Effects of physiotherapy methods in post-operative women with breast cancer: systematic review with meta-analysis

Efeitos dos métodos fisioterapêuticos em mulheres pós-operatórias com câncer de mama: revisão sistemática com meta-análise

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Abstract

Introduction: Breast cancer is characterized by abnormal, disordered and rapid proliferation of breast tissue cells; however, early diagnosis and advances in treatment allow greater chances of a good treatment. **Objective:** To present the effects of physical therapy in postoperative breast cancer patients. **Methods:** This is a systematic review of the literature, with a selection of articles published in the PubMed, SCOPUS, Cochrane, Web of Science and SciELO databases. **Results**: A total of 1,380 publications were found in the search in the databases following the proposed research methodology. After using the selection criteria, six studies (four randomized clinical trials and two clinical trials) were included in this systematic review. Of these studies, three provided data for the meta-analysis. The results of this meta-analysis showed that the abduction variable did not differ significantly ($p = 0.11$; standardized mean difference [SMD] = 1.48; 95% CI [-0.35 to 3.3]), as well as the flexion variable did not show differences ($p = 0.14$; SMD = 1.21; 95% CI [0.41 to 2.82]). **Conclusion:** According to this meta-analysis, no results were obtained that demonstrated improvements in physical therapy interventions in women after breast cancer surgery in the range of motion of the upper limbs.

Keywords: Breast cancer. Physiotherapy. Postoperative period.

Resumo

Introdução: *O câncer de mama é caracterizado pela proliferação anormal, desordenada e rápida de células do tecido mamário; no entanto, o diagnóstico precoce e avanços no tratamento permitem maiores chances de um bom tratamento.* ***Objetivo:*** *Apresentar os efeitos da fisioterapia em pacientes pós-operatórias de câncer de mama.* ***Métodos:*** *Trata-se de uma revisão sistemática da literatura, com seleção de artigos publicados nas bases de dados PubMed, SCOPUS, Cochrane, Web of Science e SciELO.* ***Resultados:*** *Foram encontradas 1.380 publicações na busca nas bases de dados seguindo a metodologia de pesquisa proposta. Após a utilização dos critérios de seleção, seis estudos (quatro ensaios clínicos randomizados e dois ensaios clínicos) foram incluídos na presente revisão sistemática. Destes estudos, três forneceram dados para a meta-análise. Os resultados desta metanálise mostraram que a variável abdução não diferiu significativamente (p = 0,11; diferença média padronizada [DMP] = 1,48; IC 95% [-0,35 a 3,3]), da mesma forma que a variável flexão não apresentou diferenças (p = 0,14; DMP = 1,21; IC 95% [0,41 a 2,82]).* ***Conclusão:*** *De acordo com esta meta-análise, não foram obtidos resultados que demonstrassem melhoras nas intervenções fisioterapêuticas em mulheres após cirurgia de câncer de mama na amplitude de movimento dos membros superiores.*

Palavras-chave: *Câncer de mama. Fisioterapia. Pós-operatório.*

Introduction

Breast cancer (BC) is characterized by the abnormal, disorderly, and rapid proliferation of breast tissue cells due to factors such as advanced age, family and personal history, lifestyle habits, and environmental influences. In addition, the estrogen hormone may be related in the enhancement of genetic changes such as a malignant tumor. However, early diagnosis and advances in treatment allow for greater chances of good treatment.[1]

The National Cancer Institute presents an estimate of 74 thousand new cases of BC in Brazil between the years 2023 and 2025, with emphasis on the South and Southeast regions, which have a 70% incidence of BC cases. This data is important for outlining strategies and planning in the oncology sector, and encouraging public policies necessary for control and treatment, as it involves the Unified Health System at different levels of care.[2]

Furthermore, kinetic-functional changes are evident in the clinical profile of women who underwent a mastectomy, such as reduced range of motion (ROM) of the upper limbs due to lack of mobility, accompanied by pain, loss of muscle strength, and dysfunction of the winged scapula due to trauma to the thoracic nerve in addition to other consequences such as altered sensitivity and lymphedema.[3]

Physiotherapeutic intervention is necessary for the prevention and rehabilitation of mastectomy. Kinesiotherapy, kinesis tape, and electrical stimulation are care strategies that have proven to be efficient, as these conditions affect the quality of life (QoL) and functional independence, also reflecting on mental and social health problems.[4]

In this direction, a systematic review study showed that multifactorial physiotherapy (stretching + exercises) and active exercises were effective in treating postoperative pain and affected ROM after treatment for BC.[5] This reinforces the need for more studies to verify the effectiveness of physiotherapeutic procedures including passive mobilization, stretching, and myofascial therapy as part of multifactorial treatment. Furthermore, exercise programs' appropriate volume and completeness need to be further investigated.[6] Given this, this study aimed to verify the effects of physiotherapy in the postoperative period of BC women.

Methods

This is a study with characteristics of a systematic literature review, through an approach based on experimental studies, which analyzes research relevant to professional practice, highlighting the main positive and negative effects on the topic addressed. Therefore, the following methodological steps were used: 1) Identification of the theme and guiding question; 2) Search in literature; 3) Data collection; 4) Critical analysis of selected studies; 5) Discussion of results; 6) Presentation of the systematic review synthesis.[7] This research was registered in the International Prospective Register of Systematic Reviews under number CRD42023418156.

Selection criteria

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) were followed in the study

selection process.[8] Inclusion criteria were performed according to the PICOS strategy,[9] as follows: (1) Population: women with breast cancer; (2) Intervention: physical therapy; (3) Comparison: other interventions and/or control group; (4) Outcome: mobility, muscle strength, and pain reduction; (5) Study design: randomized controlled trials and clinical trials. Exclusion criteria were as follows: systematic reviews and meta-analyses; other associated diseases. For the development of the research, the following guiding question was created: "What are the effects of physiotherapy intervention on women postoperatively with BC?

Search strategy

The Zotero 6.0.30 literature management software was used in the literature search. After managing the studies, the inclusion criteria were applied according to the theme researched and the descriptors used. Data collection and selection were carried out by two independent and experienced researchers, with doubts resolved by a third evaluator, without language or time filters, on the following database platforms: National Library of Medicine (PubMed): "Breast cancer" [All Fields] AND "physical therapy" [All Fields]; Scopus: ALL ("breast cancer") AND ALL ("physical therapy") AND ALL ("postoperative period"); Cochrane: "breast cancer" AND "physical therapy"; Web of Science: "breast cancer" (All fields) and "physical therapy" (All fields); and SciELO: ("Breast Cancer") AND ("physical therapy").

Assessment of risk of bias and methodological quality of studies

Risk of bias assessment was performed using the Cochrane Risk of Bias Tool for Randomized Trials (RoB 2), which is recommended for evaluating randomized trials included in Cochrane Reviews. RoB 2 is structured around a fixed set of bias domains, focusing on different aspects of the design, conduct and reporting of the trial. For each domain, questions relevant to the assessment of risk of bias are asked. The domains assessed are randomization process; deviations from the intended interventions; missing outcome data; measurement of the outcome; selection of the reported result. A proposed judgement on the risk of bias arising from each domain is generated by an algorithm, based on the responses to the signaling questions. The judgement can be of "low" or "high" risk of bias, or it can express "some concerns".[10]

To evaluate methodological quality, the TESTEX scale was used, which is a report evaluation tool created to be used in training studies with exercise methods. TESTEX is a 15-point scale used for experimental studies, including internal validity criteria and presentation of the statistical analysis used; 1 point is assigned for each criterion and zero points in the absence of these indicators.

The scale is made by the criteria: 1. Specification of inclusion criteria; 2. Random allocation; 3. Secrecy in allocation; 4. Similarity of groups in the initial or baseline phase; 5. Assessor masking (for at least one key result); 6. Measurement of at least one primary outcome in 85% of allocated subjects (up to three points); 7. Intention-to-treat analysis; 8. Comparison between groups for least one primary outcome (up to two points); 9. Report measures of variability for all results measures; 10. Monitoring activities in control groups; 11. The relative intensity of the exercise remained constant; 12. Characteristics of exercise volume and energy expenditure.[11]

To present the data from the selected articles, an electronic spreadsheet was used, and the eligibility criteria were duplicate and independent manner. In this way, the data extracted from the articles were evaluated by two independent evaluators, and a third was responsible for possible divergences to reach a consensus decision.

Meta-analysis

The software Jamovi 2.3.21.0 was used to analyze the effects of physiotherapy on women with cancer. Each standard mean difference (SMD) was weighed according to the inverse variance method. The SMD values in each study were pooled using a random (if heterogeneity was significant) or fixed effects (if heterogeneity was due to chance) model. SMD values were interpreted as: < 0.2 = weak; $0.2 - 0.79$ = moderate; ≥ 0.8 = strong.[12] A statistically significant effect was indicated by $p < 0.05$.

Evidence- certainty assessment

Two authors independently assessed the certainty of evidence using the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) approach with the GRADE PRO website. GRADE specifies four categories: "high", "moderate", "low", and "very low", applied to a body of evidence. RCTs begin with high-quality evidence. Five aspects can decrease the quality of evidence: methodological limitations, inconsistency,

indirect evidence, inaccuracy, and publication bias. On the other hand, three aspects can increase the quality of the evidence: effect size, dose-response gradient, and confounding factor.[13]

Heterogeneity between studies was analyzed using I2 statistics, which values are interpreted as low (0-50%), moderate (50-74%) and high heterogeneity (≥ 75%),[14,15] as shown in Table 1.

Table 1 - Strength of evidence assessment (GRADE) for the variables abduction and flexion

Certainty assessment					Effect (95% CI)		Certainty	Importance
Studies*	Risk of bias	Inconsistency	Indirectness	Imprecision	Relative	Absolute		
Abduction RT = 3 EG = 132 CG = 145	Serious	Serious[a]	Not serious	Not serious	-	SMD 1.21 higher (0.41 lower to 2.82 higher	⊕⊕◯◯ Low	Important
Flexion RT = 3 EG = 132 CG = 143	Serious	Serious[a]	Not serious	Not serious	-	SMD 1.48 higher (0.35 lower to 3.31 higher)	⊕⊕◯◯ Low	Important

Note: *Study design (RT = randomised trials), number of studies, and number of patients in experimental (EG) and control (CG) groups. CI = confidence interval; SMD = standard mean difference. [a]The high heterogeneity can be explained by the use of different evaluation methods, but was corrected with the use of the random effects model.

Results

A total of 1,380 publications were found from the database search following the proposed research methodology: MEDLINE via PubMed = 855; Scopus = 22; SciELO = 23; Web of Science = 477; Cochrane = 3. After using the selection criteria, a total of six studies (four randomized controlled trials, and two clinical trials) were included in the present systematic review. Of these studies, three provided data for the meta-analysis, as shown in Figure 1.

The risk of bias (Rob 2)

Regarding the risk of bias in the studies included in this meta-analysis and evaluated by the Cochrane Collaboration tool, it was found that all six studies included in this systematic review were classified as high risk of bias. The most biased domains were blinding the evaluation of results with 100%. Notably, a high-risk result among the seven domains used by the tool classifies the study as at high risk of bias. Therefore, one must carefully observe the other domains of the tool individually (Figure 2).

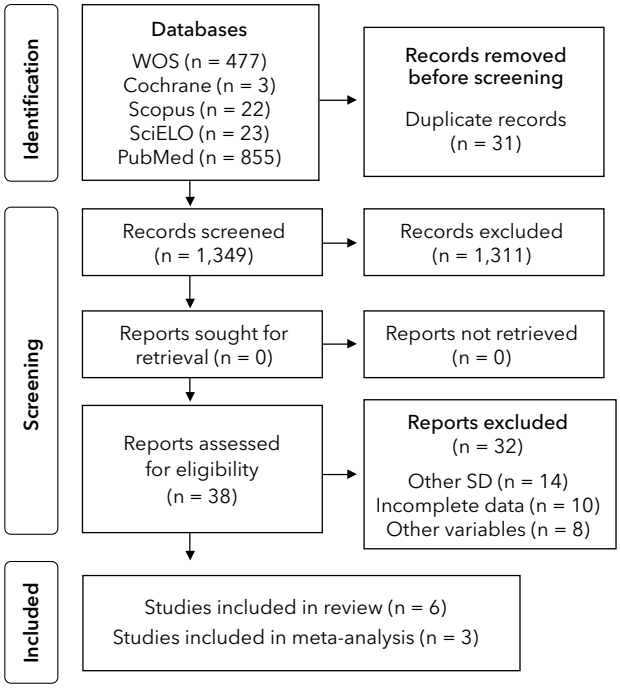

Figure 1 - Study selection flowchart: identification of studies via databases (n = 1,380) and registers.

Note: WOS = Web of Science; SD = study design.

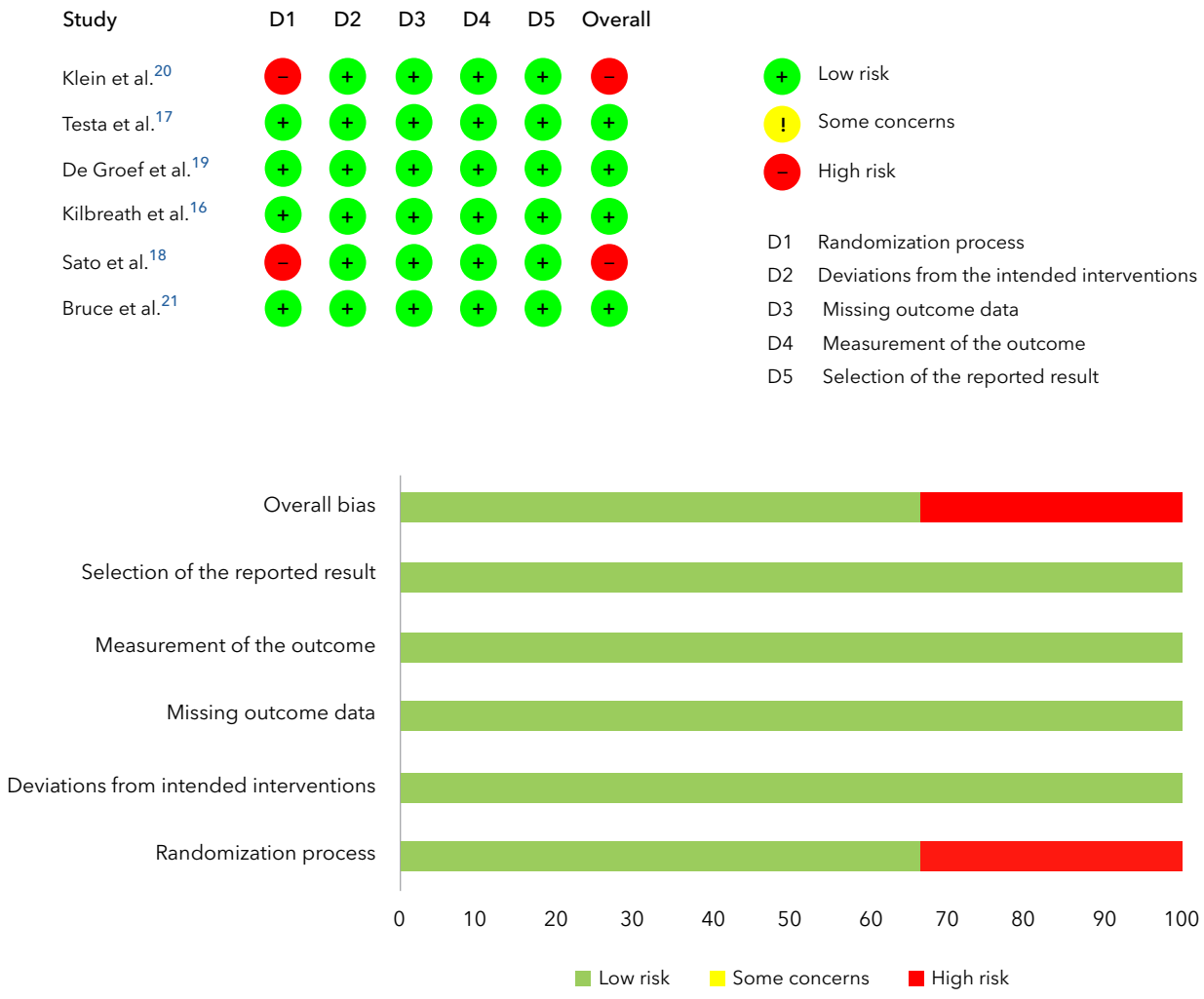

Figure 2 - Risk of bias (RoB 2).

Methodological quality

Regarding the methodological quality of the studies using the TESTEX tool (0 to 15 points), all studies scored above 10 points. The most sensitive points in the studies were the blinding of evaluators and/or study participants, adverse events, punctual measurements, variability measures for all outcome measures, exercise volume, and energy expenditure to be reported.[14]

Table 2 presents the characteristics of the studies by author, year, number of participants and groups, and the values (mean ± standard deviation) of age. The year of publication of the studies varied between 2012 and 2021. Regarding the country of origin, the studies were carried out in the United Kingdom (n = 1), Italy (n = 1), Belgium (n = 1), Australia (n = 1), Israel (n = 1) and Japan (n = 1). The average ages of the experimental (EG) and control (CG) groups were 54.80 and 53.75 years, respectively. The average number of participants in the EG was 79.7, and 76.3 in the CG. Only female participants were used. The total number of participants was 936 (CG = 458; EG = 478). The most used physiotherapeutic method was kinesiotherapy. The characteristics of the studies selected in the systematic review (sample, intervention method, protocol, and variables evaluated) are described in Table 3.

Table 2 - Characteristics of selected studies

Authors	Sample	Intervention method	Exercise protocols	Assessment instrument
Kilbreath et al.[16]	160 women BC; 52.5 age EG (n = 81): age = 53.5 ± 12.1 CG (n = 79): age = 51.6 ± 11.0	Kinesiotherapy with radiation therapy and passive stretching	EG: Supervised exercises with a weekly session for 8 weeks, started 4-6 weeks post- operatively. GC: Written information on exercises and encouragement to use your arm.	Pre-intervention and after 8 weeks and 6 months, evaluating a range of movement, muscle strength, lymphedema, a questionnaire to assess the quality of life (EORTC-BR23) and symptoms in the affected limb (4-point scale) was applied.
Testa et al.[17]	70 women BC; 51 age EG (n = 35): age = 54.3 ± 11.2 CG (n = 35): age = 55.3 ± 10.1	Kinesiotherapy	EG: One-year Exercise Program with 60 minutes per session, 5 times/ week, 20 sessions, started immediately post-operatively. GC: Not submitted to physiotherapeutic procedures.	Preoperative and postoperative 5 days, 1, 6, and 12 months, goniometry, visual analog scale, and EORTC QLQ-BR23 questionnaire were used.
Sato et al.[18]	149 women BC; 53.2 age ALND EG (n = 39): age = 52.9 ± 10.1; CG (n = 30): age = 52.1 ± 12.9 SLNB EG (n = 51): age = 54.6 ± 10.6; CG (n = 29): age = 53.7 ± 9.5	Educational physiotherapy + kinesiotherapy	EG: Educational program monitoring arm function and exercises to prevent shoulder dysfunction and lymphedema at 3 months, started in preoperative patients. GC: They received routine care on-site and were informed about the upper limb extremity function results determined in the survey.	Goniometry (shoulder flexion, horizontal extension, and abduction); Hand dynamometer; Perimeter of the upper limbs; SPOFIA questionnaire; DASH questionnaire.
De Groef et al.[19]	50 women BC; 54.2 age EG (n = 25): age = 55.3 ± 7.5 CG (n = 25): age = 53.1 ± 7.5	Myofascial facilitation + traditional physiotherapy	EG: 12 sessions myofascial release (1 time/week, 30min) + Traditional physiotherapy 2 sessions/ week (30min), started 4-6 weeks post- operatively. 1 - Passive mobilization of the shoulder to active shoulder ROM; 2 - Stretching of the pectorals, muscular flexibility, and passive and active shoulder. ROM; 3 - Scar tissue massage for scar flexibility; and 4 - Exercise regimens for muscular flexibility, endurance, strength, scapula-thoracic control, and ROM shoulder activity. Intervention time 12 weeks. CG: static bilateral activities for hands, upper body, and arm. The CG placebo session lasted 30 minutes, with a frequency of once/week for 12 weeks.	Active shoulder ROM (inclinometer); Arm lymphedema; Muscular strength (portable dynamometer); Perimetry (metallic tape), Scapular statics and dynamics; shoulder function (disability questionnaire); SF-36 QoL.

Table 2 - Characteristics of selected studies (continued)

Authors	Sample	Intervention method	Exercise protocols	Assessment instrument
Klein et al.[20]	157 women BC; 52.2 age EG (n = 72): age = 53.3 ± 12.7 CG (n = 85): age = 51.2 ± 13.1	Pre-physiotherapy	EG: 3 sessions/week, 5 repetitions for each exercise until maximum function and ROM were restored without pain. The intervention was performed on patients 1 month and 6 months post-operatively. CG: Did not undergo physical therapy procedures.	Pain, functionality of the upper limbs, and degrees of flexion and abduction ROM.
Bruce et al.[21]	350 women BC; 58.1 age EG (n = 175): age = 58.4 ± 12.4 CG (n = 175): age = 57.8 ± 12.0	Kinesiotherapy	EG: Three levels of elastic band (1.1 kg; 1.7 kg; 2.6 kg). Three physiotherapy sessions lasting 7 to 10 days. Varied intensities. Total time 12 months of intervention, started in preoperative patients. CG: Subjected to routine day-to-day care.	Upper limb function (arm, hand, and shoulder), pain, wound-related complications, and QoL.

Note: BC = breast cancer; EG = experimental group; CG = control group; EORTC = European Organization for Research and Treatment of Cancer; ALND = axillary lymph node dissection; SLNB = sentinel lymph node biopsy; SPOFIA = Subjective Perception of Post-Operative Functional Impairment of the Arm; DASH = Disabilities of the Arm, Shoulder and Hand; QoL = quality of life; SF-36 = The Short Form (36) Health Survey; ROM = range of motion.

Table 3 - Presentation of the synthesis of studies selected in the systematic review (2012-2021)

Authors	Objective	Study design	Results ($p < 0.05$)	Conclusion
Kilbreath et al.[16]	Verify the effects of a combined program on pain, discomfort, joint stiffness, and muscle weakness without causing lymphedema.	Randomized clinical trial	In the EG, the ROM of the UL homolateral to the surgery was greater than that of the CG in all evaluations. Regarding lymphedema, no differences were observed between the groups.	The kinesiotherapy program was effective in controlling the mobility variables of the ipsilateral UL, pain, discomfort, joint stiffness, and muscle weakness without causing lymphedema. (4-point scale) was applied.
Testa et al.[17]	To evaluate the effectiveness of the early physical rehabilitation program as a treatment for joint mobility and improvement of QoL.	Randomized clinical trial	EG recovered normal function of the variables studied within 1 year after surgery, which did not occur with the CG. The EG showed general improvement in QoL.	The procedure performed recovered the mobility of the glenohumeral joint, improving the functional autonomy of the UL and QoL after one year of physiotherapeutic treatment.
Sato et al.[18]	1. To investigate the effectiveness of a perioperative educational program in improving arm dysfunction in BC patients. 2. To investigate the effect of myofascial therapy in addition to a standard physical therapy program for the treatment of UL dysfunction in BC survivors.	Randomized clinical trial	Only SPOFIA and grip strength improved in EG with ALND. In contrast, the perioperative educational program did not cause improvement for patients undergoing surgery with SLNB.	The educational exercise program to prevent shoulder dysfunction and lymphedema was effective. SPOFIA and grip strength improved ($p < 0.05$) in EG with ALND. Thus, the present program improves postoperative arm function and discomfort in BC patients undergoing ALND surgery.

Table 3 - Presentation of the synthesis of studies selected in the systematic review (2012-2021) (continued)

Authors	Objective	Study design	Results (p < 0.05)	Conclusion
De Groef et al.[19]	The aim of this study was to investigate the effect of myofascial therapy in addition to a standard physiotherapy program for the treatment of UL dysfunctions in breast cancer survivors.	Clinical trial	No differences were found between groups for all outcome parameters over 12 months. However, the overall benefits of standard physical therapy for active shoulder ROM and shoulder function improved in both groups.	Myofascial therapy did not have an additional beneficial effect in improving UL function in women after BC surgery.
Klein et al.[20]	Examine the effect of early physical therapy and patient education on these morbidities.	Clinical trial	GE reduced pain levels in the first month. Minor and extensive surgeries showed an additional effect for the intervention six months after surgery on functional disabilities.	Early physical therapy and patient education have reduced pain levels and can improve functional disabilities without causing postoperative complications.
Bruce et al.[21]	To investigate the effects of an exercise program compared to usual care best practices for women at high risk of UL disability following treatment for BC.	Randomized clinical trial	The PROSPER exercise EG improved upper limb function, postoperative pain, arm symptoms, and physical QoL at 12 months compared to the CG.	The structured and progressive early exercise was safe and clinically effective for women at high risk of developing shoulder and upper limb problems after non-reconstructive breast surgery.

Note: EG = experimental group; CG = control group; UL= upper limb; BC = breast cancer; QoL = quality of life; SPOFIA = Subjective Perception of Post-Operative Functional Impairment of the Arm; ALND = axillary lymph node dissection; SLNB = sentinel lymph node biopsy; ROM = range of motion; PROSPER = Prevention of Shoulder Problems Trial.

In Figure 3A, the analysis was performed using the SMD as the outcome measure. A random effects model was fitted to the data. Therefore, the abduction variable did not differ significantly (p = 0.11). The true results appear to be heterogeneous (p < 0.00001, I^2 = 97%; and 95% CI: -0.35 to 3.31). In Figure 3B, the analysis was performed using the SMD as the outcome measure. A random effects model was fitted to the data. A total of three studies were included in the analysis. Therefore, the flexion variable did not differ significantly (p = 0.14). The true results appear to be heterogeneous (p < 0.0001, I^2 = 97%; and 95% CI: -0.41 to 2.82)

	Experimental			Control				Std. mean difference	Std. mean difference
Study	Mean	SD	Total	Mean	SD	Total	W	IV, Random, 95% CI	IV, Random, 95% CI
De Groef et al.[19]	150.0	13.0	23	143.0	20.0	23	33.4	0.41 [-0.18, 0.99]	
Klein et al.[20]	156.3	12.8	72	152.2	19.0	85	34.2	0.25 [-0.07, 0.56]	
Testa et al.[17]	164.4	5.6	35	139.1	7.2	35	32.4	3.88 [3.07, 4.69]	
Total (95%CI)	-	-	130	-	-	143	100	1.48 [-0.35, 3.31]	

Heterogeneity: Tau² = 2.53; Chi² = 67.87, df = 2 (p < 0.00001);I² = 97%

Test for overall effect: Z = 1.58 (p = 0.11)

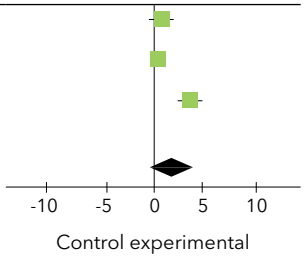

Figure 3A - Forest plot shoulder flexion.

Note: SD = standard deviation; Std. = standard; W = weight (%); CI = confidence interval.

	Experimental			Control				Std. mean difference	Std. mean difference
Study	Mean	SD	Total	Mean	SD	Total	W	IV, Random, 95%CI	IV, Random, 95%CI
De Groef et al.[19]	141.0	17.0	23	131.0	26.0	23	33.2	0.44 [-0.13, 1.02]	
Klein et al.[20]	157.5	13.8	72	155.7	17.5	85	34.2	0.11 [-0.20, 0.43]	
Testa et al.[17]	167.9	5.0	35	145.2	8.8	35	32.5	3.14 [2.43, 3.85]	
Total (95%CI)	-	-	**130**	-	-	**145**	**100**	**1.21 [-0.41, 2.82]**	

Heterogeneity: $Tau^2 = 1.96$; $Chi^2 = 58.38$, df = 2 ($p < 0.00001$); $I^2 = 97\%$

Test for overall effect: Z = 1.46 (p = 0.14)

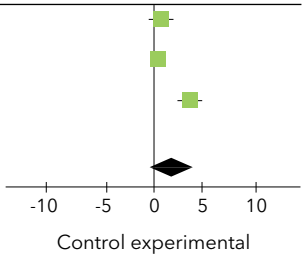

Figure 3B - Shoulder abduction.

Note: SD = standard deviation; Std. = standard; CI = confidence interval.

In Table 1, the strength of evidence of the meta-analyzed studies was analyzed, and the result showed a moderate certainty of evidence for possible decision-making. The three studies[17,19,20] included in the meta-analysis presented a low risk of bias, which is why the assessment of certainty in the "risk of bias" domain was considered "not serious".

Discussion

According to the results presented in Table 2, the analyzed articles presented the results for physiotherapeutic interventions, especially through the methods kinesiotherapy, early physiotherapy, home guidance, questionnaires for pain assessment, assessment of functional capacity, lymphedema volume and QoL of patients in women undergoing mastectomy, with or without lymphedema.

The studies included in this systematic review presented results related to increasing range of motion and upper limb muscle strength and preventing lymphedema, using mainly active or active-assisted exercises and a QoL questionnaire, however the meta-analysis showed no improvement in range of motion in shoulder flexion and abduction. The Prevention of Shoulder Problems Trial (PROSPER) program was not described in the research itself, as it was a multicenter randomized clinical trial in several cancer treatment centers in the United Kingdom, however, the Subjective Perception of Post-Operative Functional Impairment of the Arm (SPOFIA) method was detailed in the article itself.[18-21]

The protocols used in clinical trials showed differences between exercise programs and the number of sessions, the intervention time ranged from 8 weeks to 12 months. Only one study had the intervention interrupted until ROM was recovered without any pain, with the number of sessions undetermined.[20]

Kinesiotherapy was used in all studies,[16-21] one of which was combined with myofascial release.[19] However, this study did not demonstrate beneficial results in improving the ROM of the UL and highlighted that more research should be done to explore the prevalence rate of myofascial trigger points among the profile of these patients.[19] Another experimental study was related to the reduction of pain and joint stiffness.[16] It is worth mentioning that only one study highlighted the use of the goniometer to compare whether or not there was an increase in ROM at the end of the study,[17] this being an important instrument used by physiotherapy in treatment.

The most compromised movements observed in the selected studies were flexion, abduction, and external and internal rotation, which are very important for carrying out daily living activities and show additional improvement from the 10th session onwards. This evidence corroborates a research that analyzed 19 women who underwent mastectomy on the right side and 11 women on the left side and showed a significant improvement ($p < 0.05$) in the functional assessment and postoperative ROM, using flexion/extension exercises, adduction/abduction, medial and lateral.[22]

Early physiotherapy was a treatment proposal used in which women underwent treatment immediately post-surgery, which was observed to not interfere with

post-operative complications, demonstrating significant results in reducing pain levels and helping with the ability to functional status of women.[16] Another study, in which women were instructed before and after surgery through an educational prevention program, through self-care strategies, also had good results.[14] Equally, a recent investigation stated that preoperative physiotherapeutic guidelines are important in raising patient awareness, with a view to perceptions and functional difficulties that may appear.[23]

It is important to emphasize that the use of questionnaires to evaluate the QoL of these women is of great value in observing the impact of physiotherapy in the postoperative period, and it was possible to notice that the authors were concerned about applying a questionnaire together with the use of the visual analog scale, presenting greater care and knowledge. From this perspective, the Federal Council of Physiotherapy and Occupational Therapy says that one of the physiotherapist's objectives is linked to health care, developing prevention, protection, promotion, and rehabilitation of care at the individual or collective level, ensuring optimal treatment.[24] In this perspective, regarding the clarification of the intervention, the relationship between patient and professional is something that can be positively favorable, increasing adherence to the physiotherapeutic protocol immediately after surgery, which reflects in the reduction of fear and concern, since the need for returning to your day-to-day tasks is essential. This was evidenced in a study that identified, through interviews, the themes of which involved knowledge of care, anxieties and limitations, and living with care over time, and related to the prevention of lymphedema characteristic of BC in women in the post-surgical period.[25]

It is necessary to use public policies to raise awareness and provide guidance to BC, so that there is a greater reach among women on this subject. The Pink Month is a strategy that has been widely used, highlighting the need for exams to be carried out such as mammography and self-examination.[26] In this sense, in Brazil, a document was prepared on guidelines for early BC screening, presented by Ordinance No. 59 together with the National Cancer Institute (INCA) and the Ministry of Health, to expand actions aimed at early cancer detection among women in the age group aged 50 to 69.[27]

Given the above, the value of the physiotherapist in the outpatient sector, working in the prevention and control of musculoskeletal changes related to cancer patients, in addition to the use of a complete physiotherapeutic assessment, through scales, physical tests, goniometry, main complaint, among others, are important to provide better quality monitoring and intervention for patients.[28]

Implications on physiotherapy practice

This review verified the possible effects of physiotherapy in the postoperative period of women with BC. It is recommended to carry out physiotherapeutic interventions in women with post-operative breast cancer due to the reduction in pain, reduction in edema, improvement in range of movement in the lower limbs, increase in muscle strength, improvement in functional autonomy, and execution of activities of daily life.[29,30] Physiotherapeutic intervention must be administered prophylactically preoperatively, given the possible satisfactory results during the treatment of the pathology. Future research highlighting the effects of physiotherapeutic intervention on breast cancer using other study variables (breast cancer biomarkers and cardiorespiratory fitness) and statistical methods (meta-analysis) should be encouraged to better guide professionals in the field.

Limitations of the study

There was a low number of controlled clinical experimental studies related to physiotherapy intervention in the postoperative period of CM. Assessment of the risk of bias showed that all studies evaluated presented difficulties in blinding the outcome assessment, that is in blinding the assessments carried out on the results. Another difficulty encountered in this study was the small number of types of interventions, which may also restrict the conclusions. Furthermore, it is necessary to analyze each type of intervention separately. Furthermore, future studies must use standardized questionnaires to compare before and after the intervention for transparent feedback on the QoL of these patients. In this sense, the methodological standardization of the intervention is also difficult in reproduction and greater possibilities of conclusion.

Conclusion

According to this meta-analysis, no results were obtained that demonstrated improvements in physiotherapeutic interventions in women after BC surgery in the

range of motion of the upper limbs; therefore, there was no statistically significant difference in the comparison between the control and experimental groups, and the certainty of the evidence is low or very low. However, it is possible to highlight a set of benefits in the outpatient setting.

The importance of physiotherapeutic actions before surgical treatment was also highlighted, aiming at better adherence to preventive guidelines and understanding the importance of care, given the positive performance of the work carried out to maintain functionality that reflects throughout the treatment. Therefore, new studies are recommended to institutionalize early physiotherapeutic protocols in women after BC surgery, ensuring a better and faster recovery.

Authors' contributions

AECS, DGL, ASMN and CECP were responsible for the conceptualization; AECS and DGL, for the formal analysis and original draft; AECS, DGL, ASMN and CECP, for the investigation; DGL, ASMN, RGN and CJBP, for the supervision; RGN and CJBP, for the validation. All authors were responsible for the methodology and approved the final version.

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