múltipla para identificar os fatores associados à intensidade da dor, utilizando o índice geral de dor do instrumento de McGill como variável dependente. Adotou-se nível de significância de 5% para todas as análises estatísticas. **Resultados:** Foram incluídas 48 pacientes em pós-operatório de cirurgia mamária, com média de idade de $53,64 \pm 11,64$ anos. Destas, 85% haviam sido submetidas à quimioterapia, 58,3% à mastectomia, e 62,5% relataram dor no momento da avaliação. A intensidade da dor apresentou associação negativa com o consumo de álcool ($p = 0,04$) e associação positiva com inatividade física ($p = 0,02$), presença de comorbidades ($p = 0,02$), positividade de linfonodos ($p = 0,03$) e tempo de pós-operatório ($p = 0,03$). **Conclusão:** Observou-se que a maioria das pacientes apresentou dor aguda e moderada no pós-operatório e sua intensidade foi associada ao estilo de vida, características clínicas e cirúrgicas. **Palavras-chave:** Neoplasias da Mama; Dor Pós-Operatória; Medição da Dor; Fatores de Risco.

RESUMEN

Introducción: El dolor es una complicación frecuente después de la cirugía para el tratamiento del cáncer de mama y puede surgir debido a factores biológicos, psicológicos y sociales, requiriendo una evaluación y tratamiento multidimensionales. Su impacto funcional es significativo, afectando las actividades diarias y la movilidad de los miembros. **Objetivo:** Verificar la prevalencia del dolor, caracterizarlo y analizar los factores asociados a su intensidad en pacientes sometidas a tratamiento quirúrgico por cáncer de mama. **Método:** Estudio transversal realizado entre marzo de 2021 y marzo de 2022, en Belém, Pará, Brasil. Se utilizó un cuestionario estructurado para recopilar datos sociodemográficos, clínicos y de estilo de vida de pacientes en el período posoperatorio de cirugía por cáncer de mama. El dolor fue evaluado cualitativamente mediante el Cuestionario de Dolor de McGill. Se realizó una regresión lineal múltiple para identificar los factores asociados con la intensidad del dolor, utilizando el índice general de dolor del instrumento de McGill como variable dependiente. Se adoptó un nivel de significación del 5% para todos los análisis estadísticos. **Resultados:** Se incluyeron 48 pacientes en el posoperatorio de cirugía mamaria, con una edad promedio de $53,64 \pm 11,64$ años. De ellas, el 85% había recibido quimioterapia, el 58,3% se sometió a mastectomía y el 62,5% refirió dolor en el momento de la evaluación. La intensidad del dolor se asoció negativamente con el consumo de alcohol ($p = 0,04$) y positivamente con la inactividad física ($p = 0,02$), la presencia de comorbidades ($p = 0,02$), la positividad ganglionar ($p = 0,03$) y el tiempo posoperatorio ($p = 0,03$). **Conclusión:** Se observó que la mayoría de los pacientes presentaron dolor agudo y moderado en el posoperatorio y su intensidad se asoció al estilo de vida, características clínicas y quirúrgicas. **Palabras clave:** Neoplasias de la Mama; Dolor Postoperatorio; Dimensión del Dolor; Factores de Riesgo.

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INTRODUCTION

Breast cancer is the most commonly reported neoplasm and the leading cause of death in women, with an estimated 2.3 million new cases, accounting for 11.6% of all cancer cases in 2022 and the fourth leading cause of cancer mortality worldwide in this same year with 666,000 deaths¹. The treatment of breast cancer requires the administration of a multitude of therapeutic modalities that can cause adverse effects².

Pain is one of the most common and distressing complications reported by patients, with prevalence exceeding 70%³. The appearance of this symptom can occur at any stage of the treatment, although a higher incidence is observed after surgical treatment, given that this procedure is highly invasive and can cause peripheral nerve injuries, particularly in patients who had axillary lymph nodes⁴ removed.

To discern whether this symptom is a consequence of the disease progression or a result of the treatment is challenging due to the multifaceted nature of pain for these patients. Treatment can be influenced by various factors, including anxiety, depression, lymphedema, surgical and axillary approach, among others⁵. Axillary dissection is among the main surgical procedures associated with the development of postoperative pain, likely due to injury to intercostobrachial nerve. In addition, biopsychosocial conditions, as symptoms of anxiety, depression, pain catastrophizing, and low emotional resilience, act as significant predictors of pain chronicity⁶.

Further to the effects directly associated with the postoperative period, adjuvant treatment, as chemotherapy and radiotherapy, has been demonstrated to favor the emergence of pain, especially neuropathic and late onset⁷.

Pain experienced by patients following breast cancer surgery may be attributed to the interaction between biological, psychological, and social factors. Consequently, pain assessment must be conducted multidimensionally, encompassing the three aforementioned aspects and the treatment should be multimodal⁸.

It is evident that pain in patients with breast cancer has a direct impact on the activities of daily living⁴ because pain can lead to a decrease in the performance of functional tasks, as this symptomatology favors a reduction in the range of motion of the limbs, making the limitations caused by the disease even more disabling⁹.

The objective of this study is to investigate the prevalence of pain, characterize it, and analyze the sociodemographic and clinical factors associated with its intensity in patients undergoing surgical treatment for breast cancer.

METHOD

Descriptive analytical cross-sectional study according to the recommendations of Strengthening the Reporting of Observational Studies in Epidemiology (STROBE)¹⁰. Male and female patients older than 18 years of age, diagnosed with breast cancer at any stage, with a postoperative period of at least seven days, and registered at the “Hospital Universitário Joao de Barros Barretos”, Belém, state of Pará have been enrolled.

The study sample was determined by simple random sampling based on a total population of 96 patients who underwent breast surgery over a period of one year. A sampling error of 10% and a significance level of 95% were employed as statistical parameters, resulting in a minimum sample size of 48 patients.

Data collection was conducted by the study investigators. Participants were recruited at the hospital ward prior to discharge, after eligibility criteria was confirmed. The semi-structured questionnaires were administered in an in-person interview conducted at the physical therapy outpatient clinic, an annex of the surgical hospital, during postoperative follow-up visits. All instruments were interviewer-administered, ensuring standardized application and full understanding of the questions by the participants. No information was extracted from medical records, all data were obtained directly from the patients through structured questionnaires.

The data collected included sociodemographic characteristics (age, sex, education, employment status, monthly income), lifestyle (smoking, alcohol consumption, physical activity) and clinical characteristics (presence of comorbidities, immunological characteristics, histochemistry of the tumor, presence of metastases, type of clinical treatment, chemotherapy and radiotherapy, type of surgery and axillary approach, number of lymph nodes removed as well as the number of positive lymph nodes, presence of side effects, pain and postoperative days (PO).

Pain intensity was measured with the Visual Analog Scale (VAS) ranging from zero to ten, with zero representing no pain and ten representing the worst pain ever reported. The McGill questionnaire was also used, it is a tool able to characterize and differentiate the affective, sensory and evaluative variables of pain, in addition, it is an universal and effective questionnaire, validated and easy to apply, which can consolidate and standardize the language to assess pain¹¹.

The questionnaire consisted in 20 groups of pain descriptors: subgroups 1 to 10 represent sensory responses to the painful experience (traction, heat, torsion, etc.); subgroups 11 to 15, affective responses (fear, punishment,

neurovegetative responses, etc.); subgroup 16, evaluative responses (evaluation of the overall experience) and subgroups 17 to 20, miscellaneous. The Pain Index was utilized to evaluate the intensity of the painful experience, it is obtained by summing the intensity values of the chosen descriptors, with a maximum value of 78, the higher the value, more intense the pain is¹².

For descriptive analysis, data were presented as mean and standard deviation (SD), median and interquartile range (IQR), and absolute and relative frequencies (%). The main pain outcomes using the VAS scale and McGill questionnaire and their sensory, affective, evaluative, miscellaneous, and total indices were categorically divided based on the values of the first and third interquartile range. The secondary variables of sociodemographic, lifestyle and clinical characteristics were described as mean and standard deviation or absolute frequency and percentage.

Descriptive statistics were used to summarize the sociodemographic, clinical and lifestyle variables. To verify the association among these variables and pain intensity (measured by the McGill Pain Index), a multiple linear regression analysis was performed. This analytical approach allowed the identification of factors independently associated with the intensity of pain. The regression coefficients (β), 95% confidence intervals (CI), and *p*-values were reported to express the magnitude and statistical significance of these associations. The software Stata MP-64^{®13} with 5% significance level was adopted for all the analyses.

This study adheres to the standards for research involving human subjects as outlined in the Declaration of Helsinki. The Ethics and Research Committee on Human Beings of “Hospital João Barros Barreto” approved the study, report 3,956,266, (CAAE (submission for ethical review) 30475320.9.0000.0017) in compliance with Directive 466/12¹⁴ of the National Health Council. The data were collected from March 2021 to March 2022.

Individuals with cognitive impairment, associated illnesses that could potentially generate pain, and those who declined to participate were excluded.

RESULTS

A total of 48 patients were enrolled, 47 of which (98%) with mean age of 53.64±11.64 years, 58.5% had completed more than eight years of study, 66% were formally employed at the time of the evaluation, and 93.75% earned up to one minimum wage (Table 1).

71% of the subjects reported they had never smoked, while 60.5% had previously consumed alcohol, 73% were sedentary, 25% had some other type of chronic disease (comorbidity), while 75% did not (Table 1).

Table 1. Distribution of sociodemographic characteristics, lifestyle habits, and disease perception of patients submitted to breast cancer surgery, Belém (PA), Brazil, from March 2021 to March 2022

Variables	Patients (n= 48)	
	Mean (n)	Standard deviation (%)
Age	53.64	±11.64
Sex		
Female	47	98
Male	1	2
Education		
Illiterate	2	4
Up to 8 years	18	37.5
More than 8 years	28	58.5
Work		
Employee	31	66
Unemployed	17	33.5
Monthly income		
Up to 1 minimum wage	45	93.75
More than 1 minimum wage	3	6.25
Smoking		
Ex-smoker	14	29
Never smoked	34	71
Alcohol consumption		
Former alcohol user	29	60.5
Never drank	19	39.5
Comorbidities		
Yes	12	25
No	36	75
Physical activity		
Yes	13	27
No	35	73
Perception about the disease		
Serious illness	32	66.5
Simple disease	16	33.5

Most of the population (75%) reported they had acute pain of moderate intensity. To categorize pain intensity, cut-off points based on the interquartile range (IQR) of the VAS scores were applied: scores ≤ 5 were considered lower intensity (33.4%), while scores > 5 were categorized as higher intensity (29.1%). The McGill questionnaire revealed that 50% of the patients exhibited an intensity above 14 in the total score of 78. The sensory dimension achieved the highest score of the McGill questionnaire (Table 3).



Table 2. Distribution of clinical, pain and surgery information of patients (n=48) submitted to breast cancer surgery, Belém (PA), Brazil, from March 2021 to March 2022

Variables	Patients (n=48)	
	N	%
Immunohistochemistry		
HER 2 positive and lumina's A and B	39	81.25
triple negative	9	18.75
Metastasis		
Yes	2	4
No	46	96
Type of treatment		
Neoadjuvant	29	60.4
Adjuvant	5	10.4
Neoadjuvant and adjuvant	9	18.6
Chemotherapy		
Yes	41	85.4
No	7	14.6
Radiotherapy		
Yes	11	23
No	37	77
Type of surgery		
Mastectomy	28	58.3
Quadrantectomy	20	41.7
Axillary approach		
Lymphadenectomy	39	81.25
Sentinel lymph node biopsy	9	18.75
Lymph nodes removed		
Up to 7	25	52
Above 7	23	48
Positive lymph nodes		
None	19	39.5
1-3	18	37.5
Above 3	11	23
Side effects		
Yes	39	81.25
No	9	18.75
Pain		
Yes	30	62.5
No	18	37.5
Post-operative days		
Up to 25 days	25	52
Over 25 days	23	48

Table 3. Distribution of the percentage of types of pain and their assessment using the Visual Analogue Pain Scale (VAS) and McGill Questionnaire of patients (n=48) submitted to breast cancer surgery, Belém (PA), Brazil, from March 2021 to March 2022

Variables	Patients (n=48)	
	Number	Percentage
Types of pain		
Acute pain (< 3 months)	32	75
Chronic pain (≥ 3 months)	12	25
VAS		
Painless	18	37.5
Up to 5	16	33.4
Over 5	14	29.1
McGill General Index		
Painless	18	37.5
Up to 14	6	12.5
Over 14	24	50
	Median	IQR3*
McGill General Index	13.5	20.5
McGill Sensory Index	8.0	16
McGill Affective Index	1.0	2.25
McGill Assessment Index	1.0	2.0
McGill Miscellaneous Index	1.0	3.25

Captions: * Third interquartile range. VAS= Visual Analogue Scale.

The results of the study indicated that lifestyle habits as not drinking ($p = 0.04$) and physical inactivity ($p = 0.02$) presented positive and negative coefficients in the McGill questionnaire, respectively. Additionally, the presence of comorbidities ($p = 0.02$) showed positive coefficient (Table 4).

The number of lymph nodes removed presented positive coefficient ($p = 0.03$) in the McGill questionnaire. In addition to this factor, the postoperative period ($p = 0.03$) also showed positive results evaluated by the same instrument. No other significant results among pain and other factors evaluated by the McGill questionnaire have been observed (Table 4).

DISCUSSION

Pain in cancer patients, especially those with breast cancer, is multidimensional in nature, which makes it difficult to distinguish between pain caused by the progression of the disease and that resulting from treatments¹⁵. In the present study, 62.5% of participants reported experiencing some form of pain at the time of the assessment. Analyses indicated that factors such as physical inactivity, the presence of comorbidities, the number of positive lymph nodes removed, and the

Table 4. Distribution of lifestyle, clinical and surgical factors associated with total pain intensity using the McGill questionnaire for patients submitted to breast cancer surgery, Belém (PA), Brazil, from March 2021 to March 2022

Variables	Coefficient	CI 95%	p-value
Smoking	0.12	- 0.17 to 0.42	0.40
No alcohol consumption	- 0.29	- 0.58 to 0.00	0.04*
Physical inactivity	0.38	0.05 to 0.70	0.02*
Perception of the disease	- 0.24	- 0.55 to 0.07	0.12
Immunohistochemistry	0.31	- 0.04 to 0.67	0.08
Metastasis	0.40	- 0.08 to 0.89	0.10
Comorbidities	0.41	0.76 to 0.06	0.02*
Treatment	- 0.11	- 0.35 to 0.11	0.30
Type of surgery	0.03	- 0.26 to 0.33	0.81
Lymph nodes removed	0.14	- 0.13 to 0.43	0.30
Positive lymph nodes	0.21	0.02 to 0.41	0.03*
PO days	0.39	0.03 to 0.75	0.03*

Captions: CI 95%: 95% confidence interval; *Statistically significant *p*-value of the factors evaluated by the McGill questionnaire using the compound linear regression model; PO = postoperative.

number of postoperative days were significantly associated with higher pain scores, as measured by the McGill index.

The age and educational characteristics of the study sample are comparable to those observed in an observational cohort study conducted with 506 women diagnosed with breast cancer whose mean age was 55 years. However, the length of education years was different between the two studies⁵.

According to Habib et al.¹⁶ the mean age of women diagnosed with breast cancer and presenting severe pain was 54 years, while patients reporting mild pain had a mean age of 63 years. This difference may influence perceptions and pain management, suggesting that higher levels of education may be associated with more effective coping strategies.

Educational level is often associated with health literacy and coping strategies and recent studies have emphasized the role of psychological factors as anxiety, depression, and catastrophizing, as well as clinical aspects like preoperative pain, extent of axillary surgery, and presence of comorbidities^{17,18}. Moreover, limited access to rehabilitation services – especially physiotherapy and psychosocial support – has been identified as a significant barrier to effective pain management and functional recovery in breast cancer survivors^{8,19}. Although access to rehabilitation was not directly assessed in the present study, it is plausible that disparities of access may contribute to differences in pain severity and chronicity, particularly in underserved populations.

The patients' lifestyle habits were also analyzed, revealing that 29% were former smokers, 60.5% consumed alcohol beverages, and only 27% engaged in regular physical exercise. These data are in contrast to those

of a cross-sectional study involving 410 women diagnosed with breast cancer, where the majority of patients who reported postoperative pain did not smoke (81%) or used alcohol (99.7%), and more than half practiced some physical activity. These findings indicate that while healthy lifestyle habits may not necessarily alter the prevalence of pain, they may influence its intensity and management²⁰.

In this context, recent evidence has shown that healthy lifestyle habits play an important role in modulating postoperative pain in breast cancer survivors. Regular physical activity contributes to the activation of descending inhibitory pathways and the release of endogenous opioids, while also reducing systemic inflammation – mechanisms strongly associated with decreased pain perception and better functional recovery^{8,17}.

Moreover, nonsmoking and no alcohol consumption have been correlated with lower neuroinflammatory activity and better central nervous system regulation, potentially reducing the risk of peripheral and central sensitization to pain¹⁸. Patients who engage in healthier behaviors also tend to have better mental health and greater adherence to rehabilitation and pharmacological interventions, facilitating a more effective multimodal approach to pain management²¹. These factors combined may not necessarily alter the prevalence of pain, but they significantly influence its intensity, chronicity, and responsiveness to treatment strategies.

Clinically, 85% of the patients received chemotherapy. It is well documented²²⁻²⁵ that the various therapeutic modalities employed to combat cancer are a significant contributor to the pain experienced by cancer patients, including both acute and chronic pain. These painful conditions can give rise to physical and psychological complications in the lives of many cancer patients²⁶.

Moreover, adverse effects related to cancer treatment are reported in 81.25% of the patients, particularly during chemotherapy, which increases the risk of persistent pain. The development of persistent pain after breast cancer is primarily attributed to the use of neurotoxic agents as paclitaxel²⁷⁻³⁰.

In terms of surgical procedures, mastectomy was the most common (58.3%), with an axillary approach via lymphadenectomy performed in 81.25% of the cases, a procedure commonly performed during surgical treatment and associated with the emergence of pain in the postoperative period. This is due to the potential for injury to the intercostobrachial nerve during the removal of axillary lymph nodes, which can result in painful repercussions along the entire neural pathway^{6,31}.

The prevalence of pain was 62.5%, with a median intensity of 5 on the visual analogue scale (VAS). Additional studies indicate that approximately 35% of patients undergoing breast surgery may experience persistent postoperative pain, with an average intensity of 3 on the VAS scale. This pain is often accompanied by other symptoms related, as paresthesia and allodynia^{6,20}.

The elevated prevalence of pain which is considerably higher than the frequently reported average can be ascribed to a combination of clinical and methodological factors. A 2023 systematic review of observational studies reported that persistent postsurgical pain in breast cancer patients ranged from 25% to 60%, influenced by surgical extent, adjuvant therapy, and thresholds^{32,33}.

In a similar line, a research on persistent post-mastectomy pain syndrome indicates prevalence rates ranging from 20% to 68%, particularly when incorporating neuropathic components as paresthesia and allodynia³⁴. The study's findings suggest a correlation between the utilization of more invasive surgical techniques (e.g., lymph node dissection) and the administration of adjuvant treatments (chemotherapy and radiotherapy) and recognized risk factors for chronic pain.

The majority of the study participants had acute pain (75%) and only (25%) had chronic pain. According to McCowat et al.³⁵, following breast cancer surgery, certain psychological predictors, as preoperative anxiety and distress, can impede the emergence of acute or chronic pain, thereby complicating pain management.

In addition, several factors, including younger age, female gender, preoperative pain, heightened sensitivity to pain, analgesic consumption, preoperative anxiety, pain catastrophizing, and pain expectation have been linked to increased PO acute pain severity¹⁷.

The presence of PO acute pain is an important risk factor associated with the development of more persistent pain conditions, which tend to become chronic pain processes. This characteristic becomes even more evident

in cases where there is pain in the operated area during the preoperative period. Consequently, clinical management becomes even more complex³⁶.

Upon evaluation of the pain condition using the McGill Index, it was observed that approximately half of the population investigated exhibited a pain index above 14 points. With regard to the VAS assessment, only 29.1% of respondents indicated they experienced pain at an intensity level above 5.

The cut-off point of 14 on the McGill Pain Questionnaire was established based on the third quartile (IQR 3) of the total pain scores obtained from the study sample. This strategy was adopted to stratify participants into groups with higher and lower pain intensity, according to the distribution of the observed data. This analytical approach allows a data-driven categorization, rather than relying on arbitrary or external thresholds. As a result, some participants with lower VAS scores may still exhibit high McGill scores due to the multidimensional character of their pain. This methodological difference likely explains why approximately half of the sample exceeded the 14-point threshold on the McGill Index, whereas only 29.1% scored above 5 on the VAS.

The McGill Pain Questionnaire sensory pain score was notably higher than the affective, evaluative, and miscellaneous subscale scores. This finding aligns with the literature, indicating that postoperative pain following breast surgery is predominantly sensory in nature, a prospective study on women undergoing breast reconstruction reported an increase in the sensory McGill Pain Questionnaire score from 3.1 (SD 4.5) to 10.5 (SD 6.3) at one week post-surgery, compared to only a modest rise in the affective score from 1.6 (SD 2.0) to 2.9 (SD 2.3)³⁷. These results underscore the predominance of nociceptive and neuropathic sensory symptoms, as burning and stabbing.

A study carried out by Roth et al.³⁸ attempted to determine the factors associated with pain intensity in cancer patients following breast surgery. To this end, they employed linear regression, which revealed a positive association between the most intense measures of pain and high body mass index (BMI). This finding suggests that life habits that can increase the BMI may contribute to the emergence of more intense pain conditions.

In the present study, it was found that the intensity of pain assessed using the McGill questionnaire was higher in patients who consumed alcohol, did not practice physical exercise and had comorbidities, with a statistically significant value for all the variables mentioned. Regarding clinical and operative factors, a statistically significant result was observed for the number of positive lymph nodes removed and PO days.

Chronic alcohol consumption has been associated with neuropathic alterations, including axonal degeneration and central sensitization, which may exacerbate postoperative pain perception. Alcoholic neuropathy affects up to 44% of chronic drinkers and is associated with pain symptoms in approximately 42% of the cases. A large-scale meta-analysis involving over 640,000 participants identified a non-linear dose-response relationship between alcohol intake and chronic pain, suggesting potentially harmful effects of long-term alcohol consumption³⁸.

Physical inactivity may contribute to heightened postoperative pain through mechanisms as musculoskeletal deconditioning, reduced pain threshold, and impaired inflammatory regulation. A systematic review and meta-analysis demonstrated that physical exercise programs in cancer survivors resulted in a moderate reduction in pain intensity, especially in breast cancer patients, supporting the protective role of physical activity in pain modulation³⁹.

The presence of comorbidities as diabetes and cardiovascular disease can amplify postoperative pain due to increased systemic inflammation, altered pain processing, and diminished healing capacity. A systematic review highlighted that multimorbidity is significantly associated with heightened pain sensitivity and reduced effectiveness of analgesics, particularly in complex postoperative scenarios⁴⁰.

Extensive axillary dissection, involving the removal of a greater number of positive lymph nodes, is strongly associated with injury to the intercostobrachial nerve and, consequently, the development of neuropathic pain. A meta-analysis has confirmed this association, reinforcing axillary dissection as one of the main surgical predictors of persistent pain following breast cancer surgery⁴¹.

Post-mastectomy pain can manifest through a number of mechanisms, including neuropathy, lymphedema, neuromuscular impairment, and mechanical injury caused by the surgical process. These factors can lead to pain primarily in the axillary regions, anterior wall of the chest, and medial side of the ipsilateral arm. The same author posits that the factors that contribute to an exacerbation of pain intensity include the performance of movements and physical exertion, in addition to exposure to cold temperatures, which can consequently engender emotional distress for the patient⁴.

A systematic review with meta-analysis was conducted with 17 studies that evaluated the factors associated with the development of chronic pain in patients with breast cancer. The results indicated that obesity (BMI > 30), shorter study time (less than 12-13 years), the presence of lymphedema, history of smoking, axillary lymphadenectomy approach, radiotherapy

and chemotherapy demonstrated significantly high odds of developing chronic pain. Among these factors, lymphedema was identified as the strongest risk factor¹⁹.

Seeking to promote a better understanding of the factors associated with the risk of presenting pain following breast cancer surgery, studies carried out by Dereu et al.⁴² developed a scoring model that indicates a greater or lesser risk of developing pain during the postoperative period; according to the authors, the most important predictive characteristics observed in patients who present more intense pain are being younger, pre-surgical pain at the site of operation and psychological disorders.

Consequently, the present investigation reinforces the need for a multidimensional assessment of pain in breast cancer patients to better understand the mechanisms that generate and support this symptom. One of its main strengths lies in the use of the McGill Pain Questionnaire, which allowed a comprehensive characterization of pain, beyond simple intensity measures, including its sensory, affective, and evaluative dimensions.

Furthermore, the identification of specific clinical and lifestyle-related factors associated with pain intensity, as comorbidities, physical inactivity, alcohol use, lymph node involvement, and postoperative duration, offers clinically relevant insights for personalized pain management. These findings may support early screening of high-risk patients and contribute to the development of targeted interventions that address modifiable risk factors in the postoperative period.

The study limitation is that it evaluated patients at only one point in the postoperative period, which prevented an analysis of the evolution of pain over time. Additionally, the study did not assess potential preoperative pain predictors as pre-existing pain or psychological distress. Another important limitation is the small sample size, which may reduce the statistical power of the analyses and limit the generalizability of the findings to the broader population of breast cancer patients.

CONCLUSION

Therefore, the majority of patients undergoing surgical treatment for breast cancer presented some type of pain during the PO period, usually acute and moderate intensity. Furthermore, the pain was more intense in patients who did not have healthy lifestyle habits, had a greater number of positive lymph nodes for cancer cells and those who were evaluated late after surgery. These factors were associated with the manifestation of postoperative severer pain, reinforcing the importance of a multidisciplinary and personalized approach to manage pain in these patients.



CONTRIBUTIONS

All the authors contributed substantially to the conception and design of the study, acquisition, analysis and interpretation of data, critical review and approved the final version for publication.

DECLARATION OF CONFLICT OF INTERESTS

There is no conflict of interests to declare.

DATA AVAILABILITY STATEMENT

Given ethical and confidentiality issues, data can be requested to the corresponding author with reasonable justification.

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