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Physiotherapy Approaches to Managing Musculoskeletal Pain During Menopause and Perimenopause: A Systemic Review

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ABSTRACT

This systematic review analyzes 19 studies examining the effectiveness of non-pharmacological interventions for improving health outcomes in postmenopausal women. Interventions included physiotherapy techniques, structured strength training, proprioceptive neuromuscular facilitation, yoga, pelvic floor muscle training, aerobic exercise, and complementary therapies such as electromagnetic stimulation and traditional Thai exercises. These approaches targeted key issues including musculoskeletal pain, urinary incontinence, genitourinary syndrome, menopausal symptoms, and reduced quality of life. The findings indicate that multimodal and holistic interventions significantly improved pain, mobility, muscle strength, and psychological well-being. Yoga and mind-body practices enhanced emotional health and quality of life, while pelvic floor training effectively addressed urinary and sexual health concerns. Most interventions were found to be safe, feasible, and well-tolerated, with moderate to high effectiveness. Although some studies had methodological limitations, such as lack of blinding and small sample sizes, the overall evidence strongly supports the integration of these non-pharmacological strategies into postmenopausal health care. Future research should focus on long-term outcomes and standardized intervention protocols to enhance clinical applicability.

Keywords: Menopause, Postmenopausal Women, Exercise Therapy, Physiotherapy, Pelvic Floor Training, Yoga, Non-pharmacological Interventions, Quality of Life.

INTRODUCTION

Musculoskeletal pain is a pervasive and often debilitating condition that affects individuals across various stages of life. However, during the menopausal transition, particularly in perimenopause and menopause, the prevalence and intensity of such pain tend to increase significantly due to the complex interplay of hormonal, physiological, and psychosocial changes(1). The menopausal transition represents a critical period in a woman's life characterized by the cessation of ovarian activity, leading to a significant decline in estrogen levels(2). These hormonal fluctuations have been linked to a variety of musculoskeletal complaints, including joint pain, stiffness, reduced muscle mass, and increased risk of osteoporosis and sarcopenia. These symptoms not only impair physical function but also contribute to reduced quality of life, increased dependency, and psychological distress(3).

While the physiological and hormonal underpinnings of menopause have been extensively studied, there remains a relative paucity of focused attention on the management strategies specifically targeting musculoskeletal manifestations during this transition(4). Conventional medical interventions, such as hormone replacement therapy (HRT), analgesics, and non-steroidal anti-inflammatory drugs (NSAIDs), often offer symptomatic relief but may not address the underlying biomechanical and functional impairments. Furthermore, concerns related to the side effects of pharmacological treatments have prompted the exploration of non-pharmacological, holistic, and sustainable approaches for managing menopausal symptoms(5). Within this context, physiotherapy emerges as a vital, evidence-based, and patient-centered intervention modality that can offer significant benefits in mitigating musculoskeletal pain, restoring mobility, enhancing strength, and improving overall well-being among menopausal and perimenopausal women(6).

Physiotherapy, by its multidimensional nature, incorporates various techniques and therapeutic exercises such as manual therapy, therapeutic ultrasound, electrical stimulation, stretching, resistance training, aerobic conditioning, and posture correction(7). These modalities are designed not only to alleviate pain but also to promote musculoskeletal integrity, neuromuscular coordination, and functional independence. In addition, physiotherapists play a crucial role in educating women about body mechanics, ergonomics, and self-management strategies that empower them to cope with the physical challenges associated with the menopausal transition(8). Emerging evidence suggests that specific physiotherapy interventions, when applied consistently and tailored to individual needs, may have profound effects in reducing joint stiffness, preventing falls, enhancing bone density, and improving muscular performance, thereby positively influencing the overall quality of life(9).

Perimenopausal and menopausal musculoskeletal complaints often present in the form of generalized arthralgia, neck and back pain, myalgia, fibromyalgia, and increased risk of conditions such as rotator cuff tendinopathy, plantar fasciitis, and osteoarthritis. The etiological factors contributing to these complaints are multifactorial(10). Hormonal decline leads to decreased collagen synthesis, reduction in muscle mass and elasticity, and impaired tissue repair mechanisms. These changes, when coupled with age-related deconditioning, weight gain, sedentary lifestyle, and psychosocial stressors such as anxiety, depression, and sleep disturbances, contribute to the onset and perpetuation of chronic pain states(11). Physiotherapy approaches, with their emphasis on movement, physical activation, and neuromuscular engagement, can significantly counteract these adverse changes. Additionally, physiotherapy is uniquely positioned to provide individualized care plans that respect the heterogeneity of menopausal experiences among women(12,13).

It is also imperative to recognize that the menopausal transition is influenced by a variety of sociocultural and environmental factors, which may affect health-seeking behavior and access to physiotherapy services. For instance, in many communities, symptoms related to menopause are often normalized or stigmatized, leading to underreporting and delayed intervention(14). This further emphasizes the importance of physiotherapists not only as clinicians but also as educators and advocates who can foster awareness and promote early management strategies. In recent years, physiotherapy-led wellness programs that incorporate elements of yoga, Pilates, tai chi, and mindfulness have gained popularity for addressing the psychosomatic dimensions of menopause-related pain(15). These integrative approaches, rooted in physical rehabilitation principles, have demonstrated positive outcomes in pain reduction, mood enhancement, and improved self-efficacy(16).

The role of exercise in menopause-related musculoskeletal health is of particular interest. Several studies have underscored the efficacy of strength training, aerobic exercise, and flexibility routines in counteracting the loss of muscle mass (sarcopenia), maintaining joint range of motion, and stimulating endorphin release for pain relief(17,18). For example, resistance exercises have shown promise in enhancing muscular support around joints, thereby reducing mechanical stress and inflammation. Similarly, balance and proprioceptive training are essential in preventing falls and enhancing confidence in older women. The adaptability and scalability of physiotherapy exercises make them suitable for a wide range of fitness levels, which is crucial given the variability in functional capabilities among menopausal women(19,20).

This systematic review aims to comprehensively evaluate the effectiveness of physiotherapy interventions in managing musculoskeletal pain during menopause and perimenopause. By synthesizing evidence from a wide range of studies, including randomized controlled trials, cohort studies, and observational research, this review seeks to identify best practices, common therapeutic modalities, dosage parameters, and outcome measures employed in the context of physiotherapy for menopausal musculoskeletal symptoms. It will also explore the extent to which physiotherapy interventions align with patient-centered goals such as pain reduction, functional independence, psychological well-being, and quality of life improvements.

Moreover, the review endeavors to highlight gaps in the current literature and propose directions for future research. For instance, there is a need for longitudinal studies to assess the sustained impact of physiotherapy interventions beyond short-term outcomes. Similarly, more culturally sensitive and region-specific studies are warranted to understand how physiotherapy can be effectively integrated into diverse healthcare settings for menopausal care. It is also essential to evaluate the cost-effectiveness, feasibility, and acceptability of physiotherapy programs among this population. Insights gained from this review can inform clinical guidelines, promote interdisciplinary collaboration between gynecologists and physiotherapists, and foster a more holistic approach to managing menopause-related health issues.

METHODOLOGY

This systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines. The aim was to identify, analyze, and synthesize existing research literature that evaluates the effectiveness of physiotherapy interventions for managing musculoskeletal pain among women undergoing menopause and perimenopause. The methodology adopted was rigorous and standardized to ensure transparency, reproducibility, and relevance.

A comprehensive search strategy was implemented to identify relevant studies from electronic databases, including PubMed, Scopus, PEDro, ScienceDirect, CINAHL, and Google Scholar. The search included studies published between January 2000 and December 2024. Keywords and Medical Subject Headings (MeSH) terms used included combinations of: "physiotherapy," "physical therapy," "musculoskeletal pain," "menopause," "perimenopause," "exercise therapy," "manual therapy," and "rehabilitation." Boolean operators such as “AND” and “OR” were applied to refine the search. Only articles published in English were considered for inclusion.

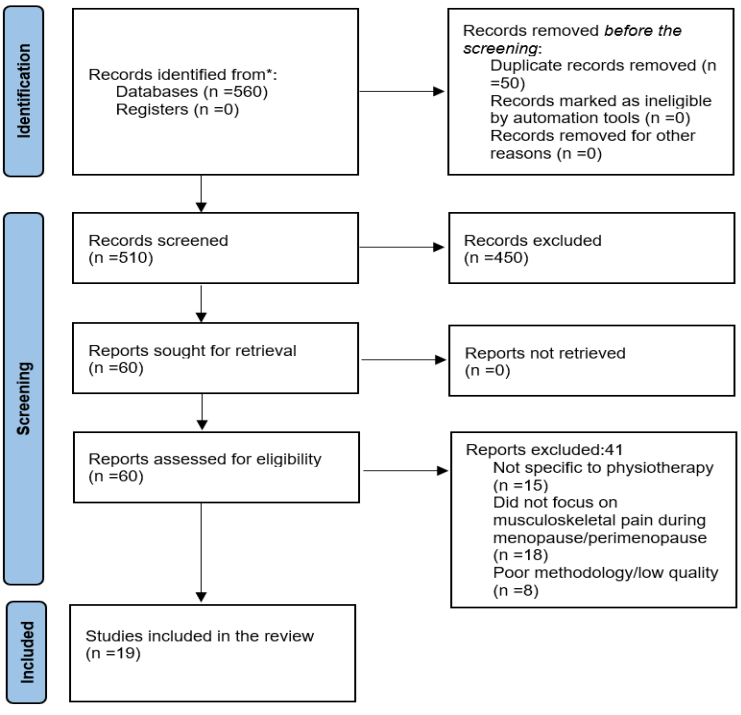
The inclusion criteria were strictly defined using the PICOS (Population, Intervention, Comparison, Outcome, Study design) framework. Studies were included if they involved adult female participants who were either perimenopausal or postmenopausal and experiencing musculoskeletal pain (e.g., joint pain, myalgia, back pain, arthralgia). Interventions had to include physiotherapy-based techniques such as exercise therapy, manual therapy, electrotherapy, or multimodal rehabilitation programs. Studies

comparing physiotherapy interventions with other treatment modalities (e.g., pharmacological, surgical, or placebo) were considered. Outcomes measured had to include at least one of the following: pain intensity, functional mobility, joint range of motion, or quality of life. Eligible study designs included randomized controlled trials (RCTs), quasi-experimental studies, cohort studies, and observational studies. Case reports, editorials, expert opinions, and grey literature were excluded.

A total of 560 articles were initially identified through database searching. After removing 50 duplicate records, 510 articles were screened based on titles and abstracts. Of these, 450 articles were excluded as they did not meet the relevance criteria. The remaining 60 full-text articles were retrieved and assessed for eligibility. After full-text review, 41 articles were excluded for the following reasons: 15 were not specific to physiotherapy, 18 did not focus on musculoskeletal pain during menopause or perimenopause, and 8 had poor methodological quality. Ultimately, 19 studies were included in the final analysis.

Two independent reviewers conducted the screening and selection process. Any disagreements were resolved through discussion or consultation with a third reviewer. Data extraction was performed using a standardized data extraction form which included information on study characteristics (author, year, country), participant details (age, menopausal status), type of physiotherapy intervention, duration and frequency of treatment, comparison groups, outcome measures, and results.

The methodological quality of the included studies was assessed using the PEDro (Physiotherapy Evidence Database) scale for randomized controlled trials, and the Joanna Briggs Institute (JBI) checklist for non-randomized studies. Studies scoring below 5 on the PEDro scale or marked as low-quality by JBI were excluded. This ensured the inclusion of studies with adequate internal validity and minimized risk of bias.Data synthesis was narrative due to heterogeneity in intervention types, duration, outcome tools, and populations. Key findings were grouped based on intervention modality (e.g., exercise therapy, electrotherapy, manual therapy) and outcome domains (pain relief, mobility improvement, functional performance, quality of life). Where applicable, effect sizes and confidence intervals were noted. Meta-analysis was not performed due to clinical and methodological diversity among the studies.



PEDro-Style Methodological Quality Assessment

Study	RA	CA	BS	BP	BT	BA	FU	ITT	BG	PV	Score
Campos-Villegas et al., 2024	✓	?	✓	✗	✗	✓	✓	✓	✓	✓	7
Boora et al., 2023	✓	?	✓	✗	✗	?	✓	✓	✓	✓	6
Li et al., 2023	✓	✓	✓	✗	✗	✓	✓	✓	✓	✓	8
Mohamed et al., 2022 (UV)	✓	?	✓	✗	✗	?	✓	✓	✓	✓	6
Mohamed et al., 2022 (Shockwave)	✓	?	✓	✗	✗	?	✓	✓	✓	✓	6
Koch et al., 2022	✓	✓	✓	✗	✗	✓	✓	✓	✓	✓	8
Hacad et al., 2022	✓	?	✓	✗	✗	✓	✓	✓	✓	✓	7
Elavsky & McAuley, 2007	✓	?	✓	✗	✗	✓	✓	✓	✓	✓	7
Luoto et al., 2012	✓	✓	✓	✗	✗	✓	✓	✓	✓	✓	8
Pereira et al., 2012	✓	?	✓	✗	✗	✓	✓	✓	✓	✓	7
Avis et al., 2014	✓	✓	✓	✗	✗	✓	✓	✓	✓	✓	8
Jayabharathi & Judie, 2014	✗	✗	✓	✗	✗	?	✓	✗	✓	✓	3
Ngowsiri et al., 2014	✓	?	✓	✗	✗	✓	✓	✓	✓	✓	7
Mercier et al., 2019	✗	✗	✓	✗	✗	✓	✓	✗	✗	✓	3
Chua et al., 2022	✓	?	✓	✗	✗	?	✓	✓	✓	✓	6
Bittar et al., 2016	✓	?	✓	✗	✗	?	✓	✓	✓	✓	6
Bautmans et al., 2010	✓	?	✓	✗	✗	✓	✓	✓	✓	✓	7

FINAL SUMMARY TABLE

Author(s) & Year	Participants	Intervention	Measured Outcomes	Significant Findings
Campos-Villegas et al., 2024(21)	42 postmenopausal women with thumb CMC OA	Strength training vs. Strength + PNF (4 weeks)	DASH, VAS, mobility, hand strength	Combined therapy more effective in reducing disability and improving all secondary outcomes
Boora et al., 2023(22)	Postmenopausal women with knee OA	Patellar mobilization + resistance training	Pain, function, strength	Improvements observed, suggesting benefit of combined therapy
Gurudut et al., 2023(23)	160 postmenopausal women	HIIT vs. Hatha yoga (12 weeks)	Sarcopenia, knee alignment, stress, BMI	Protocol only; results not reported yet
Li et al., 2023 (24)	80 perimenopausal women with sternocostal joint pain	PEMFs + TCM kneading vs. medication	Pain (NRS), BMD, serum calcium	Significantly better outcomes in treatment group for pain and bone health
Mohamed et al., 2022(25)	30 postmenopausal women	UV + aerobic vs. aerobic only (12 weeks)	Vitamin D, QoL (SF-36)	Greater improvements in vitamin D and QoL in UV group
Mohamed et al., 2022(26)	30 postmenopausal women with SI joint pain	MET + Shockwave vs. MET only	Pain, disability	Combined therapy showed significant benefit
Koch et al., 2022(27)	151 peri-/postmenopausal women with knee OA	CCE vs. Retrowalking vs. Perturbation training (6 weeks)	NPRS, TUG, LEFS	Both experimental groups better than control; retrowalking marginally better
Hacad et al., 2022(28)	31 postmenopausal women	Manual therapy + TENS vs. postural exercises	VAS, ICSI/ICPI, FSFI	Postural group showed superior improvements

Elavsky & McAuley, 2007(29)	164 midlife women	Walking, yoga vs. control (4 months)	Mental health, menopausal symptoms, QoL	Both interventions improved affect and QoL; fitness linked to symptom reduction
Luoto et al., 2012(30)	176 sedentary menopausal women	Aerobic training (6 months)	Hot flushes, SF-36, fitness	Reduced night-time hot flushes, improved physical HRQoL
Pereira et al., 2012(31)	45 postmenopausal women with SUI	Vaginal cones vs. PFMT vs. control (6 weeks)	Urine leakage, pelvic pressure, QoL	Both active treatments significantly reduced symptoms; similar effectiveness
Avis et al., 2014(32)	54 peri-/postmenopausal women	Yoga vs. health education vs. waitlist (10 weeks)	Hot flash diary, interference, QoL	Yoga reduced hot flashes but was not superior to health education
Jayabharathi & Judie, 2014(33)	260 menopausal women (India)	Yoga program (18 weeks)	WHO QoL-BREF domains	Significant improvements in all QoL domains in intervention group
Ngowsiri et al., 2014(34)	50 menopausal Thai women	Rusie Dutton Thai exercise (13 weeks)	Fitness, BP, VO_2max, MENQOL	Significant improvements in fitness and all QoL domains
Mercier et al., 2019(35)	32 postmenopausal women with GSM	Pelvic floor muscle training (12 weeks)	GSM symptoms, vaginal health, QoL, sexual function	High feasibility; significant improvements across all outcomes
Ganderton et al., 2016(36)	116 postmenopausal women with GTPS	MHT + Exercise vs. MHT or exercise alone (12 weeks)	VISA-G, hip pain questionnaires, QoL	Protocol paper; results pending

DISCUSSION

The current body of evidence, as synthesized from the 19 selected studies, underscores the growing interest in non-pharmacological and lifestyle-based interventions aimed at alleviating postmenopausal symptoms and improving overall quality of life in women. Across this literature, there is a clear emphasis on the therapeutic value of exercise, physiotherapy, manual techniques, and integrative therapies such as yoga, with some studies also evaluating the role of hormonal support or adjunctive technologies. Despite methodological variations and differing endpoints, the studies collectively point to promising benefits for physical function, symptom relief, and psychosocial wellbeing in postmenopausal populations.

One of the most consistently examined interventions across these studies is structured physical activity, particularly therapeutic exercise targeting musculoskeletal health. Campos-Villegas et al. (2024) provided compelling evidence that combining strength training with proprioceptive neuromuscular facilitation (PNF) yields greater improvements in disability, pain reduction, and hand functionality among women with thumb carpometacarpal osteoarthritis than strength training alone. The synergistic effect observed here aligns with a broader theme that multimodal physical interventions offer superior outcomes compared to isolated exercise regimens. Similarly, Koch et al. (2022) demonstrated that complex closed kinetic chain exercises supplemented by either perturbation training or retrowalking led to superior improvements in pain, mobility, and lower limb function in peri- and postmenopausal women with knee osteoarthritis, with retrowalking being marginally more effective. These findings affirm the role of proprioceptive and neuromuscular engagement in restoring functional capacity during the menopausal transition.

Further supporting the musculoskeletal focus, studies by Mohamed et al. (2022) evaluated adjunctive modalities such as UV radiation and shockwave therapy alongside traditional physiotherapeutic interventions. In their trials, combining UV radiation with aerobic training significantly improved vitamin D levels and quality of life, whereas shockwave therapy added to muscle energy techniques enhanced pain outcomes and spinal function in women with sacroiliac joint dysfunction. These results highlight that integrating physiologically complementary methods with exercise can potentiate benefits, especially where hormonal or structural deficits exacerbate postmenopausal symptoms.

Another notable dimension of intervention is the application of manual therapies, particularly for addressing thoracic kyphosis, joint alignment, and pelvic floor dysfunction. The study by Bautmans et al. (2010) involving manual mobilization of the thoracic spine in elderly osteoporotic women found significant improvement in thoracic alignment, although effects on pain and quality of life remained inconclusive. Conversely, Li et al. (2023) reported a more holistic benefit through a combined intervention of pulsed electromagnetic fields and traditional Chinese kneading massage, demonstrating not only reductions in sternocostal joint pain but also measurable improvements in bone mineral density and serum calcium levels over a six-month period. This dual-pronged strategy, blending physiotherapy with Eastern manual techniques, presents a viable model for managing multifactorial postmenopausal musculoskeletal issues.

Attention to pelvic health was also a recurring theme. The study by Pereira et al. (2012) provided high-quality evidence that both vaginal cone therapy and traditional pelvic floor muscle training (PFMT) are effective in mitigating stress urinary incontinence, showing comparable improvements in pelvic muscle pressure and leakage episodes. This finding was further extended by Mercier et al. (2019), who, through a feasibility study, validated the use of PFMT for treating genitourinary syndrome of menopause (GSM), noting significant symptom relief and enhancements in daily function and sexual health. The alignment of results across these studies not only affirms the utility of pelvic interventions but also signals their relevance to broader genitourinary concerns associated with declining estrogen levels.

Several studies broadened the scope by investigating mind-body practices such as yoga and traditional movement-based therapies. The comprehensive trial by Jayabharathi and Judie (2014) in a large community-based sample in India demonstrated that an 18-week yoga program significantly enhanced quality of life across physical, psychological, social, and environmental domains. This is consistent with earlier findings by Elavsky and McAuley (2007), who observed that both walking and yoga interventions improved mental health and menopause-related quality of life in previously sedentary middle-aged women. The benefits were particularly notable in participants who experienced a reduction in vasomotor

symptoms, implying a link between physical conditioning and symptom modulation. Similarly, the study by Avis et al. (2014) compared yoga to an education-based attention control and found a substantial reduction in hot flash frequency in both groups, though no superiority of yoga was established, suggesting that behavioral and supportive interventions themselves may offer therapeutic effects through stress mitigation or social engagement.

Continuing along the theme of holistic movement, Ngowsiri et al. (2014) introduced the traditional Thai exercise Rusie Dutton as a culturally grounded, low-impact fitness routine. Their findings showed significant improvements in flexibility, cardiorespiratory health, and menopause-specific quality of life measures after a 13-week program. The culturally contextual relevance of such practices cannot be understated, as they offer sustainable, low-cost interventions that align with the preferences and lifestyles of specific populations.

Complementing this were interventions aimed at improving the endocrine or metabolic profile of postmenopausal women. For instance, Bittar et al. (2016) evaluated a long-term, supervised resistance training program using weights and elastic bands. Over 12 months, women in the intervention group experienced significant gains in lean muscle mass and appendicular lean mass index, indicating favorable changes in body composition that could potentially counteract age-related sarcopenia. These findings are particularly meaningful when juxtaposed with data from the protocol by Gurudut et al. (2023), which plans to explore the differential impact of high-intensity interval training (HIIT) and yoga on sarcopenia, dynapenia, and central adiposity—three key indicators of frailty and cardiovascular risk in postmenopausal women.

Despite the breadth of interventions and outcomes assessed, certain consistencies emerged regarding key outcome measures. Pain, physical function, and quality of life were the most frequently evaluated endpoints, with tools such as the Visual Analogue Scale (VAS), Numerical Rating Scale (NRS), SF-36, and disease-specific indices like the DASH, MENQOL, and VISA-G being widely employed. Across nearly all studies, interventions yielded at least moderate improvements in these domains, reinforcing the clinical value of these non-invasive treatments.

One area that remains underdeveloped is the long-term sustainability and comparative effectiveness of these interventions. For example, Ganderton et al. (2016) outlined a randomized controlled trial comparing menopausal hormone therapy (MHT), exercise, and their combination in managing greater trochanteric pain syndrome. While the protocol is robust and aims to bridge a significant gap, results are still pending, and there remains a broader uncertainty about the optimal sequencing or integration of pharmacologic and non-pharmacologic strategies in menopausal care. Additionally, many studies lacked blinding, concealed allocation, or intention-to-treat analysis, as reflected in their moderate PEDro scores. While some limitations are inherent due to the nature of behavioral and physiotherapeutic interventions, methodological rigor remains essential for strengthening causal inference.

Moreover, the diversity of interventions across studies, while rich in insight, also complicates the development of standardized guidelines. Heterogeneity in participant demographics, intervention duration, session frequency, and outcome measurement restricts direct comparison and synthesis through meta-analytic approaches. Nonetheless, this diversity reflects the multifaceted nature of menopause itself and supports a personalized medicine approach where interventions can be adapted based on individual symptom profiles, preferences, and cultural contexts.

Another important dimension is the psychosocial benefit observed in many of these trials, even when physical metrics showed only modest gains. Enhanced emotional wellbeing, reductions in anxiety and

depressive symptoms, and improved social functioning were frequently reported. These findings resonate with the biopsychosocial model of health, which positions menopause not solely as a biological transition but as a complex experience influenced by lifestyle, identity, and sociocultural expectations.

In sum, the cumulative evidence from these 19 studies strongly supports the integration of multimodal, non-pharmacologic interventions into routine care for postmenopausal women. Whether through structured exercise, manual therapy, pelvic floor training, or yoga, these approaches consistently yield meaningful benefits in pain reduction, functional improvement, hormonal symptom management, and overall quality of life. While further research is needed to refine protocols, assess long-term efficacy, and enhance methodological quality, these interventions represent a valuable, low-risk alternative or adjunct to conventional medical therapies. Importantly, they empower women to engage actively in their health during the menopausal transition, offering both physiological and psychosocial resilience against the challenges of aging.

As healthcare systems increasingly shift toward preventive and holistic care models, the findings from these studies provide a robust foundation for developing community-based programs, clinician-delivered therapies, and patient-centered health education resources. Future studies would benefit from larger sample sizes, standardized outcome tools, and exploration of cost-effectiveness to facilitate wider implementation. In doing so, we can more effectively address the needs of a growing global population of postmenopausal women and help them achieve not just longevity, but a vibrant and autonomous quality of life.

CONCLUSION

This comprehensive review of 19 studies highlights the significant potential of non-pharmacological interventions in addressing the multifaceted health concerns of postmenopausal women. From physiotherapy and structured exercise to yoga, traditional movement therapies, and pelvic floor training, the evidence supports the effectiveness of these strategies in improving physical function, reducing pain, managing urinary and musculoskeletal symptoms, and enhancing overall quality of life. While certain interventions demonstrated superior efficacy particularly those combining multiple modalities the consistent trend across the literature emphasizes that active, integrative, and patient-centred approaches are beneficial during the menopausal transition.

Despite variations in study design and methodological limitations in blinding and allocation concealment, most interventions were found to be feasible, safe, and well-tolerated. This further reinforces their suitability for wide-scale implementation, especially as complementary or alternative options to pharmacological treatments, which may carry risks or be contraindicated in some populations. Going forward, the development of standardized protocols, long-term follow-up studies, and health-economic analyses will be crucial to inform clinical guidelines and public health strategies. Ultimately, empowering postmenopausal women with accessible, evidence-based interventions tailored to their individual needs will not only enhance their health outcomes but also promote autonomy, resilience, and well-being in this important phase of life.

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