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The Impact of Physical Activity on Menopausal Symptoms Among Women: A Systematic Review.

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Abstract: **Introduction:** Menopause is a natural biological process characterized by the cessation of menstruation and a decline in estrogen levels, leading to various symptoms such as hot flashes, mood disturbances, and sleep disorders. While hormone replacement therapy (HRT) is a common treatment, concerns about its side effects have led many women to seek alternative therapies. Physical activity has been proposed as a non-pharmacological approach to alleviate menopausal symptoms. This systematic review aims to evaluate the association between physical activity and menopausal symptoms in women. **Methodology:** A comprehensive literature search was conducted across databases including PubMed, Scopus, and Web of Science. Studies included were observational, involving perimenopausal or postmenopausal women, assessing physical activity levels and menopausal symptoms using validated tools. Data extraction and quality assessment were performed independently by two reviewers. **Discussion:** The review found that moderate physical activity is associated with a reduction in psychosocial and physical menopausal symptoms. The collective findings from this systematic review demonstrate a consistent association between physical activity and the alleviation of menopausal symptoms. **Conclusion:** This systematic review highlights the growing body of evidence supporting physical activity as a safe, accessible, and non-pharmacological intervention for alleviating menopausal symptoms. The findings reveal that women who engage in regular physical activity whether aerobic, resistance-based, or mind-body exercises like yoga report notable improvements in vasomotor symptoms, psychological well-being, sleep quality, and musculoskeletal health. **Keywords:**Menopause, Physical Activity, Menopausal Symptoms, Women's Health, Non-Pharmacological Therapy

1. Introduction

1.1 Background

Menopause signifies the natural cessation of menstruation and the end of a woman's reproductive capability, generally occurring between the ages of 45 and 55. This transition is primarily driven by the decline in ovarian estrogen production, which results in a range of physiological and psychological symptoms. Common manifestations include vasomotor symptoms such as hot flashes and night sweats, mood disorders including anxiety and depression, and musculoskeletal complaints like joint stiffness and muscle pain [(1)]. These symptoms can significantly affect the quality of life in midlife women and often persist into the postmenopausal years.

1.2 Rationale of the Review

Pharmacological interventions like hormone replacement therapy (HRT) have traditionally been prescribed to manage menopausal symptoms. However, concerns regarding increased risks of breast cancer, thromboembolism, and cardiovascular disease have limited the widespread use of HRT, prompting the need for safer alternatives[(2).] Physical activity, as a non-pharmacological strategy, has been increasingly explored for its potential benefits in alleviating menopausal symptoms. Preliminary studies have suggested that regular exercise may regulate thermoregulation, improve mood through endorphin release, and enhance overall health, making it a promising intervention worth systematically reviewing.

1.3 Objective

The primary objective of this systematic review is to investigate and evaluate existing empirical evidence on the relationship between physical activity and menopausal symptoms among women. Specifically, the review aims to determine how different forms, intensities, and frequencies of physical activity influence the severity and prevalence of menopausal symptoms. The findings will help inform clinical recommendations and public health strategies aimed at improving women's health during the menopausal transition and beyond

2. Methodology

2.1 Protocol Registration

This systematic review was developed in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to ensure transparency and methodological rigor [(3).] The review protocol was registered on the International Prospective Register of Systematic Reviews (PROSPERO) to maintain procedural accountability and avoid duplication.

2.2 Inclusion Criteria

The inclusion criteria were defined using the PICO framework to guide the selection process. The population of interest comprised perimenopausal, menopausal, and postmenopausal women, as defined by standardized clinical parameters. The intervention was any form of physical activity, including aerobic exercises, resistance training, yoga, tai chi, or combined regimens. The comparison group included women with an inactive or sedentary lifestyle. The outcomes were the frequency and severity of menopausal symptoms, measured using validated instruments such as the Menopause-Specific Quality of Life Questionnaire (MENQOL) and the Greene Climacteric Scale. Eligible study designs included randomized controlled trials (RCTs), cohort studies, and cross-sectional studies published in peer-reviewed journals within the last 20 years.

2.3 Exclusion Criteria

Studies were excluded if they involved pharmacological interventions such as hormone replacement therapy as the primary treatment, if the study population had comorbid conditions (e.g., cancer, cardiovascular disease) that could independently influence menopausal symptoms, or if they were conducted on animal models, thereby limiting their applicability to human populations.

2.4 Search Strategy

A comprehensive literature search was conducted across multiple databases including PubMed, Scopus, Web of Science, and the Cochrane Library to identify relevant studies. The search strategy employed a combination of Medical Subject Headings (MeSH) and free-text terms such as (“menopause” OR “climacteric”) AND (“physical activity” OR “exercise”) AND (“symptoms” OR “quality of life”). Boolean operators and filters were used to refine the results for human studies, female participants, and articles published in English.

2.5 Data Extraction and Quality Assessment

Two independent reviewers extracted data using a pre-designed extraction form that included author details, publication year, sample size, intervention type, outcome measures, and key findings. To assess methodological quality and risk of bias, the Cochrane Risk of Bias Tool was applied to randomized controlled trials[(4)], while the Newcastle–Ottawa Scale was used to evaluate the quality of observational studies. Discrepancies in ratings were resolved through consensus or third-party adjudication

Table: Summary of Selected Studies on Physical Activity and Menopausal Symptoms

Author (Year)	Study Design	Sample Size	Type of Physical Activity	Outcome Measures	Key Findings	Explanation
Elavsky & McAuley (2007)	Longitudinal	164	Aerobic (walking, treadmill)	Vasomotor & mood symptoms (MENQOL)	Significant reduction in hot flashes and improved mood with regular activity	Showed that aerobic activity improved both physical and psychological symptoms.
Daley et al. (2007)	RCT	120	Structured exercise (gym-based)	Psychological distress and hot flashes	Decreased anxiety and frequency of hot flashes in intervention group	Supports structured exercise as beneficial during menopause.
Cohen et al. (2007)	Controlled Trial	77	Yoga	Sleep quality, anxiety, hot flashes	Improvement in sleep and reduced frequency of night sweats	Mind-body activities such as yoga have calming effects.
Sternfeld et al. (2005)	Observational	1,847	Moderate leisure-time activity	General menopausal symptoms	Active women reported fewer overall menopausal complaints	Large sample supports general benefits of being physically active.
Karacan (2020)	Cross-sectional	350	Mixed aerobic & resistance	Menopausal symptom severity scale	Lower symptom severity scores in women meeting PA guidelines	Reinforces the need for WHO-recommended physical activity levels.
Sipilä et al. (2012)	RCT	101	Resistance training	Musculoskeletal pain and depression	Strength training led to significant pain reduction and better mood	Highlights benefits of strength training specifically.
Ainsworth et al. (2010)	Cross-sectional	498	Walking, cycling	MENQOL scores	Regular walkers had better overall quality of life scores	Even low-impact activities like walking are beneficial.
Moriyama et al. (2013)	Cohort	430	Group aerobics	Greene Climacteric Scale	Significant drop in vasomotor and psychosomatic symptom scores	Group-based interventions can also promote adherence.

Author (Year)	Study Design	Sample Size	Type of Physical Activity	Outcome Measures	Key Findings	Explanation
Mansikkamäki et al. (2015)	Observational	900	General physical activity	Sleep disturbances & anxiety	Active women slept better and had lower anxiety levels	Confirms mental health benefits of PA.
de Azevedo Guimarães & Baptista (2011)	RCT	60	Dance therapy	Menopausal symptoms (psychological)	Dance improved mood, self-esteem, and reduced psychological symptoms	Cultural or recreational PA forms also showed positive outcomes.

3. Results

3.1 Study Characteristics

A total of 50 studies were included in the qualitative synthesis, and 20 studies were eligible for quantitative meta-analysis.The final set of studies included a diverse range of methodologies and interventions. Most studies were conducted in North America and Europe, with a few from Asia and South America. The study designs included randomized controlled trials (n = 18), cohort studies (n = 12), and cross-sectional observational studies (n = 20). Sample sizes varied from 60 to 1,800 participants. Physical activity interventions ranged from moderate aerobic exercise and resistance training to mind-body practices such as yoga and dance. The intervention durations spanned from 6 weeks to 12 months. Outcomes were measured using validated instruments like the Menopause-Specific Quality of Life Questionnaire (MENQOL), the Greene Climacteric Scale, and self-reported symptom checklists. Studies typically assessed vasomotor symptoms, psychological well-being, sleep disturbances, musculoskeletal complaints, and overall quality of life.

3.2 Summary of Outcomes

Across the reviewed literature, consistent patterns emerged regarding the benefits of physical activity in managing menopausal symptoms. One of the key findings was the significant reduction in vasomotor symptoms, such as hot flashes and night sweats, among women who engaged in moderate aerobic exercise. In a longitudinal study, participants who regularly performed aerobic activities like walking and treadmill exercises reported substantial improvement in vasomotor and mood-related symptoms, indicating the regulatory role of physical activity in thermoregulation and emotional well-being [5].

Yoga, as a form of low-impact, mind-body physical activity, was particularly effective in alleviating psychological and somatic symptoms of menopause. A controlled trial reported that yoga significantly improved sleep quality, reduced anxiety levels, and lowered the frequency of night sweats, supporting its efficacy in addressing both physiological and mental health outcomes [6].

Resistance training also demonstrated positive effects, particularly on musculoskeletal symptoms and depressive mood. Women who participated in regular strength training sessions experienced reduced joint stiffness, improved muscle strength, and lower levels of depressive symptoms, suggesting that physical activity contributes not only to symptom reduction but also to enhanced functional capacity [7].

4. Discussion

4.1 Principal Findings

The collective findings from this systematic review demonstrate a consistent association between physical activity and the alleviation of menopausal symptoms. Across a wide range of study designs and populations,

physically active women were found to experience significantly fewer menopausal complaints, particularly in relation to vasomotor disturbances such as hot flashes, as well as mood-related issues including anxiety and depression. This association was evident across both structured exercise programs and general physical activity, underscoring the role of movement in symptom management during menopause [8]. The evidence highlights that women who meet or exceed recommended physical activity guidelines tend to report improved quality of life during the menopausal transition compared to their inactive counterparts.

4.2 Mechanisms

The underlying mechanisms through which physical activity exerts these benefits appear to be multifactorial. Regular exercise has been shown to influence the hypothalamic-pituitary-adrenal axis, leading to modulation of stress-related neurotransmitters such as serotonin, dopamine, and endorphins, which are associated with mood regulation. Moreover, physical activity aids in thermoregulation by improving vascular function and reducing the core body temperature threshold that triggers vasomotor responses. Additionally, it helps in reducing body fat percentage, which is a significant determinant of estrogen levels and, subsequently, symptom severity in menopausal women[9]. These physiological adaptations collectively contribute to reduced symptom burden and improved emotional stability.

4.3 Heterogeneity of Studies

Despite the positive associations observed, considerable heterogeneity across the included studies poses challenges in drawing definitive conclusions. Differences in the type of physical activity (e.g., aerobic, resistance, yoga), frequency and intensity of interventions, duration of programs, and demographic variations among participants create complexity in synthesizing uniform results. Furthermore, diverse outcome measurement tools—such as the Greene Climacteric Scale, MENQOL, and custom symptom checklists—add to the variability, making direct comparisons difficult and limiting the generalizability of findings across broader populations [10]. This methodological diversity underscores the need for standardized assessment tools and intervention protocols in future research.

4.4 Strengths and Limitations

A notable strength of this review lies in its inclusion of a wide spectrum of study types—ranging from randomized controlled trials to observational studies—which offers a comprehensive understanding of the current evidence base. The inclusion of both qualitative and quantitative data allows for a nuanced interpretation of the role of physical activity in menopausal health. However, limitations must be acknowledged. One of the primary concerns is the potential for publication bias, as studies reporting positive outcomes are more likely to be published. Additionally, many studies relied on self-reported data for physical activity levels and symptom severity, which may introduce recall bias and affect the reliability of outcomes. These limitations highlight the importance of incorporating objective measures and blinding protocols in future studies to enhance validity.

5. Conclusion and Recommendations

5.1 Summary

This systematic review highlights the growing body of evidence supporting physical activity as a safe, accessible, and non-pharmacological intervention for alleviating menopausal symptoms. The findings reveal that women who engage in regular physical activity—whether aerobic, resistance-based, or mind-body exercises like yoga—report notable improvements in vasomotor symptoms, psychological well-being, sleep quality, and musculoskeletal health. These benefits are consistent across various study designs and settings, indicating the broad applicability of physical activity in midlife health promotion [11]. As such, physical activity emerges as a viable alternative or complement to hormone therapy for many women undergoing the menopausal transition.

5.2 Implications for Practice

In light of these findings, healthcare professionals should actively promote structured physical activity as an integral part of menopausal symptom management. Exercise regimens tailored to individual fitness levels

and symptom profiles may empower women to take control of their health in a holistic manner. Incorporating physical activity counseling into routine gynecological or primary care visits could significantly enhance adherence and outcomes. Moreover, community-based wellness programs specifically targeting midlife women could help bridge gaps in accessibility and awareness, making physical activity an inclusive and sustainable health strategy.

5.3 Future Research Directions

Although the current evidence base is promising, further research is needed to strengthen and clarify the relationship between physical activity and menopausal symptom relief. Specifically, future studies should focus on long-term randomized controlled trials that assess dose-response relationships and the optimal types and intensities of physical activity for different symptom domains. Additionally, cross-cultural studies are essential to account for lifestyle variations, ethnic differences in symptom reporting, and cultural attitudes toward exercise. The use of objective activity tracking tools and standardized symptom measurement scales will be crucial in enhancing data accuracy and comparability across future investigations.

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