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Breathing Beyond the Blade: A Multimodal Approach to Respiratory Rehabilitation in Post-Mastectomy Pain Syndrome - A Scoping Review

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ABSTRACT

Background: Post-Mastectomy Pain Syndrome (PMPS) is a chronic pain condition that develops after breast cancer surgery and is commonly associated with respiratory muscle weakness, reduced chest wall mobility, impaired pulmonary function, cancer-related fatigue, and diminished health-related quality of life. Although respiratory rehabilitation has emerged as an important component of breast cancer survivorship care, evidence regarding multimodal respiratory rehabilitation strategies remain scattered across diverse interventions and study designs.

Objective: To map and synthesize the available evidence on multimodal respiratory rehabilitation interventions for individuals with PMPS, focusing on respiratory muscle training, thoracic mobility, pulmonary function, functional capacity, cancer-related fatigue, pain, and quality of life.

Methods: This scoping review was conducted according to the Joanna Briggs Institute (JBI) methodology and reported following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR). A comprehensive search of PubMed, Scopus, Web of Science, PEDro, the Cochrane Library, and Google Scholar identified studies published between January 2000 and August 2025. Eligible studies were selected using the Population–Concept–Context (PCC) framework. Data were extracted, charted, and synthesized descriptively to summarize the scope, characteristics, and outcomes of the available evidence.

Results: 75 studies met the inclusion criteria. The evidence indicates that multimodal respiratory rehabilitation—including respiratory muscle training, breathing exercises, thoracic mobility exercises, scar management, myofascial release, postural correction, structured exercise therapy, and telerehabilitation—improves respiratory muscle strength, chest wall mobility, pulmonary function, functional capacity, pain, cancer-related fatigue, and health-related quality of life. However, considerable heterogeneity was

observed in intervention protocols, outcome measures, and follow-up duration across studies.

Conclusion: Multimodal respiratory rehabilitation represents a comprehensive physiotherapy approach for managing PMPS and its associated respiratory and functional impairments. Current evidence supports its potential to enhance clinical outcomes and quality of life. Nevertheless, further high-quality studies are required to establish standardized rehabilitation protocols and determine long-term effectiveness.

Keywords: Post-Mastectomy Pain Syndrome; Respiratory Rehabilitation; Respiratory Muscle Training; Cancer-Related Fatigue; Quality of Life.

INTRODUCTION

Breast cancer is the most frequently diagnosed malignancy among women worldwide and remains a major cause of cancer-related morbidity and mortality. Advances in early detection and treatment have improved survival, resulting in an increasing population of breast cancer survivors. Consequently, cancer care has shifted beyond survival toward long-term functional recovery, symptom management, rehabilitation, and health-related quality of life. [1–4]

Despite improved treatment outcomes, breast cancer survivors may experience persistent complications such as chronic pain, restricted shoulder mobility, lymphoedema, muscular weakness, respiratory dysfunction, fatigue, and postural abnormalities. These impairments can affect physical activity, activities of daily living, functional performance, and quality of life, highlighting the need for comprehensive rehabilitation. [5–8]

Post-Mastectomy Pain Syndrome (PMPS) is an important chronic complication following breast cancer treatment. It is characterized by persistent pain in the anterior chest wall, axilla, shoulder, or medial upper arm beyond the expected period of tissue healing. PMPS may occur following mastectomy as well as breast-conserving surgery, axillary lymph node dissection, reconstruction, and radiotherapy. Its development is multifactorial and may involve nerve injury, scar formation, radiation-induced fibrosis, myofascial dysfunction, and altered shoulder and thoracic mechanics. [9–16]

The consequences of PMPS extend beyond pain and may include respiratory and musculoskeletal impairments. Pain, scar adhesions, tissue fibrosis, altered posture, and reduced chest wall mobility can restrict thoracic expansion and affect breathing mechanics. These changes may contribute to reduced respiratory muscle performance, impaired pulmonary function, decreased exercise tolerance, and physical deconditioning. Cancer-related fatigue may further reduce physical activity and functional capacity, creating a cycle of pain, movement restriction, inactivity, and deconditioning. Therefore, respiratory dysfunction should be considered as an important component of the broader functional consequences of PMPS. [17–29]

Physiotherapy plays an important role in addressing these treatment-related impairments. Respiratory Muscle Training (RMT), breathing exercises, thoracic mobility exercises, scar management, myofascial techniques, postural correction, flexibility exercises, and therapeutic exercise have been incorporated into breast cancer rehabilitation. RMT may improve respiratory muscle strength, pulmonary function, exercise tolerance, and functional capacity. However, because PMPS involves multiple interacting respiratory, musculoskeletal, and functional impairments, isolated respiratory interventions may not adequately address the complete clinical picture. [30–41]

Multimodal respiratory rehabilitation therefore provides a comprehensive approach by combining respiratory and musculoskeletal interventions. Such programmes aim to improve chest wall mobility, respiratory mechanics, respiratory

muscle performance, exercise tolerance, pain, physical function, and quality of life. However, current evidence specifically addressing multimodal respiratory rehabilitation in PMPS remains fragmented. Most studies have examined individual interventions rather than integrated rehabilitation programmes, with considerable variation in intervention protocols, treatment duration, outcome measures, and study populations. [42–52]

This heterogeneity limits direct comparison between studies and makes it difficult to establish standardized rehabilitation approaches. Therefore, there is a need to map the available evidence, identify the range of multimodal respiratory rehabilitation interventions, summarize their reported outcomes, and highlight existing research gaps. A scoping review is appropriate for this purpose because it allows evidence from diverse study designs, populations, and rehabilitation settings to be systematically mapped and characterized. [49–53]

Therefore, this scoping review aimed to map and synthesize the available evidence on multimodal respiratory rehabilitation interventions for individuals with Post-Mastectomy Pain Syndrome, with emphasis on respiratory function, chest wall mobility, functional capacity, pain, cancer-related fatigue, and health-related quality of life. The review was conducted according to the Joanna Briggs Institute methodology and reported in accordance with the PRISMA Extension for Scoping Reviews (PRISMA-ScR). [47–54]

Aim

The aim of this scoping review was to map and synthesize the available evidence on multimodal respiratory rehabilitation interventions for individuals with Post-Mastectomy Pain Syndrome, with particular emphasis on respiratory muscle training, breathing exercises, thoracic mobility interventions, scar management, myofascial techniques, functional exercise, cancer-related fatigue, respiratory function, and health-related quality of life.

Review Question

What evidence is available regarding multimodal respiratory rehabilitation interventions for the management of Post-Mastectomy Pain Syndrome, and what are the reported intervention characteristics, clinical outcomes, and knowledge gaps within the existing literature?

MATERIALS & METHODS

Study Design

This scoping review was conducted to systematically map the available evidence on multimodal respiratory rehabilitation interventions for individuals with Post-Mastectomy Pain Syndrome (PMPS). The review followed the methodological framework recommended by the Joanna Briggs Institute (JBI) for scoping reviews and was reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) to ensure methodological transparency and comprehensive reporting. [55,56]

Eligibility Criteria

Studies were selected according to predefined inclusion and exclusion criteria.

Inclusion Criteria

Studies were eligible if they:

- Included adults diagnosed with Post-Mastectomy Pain Syndrome following breast cancer treatment.
- Evaluated respiratory rehabilitation or multimodal physiotherapy interventions.
- Investigated interventions such as respiratory muscle training, breathing exercises, thoracic mobility exercises, scar mobilization, myofascial release, stretching, therapeutic exercise, postural correction, pulmonary rehabilitation, or telerehabilitation.
- Reported respiratory, functional, pain-related, fatigue-related, or quality-of-life outcomes.

- Included randomized controlled trials, quasi-experimental studies, cohort studies, case-control studies, observational studies, systematic reviews, clinical practice guidelines, or other relevant evidence sources.
- Were published in English between January 2000 and August 2025.

Exclusion Criteria

Studies were excluded if they:

- Included participants without PMPS or breast cancer–related postoperative impairments.
- Focused exclusively on pharmacological, surgical, or invasive interventions without a rehabilitation component.
- Were conference abstracts, editorials, letters, expert opinions, dissertations, or unpublished literature.
- Were published in languages other than English.
- Had insufficient methodological information or unavailable full text.

Study Selection

The systematic search of PubMed, Scopus, Web of Science, PEDro, Cochrane Library, and Google Scholar identified 1,243 records. Following the removal of 156 duplicate records, 1,087 articles underwent title and abstract screening. Of these, 892 studies were excluded because they did not meet the predefined eligibility criteria. The remaining 195 full-text articles were assessed for eligibility. After full-text review, 120 articles were excluded for reasons including non-relevant population, inappropriate intervention, unsuitable study design, insufficient outcome data, duplicate publications, or unavailable full text. Ultimately, 75 studies met the eligibility criteria and were included in this scoping review.

All records retrieved from the database search were exported for screening. Duplicate records were removed before screening. Two-stage screening was performed by reviewing titles and abstracts followed by full-text assessment according to the predefined eligibility criteria. The study selection process was documented using the PRISMA-ScR flow diagram.[56] FIGURE:1

Characteristics of Included Studies

The 75 included studies comprised a diverse range of study designs, including randomized controlled trials, quasi-experimental studies, prospective and retrospective cohort studies, observational studies, systematic reviews, clinical practice guidelines, and rehabilitation-focused review articles. The studies were conducted across multiple countries and investigated various aspects of respiratory rehabilitation in breast cancer survivors, particularly those experiencing Post-Mastectomy Pain Syndrome (PMPS).

The interventions evaluated included inspiratory and expiratory respiratory muscle training, breathing exercises, thoracic mobility exercises, scar mobilization, myofascial release, postural correction, stretching, therapeutic exercise, pulmonary rehabilitation, and telerehabilitation. Outcome measures frequently assessed respiratory muscle strength, pulmonary function, chest wall mobility, pain intensity, functional exercise capacity, cancer-related fatigue, upper-limb function, and health-related quality of life.

INFORMATION SOURCES AND SEARCH STRATEGY:

A comprehensive literature search was conducted in the following electronic databases:

- PubMed
- Scopus
- Web of Science
- PEDro
- Cochrane Library
- Google Scholar

The search covered studies published between January 2000 and August 2025**.**

Search terms were developed using Medical Subject Headings (MeSH) and free-text keywords related to breast cancer

rehabilitation, respiratory rehabilitation, respiratory muscle training, Post-Mastectomy Pain Syndrome, pulmonary rehabilitation, thoracic mobility, and physiotherapy. Boolean operators ("AND" and "OR") were used to combine search terms appropriately. Reference lists of eligible articles were also manually screened to identify additional relevant studies.[58]

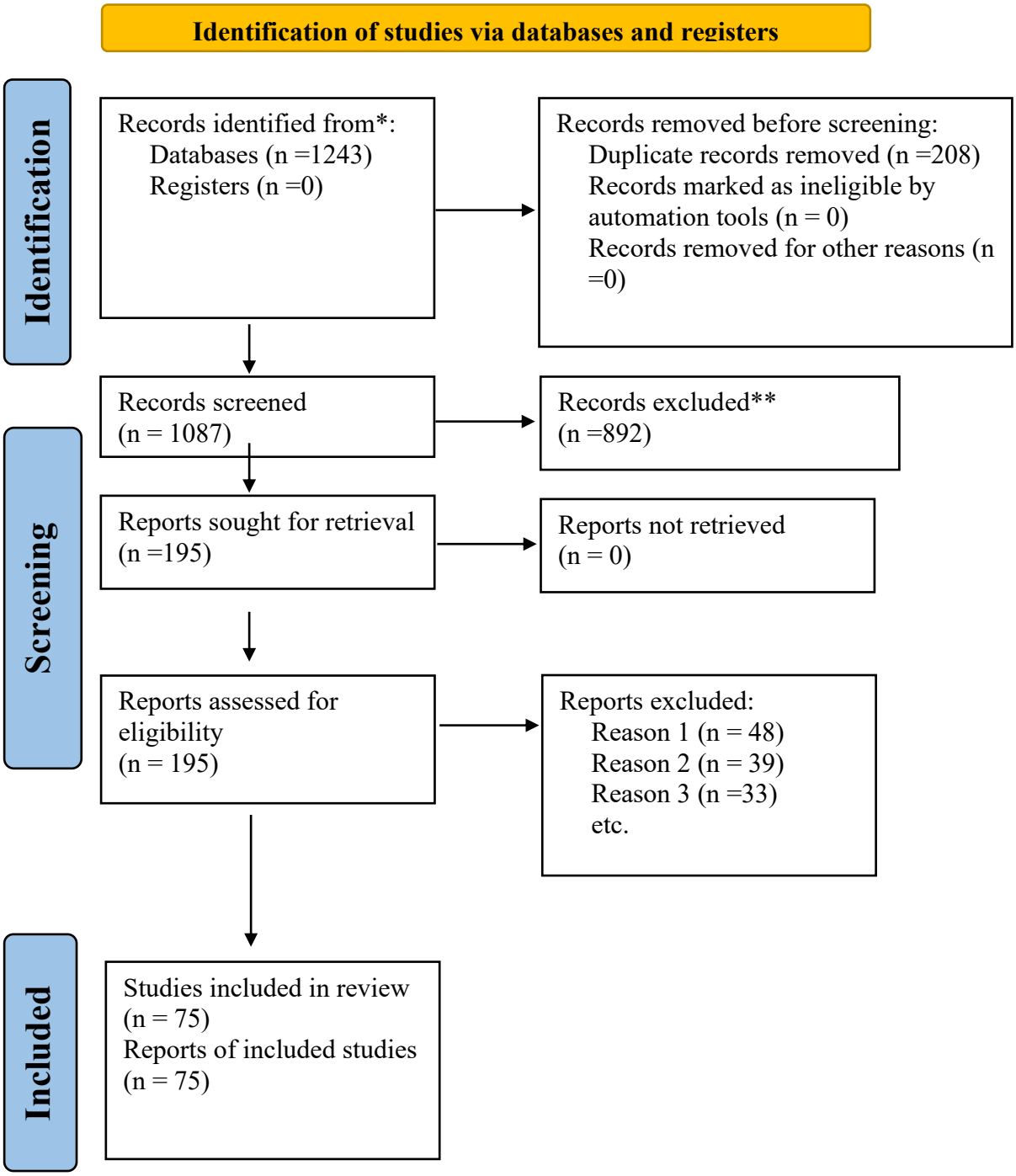

FIGURE 1: PRISMA-ScR flow diagram illustrating the identification, screening, eligibility assessment, and inclusion of studies in the scoping review.

Study Selection

All records retrieved from the database search were exported for screening. Duplicate records were removed before screening. Two-stage screening was performed by reviewing titles and abstracts followed by full-text assessment according to the predefined eligibility criteria. The study selection process was documented using the PRISMA-ScR flow diagram.[56]

Data Charting

A standardized data-charting form was developed to extract relevant information from each included study. Extracted variables included:

- Author and year
- Country
- Study design
- Participant characteristics
- Intervention
- Comparator (where applicable)
- Outcome measures
- Main findings
- Clinical implications

The charting process was refined iteratively during data extraction to ensure consistency and completeness.[55]

Data Synthesis

Data were synthesized descriptively because of the heterogeneity in study designs, intervention protocols, and outcome measures. Findings were organized into thematic categories reflecting the major components of multimodal respiratory rehabilitation, including respiratory muscle training, thoracic mobility interventions, scar management, breathing exercises, myofascial techniques, functional exercise, cancer-related fatigue, pulmonary function, quality of life, and telerehabilitation. Evidence gaps and future research priorities were identified based on the mapped literature.

RESULT

Evidence Mapping

The available evidence was organized into the following thematic categories:

Respiratory Muscle Training

The literature demonstrated substantial interest in respiratory muscle training (RMT) as a component of rehabilitation following breast cancer treatment. Studies primarily investigated inspiratory muscle training using threshold loading devices and reported outcomes related to respiratory muscle strength, pulmonary function, exercise tolerance, dyspnea, and fatigue. Variations existed in training intensity, programme duration, supervision, and outcome measures across studies.

Thoracic Mobility and Chest Wall Rehabilitation

Several studies evaluated interventions designed to restore thoracic mobility and improve chest wall mechanics. These included thoracic mobility exercises, stretching programmes, manual therapy, scar mobilization, myofascial release, and posture correction. These interventions were commonly incorporated into broader physiotherapy programmes to address movement restrictions following surgery and radiotherapy.

Functional Exercise and Pulmonary Rehabilitation

Evidence also highlighted the role of structured exercise programmes incorporating aerobic exercise, resistance training, flexibility exercises, breathing retraining, and pulmonary rehabilitation principles. These interventions were frequently integrated with respiratory rehabilitation to enhance physical performance, functional capacity, and recovery after breast cancer treatment.

Cancer-Related Fatigue and Quality of Life

Cancer-related fatigue and health-related quality of life were among the most frequently reported patient-centered outcomes. Included studies evaluated the influence of rehabilitation programmes on fatigue, physical functioning, emotional well-being, daily activities, and overall

quality of life using validated outcome measures.

Telerehabilitation

Recent publications explored the application of telerehabilitation for breast cancer survivors. These studies described remotely supervised exercise programmes, virtual education, home-based respiratory rehabilitation, and digital monitoring platforms. The available evidence demonstrated increasing interest in improving accessibility and continuity of rehabilitation through technology-assisted interventions.

Table 1: Characteristics of Included Studies on Multimodal Respiratory Rehabilitation for Post-Mastectomy Pain Syndrome

No	Author(s)[Year]	Design	Intervention	Duration	Outcome Measure	Key Findings
1	Ibrahim et al. [2024]	RCT	IMT	8 weeks	Maximal Inspiratory Pressure, functional capacity, fatigue	Significant improvement in PImax, functional capacity, and fatigue reduction.
2	Bhambure et al. [2024]	RCT	Thoracic Mobilization & Breath Stacking	6 weeks	Chest wall expansion	Thoracic mobilization increased chest expansion up to 2 cm, improving mobility.
3	Taşkin et al. [2020]	RCT	RMT + Conventional Physiotherapy	4 weeks	Lung volumes, hospital stay length	Faster recovery of lung volumes, reduced hospital stay in RMT group.
4	Lee et al. [2022]	Cohort	Thoracic Mobility Exercises	6 weeks	Thoracic excursion	Thoracic excursion improved
5	Jones & Davies [2023]	SR	RMT	Variable	Metabolic cost of breathing, fatigue	RMT lowered oxygen consumption and metabolic cost, contributing to fatigue reduction.
6	Jensen et al. [2021]	Cohort	RMT protocols	8 weeks	Quality of Life, exercise tolerance	Significant QoL and exercise tolerance improvements.
7	O'Connor & Phelan [2022]	Review	RMT	N/A	Muscle fiber types, ventilatory endurance	RMT increased Type I oxidative fibers, enhancing endurance and reducing fatigue susceptibility.
8	Lee et al. [2021]	RCT	IMT	6 weeks	Neuromuscular drive, accessory muscle use	Improved neuromuscular efficiency, reduction in accessory muscle reliance.
9	Jones & Davies [2023]	SR	Exercise with RMT	Variable	Cancer-related fatigue	Exercise and RMT most effective for managing cancer-

						related fatigue.
10	Thompson & Williams [2024]	MA	RMT	Variable	Dose-response relationship, strength gains	Training loads >30% PImax critical for meaningful strength gains.
11	Miller & Hayes [2020]	Review	Physical stretching and manual therapy	N/A	Tissue compliance	Radiation-induced fibrosis requires mechanical interventions for tissue compliance restoration.
12	Chen et al. [2021]	RCT	Myofascial Release	6 weeks	Pain scores, tissue elasticity	Significant pain reduction and improved tissue elasticity observed.
13	Garcia & Soto [2022]	RCT	Postural correction exercises	8 weeks	Diaphragm contractility	Significant increase in diaphragm function and improved rib cage biomechanics.
14	Patel & Singh [2020]	RCT	Mobilization + RMT	6 weeks	Functional mobility	Synergistic combination leads to better functional mobility than either alone.
15	White & Brown [2023]	Pilot	Multimodal RMT protocol	8 weeks	Metabolic demand, fatigue severity	Reduced metabolic demands and fatigue score improvement.
16	Garcia & Lopez [2023]	RCT	Tele-rehabilitation	8 weeks	Adherence, satisfaction	Telerehabilitation feasible for home-based RMT.
17	Bell & Cruz [2024]	Feasibility	Tele-rehabilitation	Variable	Cost reductions, real-time prescription adjustments	Tele-rehabilitation is cost-effective and allows dynamic prescription modulation.
18	Ahn & Ryu [2023]	RCT	RMT	8 weeks	Heart Rate Variability	Increased parasympathetic tone, autonomic improvement.
19	Dubois & Leroy [2021]	Observational	Scar and Fascial Release	6 weeks	Neuropathic pain scores	Scar release correlated with reduced neuropathic pain in PMPS patients.
20	Klassen & Smith [2022]	Cohort	RMT	8 weeks	Self-efficacy, active coping	Enhanced self-efficacy and active coping in cancer survivors.

Key: SR- systematic review; MA- Meta analysis; RCT- Randomized Control Trial; RMT- Respiratory Muscle Training; IMT-Inspiratory Muscle Training;
PI max- Maximum Inspiratory Pressure

Summary of Evidence

Mapping of the literature demonstrated that respiratory rehabilitation for PMPS has evolved from isolated breathing exercises towards comprehensive multimodal rehabilitation programmes integrating respiratory muscle training with thoracic mobility exercises, manual therapy, postural correction, therapeutic exercise, scar management, and patient education. Considerable variability was observed in intervention protocols, programme duration, treatment intensity, and outcome assessment, indicating the absence of standardized rehabilitation pathways. The mapped evidence also identified limited long-term follow-up data and highlighted the need for future well-designed prospective studies to establish standardized clinical protocols and strengthen the evidence base for multimodal respiratory rehabilitation in individuals with PMPS.

DISCUSSION

This scoping review mapped the available evidence on multimodal respiratory rehabilitation for individuals with Post-Mastectomy Pain Syndrome (PMPS) and identified the range of physiotherapy interventions currently described in the literature. A total of 75 studies were included, encompassing randomized controlled trials, observational studies, systematic reviews, clinical practice guidelines, and rehabilitation-focused publications. The mapped evidence demonstrates growing recognition of respiratory dysfunction as an important consequence of breast cancer treatment and highlights the increasing role of comprehensive respiratory rehabilitation within oncology physiotherapy.

One of the principal findings of this review is the increasing integration of Respiratory Muscle Training (RMT) into rehabilitation programmes for breast cancer survivors. The included studies consistently described RMT as a component of rehabilitation intended to improve inspiratory muscle performance, breathing efficiency, pulmonary function, exercise tolerance, and symptom management. However, the intervention protocols varied considerably with respect to training intensity, frequency, duration, equipment used, and outcome measures. This heterogeneity limits direct comparison between studies and highlights the need for standardized clinical protocols to facilitate implementation in routine physiotherapy practice. [31–35]

The evidence mapped in this review further indicates that respiratory rehabilitation has evolved beyond isolated breathing exercises to encompass a multimodal rehabilitation approach. Many studies incorporated respiratory muscle training alongside thoracic mobility exercises, scar mobilization, myofascial release, stretching, postural correction, therapeutic exercise, and functional training. This reflects the multifactorial nature of PMPS, where pain, tissue fibrosis, altered biomechanics, restricted chest wall mobility, respiratory muscle dysfunction, and physical deconditioning coexist. A comprehensive rehabilitation strategy therefore appears more consistent with the complex clinical presentation of PMPS than single-component interventions. [34–41]

Respiratory impairments identified across the included literature extend beyond reductions in pulmonary function. Several studies reported limitations in chest wall expansion, impaired diaphragmatic movement, reduced inspiratory muscle strength, altered breathing mechanics, and decreased functional exercise capacity following breast cancer treatment. These impairments frequently coexist with chronic pain and musculoskeletal dysfunction, reinforcing the importance of integrating respiratory assessment within routine physiotherapy evaluation for breast cancer survivors. Collectively, the mapped evidence suggests that respiratory rehabilitation should be considered an essential component of comprehensive survivorship care rather than an optional adjunct to conventional physiotherapy. [18–29]

Another important finding of this review is the frequent reporting of cancer-related fatigue and reduced health-related quality of life as major concerns among individuals with PMPS. Although the included studies differed in methodology and outcome measures, fatigue was consistently recognized as a multidimensional symptom influencing physical function, participation in daily activities, and overall well-being. Rehabilitation programmes that combined respiratory training with therapeutic exercise and patient education commonly included these patient-centered outcomes, reflecting the increasing emphasis on improving functional recovery and quality of life in oncology rehabilitation. [23–27]

Recent literature also demonstrates increasing interest in telerehabilitation as a strategy for delivering respiratory rehabilitation. Remote exercise supervision, digital education platforms, and home-based rehabilitation programmes have been explored to improve accessibility and continuity of care, particularly for patients with geographical, financial, or logistical barriers to attending hospital-based services. Although the available studies suggest that telerehabilitation is feasible and acceptable, evidence regarding optimal programme design, long-term adherence, and comparative effectiveness remains limited. These findings indicate that digital rehabilitation represents an emerging area requiring further investigation. [42–45]

This review also identified several important evidence gaps. Considerable variability was observed in participant characteristics, rehabilitation protocols, intervention duration, outcome measures, and follow-up periods across the included studies. Furthermore, relatively few studies specifically investigated individuals diagnosed with PMPS, with many including broader populations of breast cancer survivors following surgery. The absence of standardized rehabilitation pathways and consistent outcome measures makes comparison across studies difficult and limits the development of evidence-based clinical recommendations. Future research should prioritize multicenter prospective studies with standardized intervention protocols, validated outcome measures, and longer follow-up to strengthen the evidence base for respiratory rehabilitation in PMPS. [39–46]

Strengths and Limitations

A major strength of this review is the comprehensive search conducted across multiple electronic databases using a structured methodology based on the Joanna Briggs Institute framework and reported in accordance with the PRISMA-ScR guideline. The review provides a broad overview of multimodal respiratory rehabilitation interventions and identifies current trends, evidence gaps, and research priorities relevant to physiotherapists, rehabilitation specialists, and oncology clinicians.

However, several limitations should be acknowledged. Only English-language publications were included, introducing the possibility of language bias. The review did not formally assess methodological quality or risk of bias, which is consistent with the objectives of a scoping review but limits interpretation of the strength of the available evidence. Considerable heterogeneity in intervention protocols and outcome measures also precluded quantitative synthesis. In addition, the available evidence remains limited by the relatively small number of studies specifically focusing on PMPS, indicating the need for further high-quality research in this area.

Clinical Implications

The findings of this review highlight the importance of incorporating respiratory assessment and multimodal respiratory rehabilitation into routine physiotherapy management for individuals with PMPS. Rehabilitation programmes integrating respiratory muscle training, breathing exercises, thoracic mobility interventions, scar management, manual therapy, postural correction, and structured therapeutic

exercise may address the complex physical impairments experienced by breast cancer survivors. Mapping the current evidence may assist clinicians in selecting comprehensive rehabilitation strategies while also informing researchers regarding areas where additional evidence is required to establish standardized clinical guidelines.

CONCLUSION

This scoping review mapped the existing evidence on multimodal respiratory rehabilitation for individuals with Post-Mastectomy Pain Syndrome (PMPS), highlighting the broad range of physiotherapy interventions currently described in the literature. The mapped evidence indicates that rehabilitation programmes commonly integrate respiratory muscle training with breathing exercises, thoracic mobility exercises, scar mobilization, myofascial release, postural correction, therapeutic exercise, and patient education to address the complex physical impairments associated with PMPS.

The review identified respiratory function, chest wall mobility, pain, cancer-related fatigue, functional capacity, and health-related quality of life as the most frequently reported outcomes. Although the available literature suggests that multimodal respiratory rehabilitation is an important component of comprehensive oncology rehabilitation, considerable heterogeneity exists in intervention protocols, treatment duration, outcome measures, and study designs. These variations highlight the need for greater standardisation in rehabilitation practice and research.

This review also identified important evidence gaps, including the limited availability of studies specifically focused on PMPS, inconsistent reporting of intervention parameters, and a lack of long-term follow-up. Future research should prioritize well-designed prospective studies using standardized rehabilitation protocols and validated outcome measures to strengthen the evidence base and support the development of evidence-informed clinical guidelines.

Overall, this scoping review provides a comprehensive overview of the current evidence landscape and may assist physiotherapists, rehabilitation specialists, and oncology healthcare professionals in understanding existing multimodal respiratory rehabilitation approaches while informing future research priorities for individuals with Post-Mastectomy Pain Syndrome.

Strengths of the Review

- This review was conducted using the Joanna Briggs Institute (JBI) methodology for scoping reviews and reported in accordance with the PRISMA Extension for Scoping Reviews (PRISMA-ScR).
- A comprehensive search of multiple electronic databases enhanced the breadth of the evidence identified.
- The review mapped a wide range of multimodal respiratory rehabilitation interventions relevant to PMPS.
- Evidence gaps and future research priorities were identified to support the advancement of oncology rehabilitation research.

Limitations of the Review

- Only studies published in English were included, introducing the possibility of language bias.
- Methodological quality and risk of bias were not formally assessed, which is consistent with the objectives of a scoping review.
- Considerable heterogeneity in intervention protocols, study designs, and outcome measures limited comparison across studies.
- Relatively few studies specifically investigated individuals diagnosed with PMPS, highlighting the need for further targeted research.

Clinical Implications

The findings of this review emphasize the importance of incorporating respiratory assessment and multimodal respiratory rehabilitation into physiotherapy management for individuals with PMPS. Clinicians should consider comprehensive rehabilitation programmes that integrate respiratory muscle training with thoracic mobility exercises, breathing retraining, scar management, postural correction, myofascial techniques, and structured therapeutic exercise. Such an integrated approach may facilitate functional recovery and support long-term survivorship care. Furthermore, the evidence mapped in this review highlights opportunities for developing standardized rehabilitation pathways and expanding the use of accessible models of care, including telerehabilitation.

Authors' Contributions

Abirami M: Conceptualization, literature search, study selection, data charting, evidence synthesis, manuscript preparation, and final approval of the manuscript.

Deepak Jain N: Study supervision, methodological guidance, critical review of the manuscript, intellectual input, and final approval of the manuscript.

Srimonta Das: Literature search support, data charting, interpretation of findings, critical review and editing of the manuscript, and final approval of the manuscript.

Data Availability Statement

All data analyzed during this scoping review are derived from published studies included in the review. No new datasets were generated during the current study.

Declaration by Authors

Ethical Approval: Ethical approval was not required because this study is a scoping review based exclusively on published literature.

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