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Research Paper

Influence of Mindfulness and Physical Activity on Biopsychosocial Health among Perimenopausal Women

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ABSTRACT

A woman's journey from infancy to maturity involves several phases, each marked by hormonal and bodily changes. Perimenopause, the transitional phase before menopause, brings significant physical and emotional shifts that can impact overall health, mindset, and quality of life. This study explored the influence of mindfulness and physical activity on bio-psycho-social health among perimenopausal women. Awareness (Aw) refers to the ability to stay present in the moment, while Acceptance (Ac) involves embracing experiences without judgment. Together, these two components form the foundation of mindfulness - being fully present and living in the moment. On the other hand, physical activity plays a key role in enhancing physical health and promoting overall well-being. When combined, mindfulness and physical activity can work synergistically to improve biopsychosocial health—a holistic concept that reflects the balance of biological, psychological, and social well-being. In this 2×3 factorial design study, 401 women aged 40–55 completed the Philadelphia Mindfulness Scale (PHLMS) and a self-developed Perimenopausal Biopsychosocial Health Index (PBHI). Analysis using a two-way ANOVA indicated significant main effects as well as interaction effect. Significant main effects were found for both mindfulness and physical activity. Participants who practiced yoga exhibited the highest Perimenopausal Bio-Psycho-Social Index scores (M = 267.32), while those with no physical activity reported the lowest. Interestingly, participants with lower mindfulness scores had higher PBHI scores (M = 250.28) than those with higher mindfulness scores (M = 256.48). These findings underscore the critical role of physical activity, particularly yoga, in enhancing both the physical and mental well-being of perimenopausal women. Incorporating physical activity into interventions may serve as an effective strategy to support overall health during this transformative phase. Moreover, the study highlights the importance of psychological education that integrates both mindfulness practices and physical engagement. Such knowledge can empower perimenopausal women to adopt healthier lifestyle behaviors, thereby enhancing their overall well-being. Additionally, the newly developed Perimenopausal Biopsychosocial Health Index (PBHI) offers a comprehensive tool for assessing multiple dimensions of health among perimenopausal women. This scale holds significant potential for use in future research, clinical assessments, and intervention planning within this population.

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Influence of Mindfulness and Physical Activity on Biopsychosocial Health among Perimenopausal Women

Keywords: *Mindfulness, Physical Activity, Biopsychosocial Health, Perimenopausal Women*

A woman's journey from infancy to maturity is marked by many phases, each bringing its own set of changes. As she moves through these stages, shifts in hormone levels and body functions occur naturally. When the women reach the midlife age, menopause transition will occur (Annette Joan Thomas, 2018). **Menopause** - a normal part of aging. The word *menopause* comes from the Greek words *pausis*, meaning 'pause,' and *men*, meaning 'month'—together referring to the 'monthly cessation' or 'end of menstruation.' Amenorrhea lasting for twelve consecutive months marks the end of a woman's reproductive and childbearing years (Peacock & Ketvertis, 2023). Before reaching this stage, women go through **perimenopause**, a transitional period that often brings noticeable changes, both physically and emotionally. These shifts can significantly influence a woman's overall health, mindset, and quality of life. Perimenopause is a transitional period that marks the final years of a woman's reproductive life. It begins with the onset of menstrual irregularity and ends one year after amenorrhea, signifying the final menstrual period (FMP). According to Nanette Santoro (2016), perimenopause consists of two stages: the early transition, characterized by mostly regular cycles with occasional irregularities, and the late transition, where amenorrhea becomes more prolonged—lasting at least 60 days—leading up to the final menstrual period**.** When a woman has gone 12 consecutive months without a menstrual period, it marks the end of perimenopause.

During the perimenopausal stage, women often face numerous challenges that affect their overall quality of life. These experiences vary in severity from one woman to another, but many commonly encounter both psychological and physiological issues. These may include vasomotor symptoms (such as hot flashes and night sweats), somatic complaints (like headaches and joint or muscle pain), cognitive difficulties (such as forgetfulness and trouble concentrating), urogenital issues (including vaginal dryness, frequent urination, and changes in sexual desire), and psychological disturbances (such as mood swings, insomnia, anxiety, and irritability). Unfortunately, these symptoms are often overlooked or dismissed as a normal part of aging, leading many women to endure significant distress without seeking support or treatment. While not life-threatening, these challenges are nonetheless important and deserve appropriate attention and care.

Studies show that interventions focusing on lifestyle interventions, such as mindfulness and physical activity, offer promising benefits in reducing these challenges associated with perimenopause. While both have shown individual benefits, research exploring their interaction and combined effects remains scarce. Mindfulness, defined as the awareness of the present moment with non-judgmentally, helps individuals become more attuned to their body's and mind's changes, promoting better emotional regulation, stress reduction, and increased self-compassion. Kabat-Zinn (2003) explained that the goal of mindfulness meditation is to intentionally focus attention on the "here and now," on immediate experience without judgment. According to Carmody and Baer (2008), mindfulness reduces perceived stress as well as psychological distress, thereby partially improving psychological well-being. In terms of physical activity, practices such as yoga and walking have a profound impact on hormonal regulation, mood stability, and body image concerns commonly associated with the middle and late stages of life. According to Searle et al. (2011) Depressed people who undergo regular physical activity have admitted to having subjective benefits in terms of biochemical pathways and cognitive mechanisms that allow them to avoid negative thinking and give them a sense of purpose in life. According to Chan and Singh (2023), physical activity has shown

medium to large improvements in mood, stress, anxiety, and depression. In some cases, these effects are even greater than those achieved through current treatment methods, including cognitive-behavioral therapy (Singh et al., 2023).

The menopausal transition is a bio-psycho-social process. Studies highlight the interplay of lifestyle, cultural, and psychological factors that influence a woman's experience of perimenopause. For the majority of healthy women, menopause is a relatively neutral event; however, women living in Western countries generally report more symptoms than those from non-Western cultures (Hunter & Rendall, 2007). Perimenopause impacts the biological, psychological, and social aspects of a woman's life. Biologically, it can involve vasomotor symptoms (such as hot flashes), hormonal fluctuations, fatigue, sleep disturbances, changes in energy levels, and sometimes body image concerns. Menopausal hot flushes and/or night sweats (also known as vasomotor symptoms) are reported by 60–70% of menopausal women in Western cultures (Hunter & Rendall, 2007). Psychologically, women may experience mood swings, anxiety, irritability, and cognitive difficulties such as forgetfulness or trouble concentrating. Socially, perimenopause can affect interpersonal relationships, social support, relationship quality, and overall life satisfaction. Identifying these bio-psycho-social factors is essential for providing comprehensive care and developing effective interventions.

The biopsychosocial paradigm, which holds that biological, psychological, and social factors interact intricately to produce health and well-being, is the foundation of this study. In recognition of the limitations of fragmented approaches that target only one dimension of health, this study introduces the Perimenopausal Bio-Psycho-Social Health Index (PBHI)—a comprehensive scale designed to capture the full spectrum of well-being during perimenopause. The 15 sub-dimensions of the PBHI range from body image, self-esteem, and social support to physical symptoms and cognitive performance. This multidimensional tool enables a more nuanced understanding of perimenopausal health outcomes. The study specifically examines the influence of mindfulness and physical activity on bio-psycho-social health of perimenopausal women.

Sample

The sample consisted of 401 participants with the age limit of 40- 55 years, from various part of Kerala. Based on their self-reported engagement in physical activity, participants were categorized into three groups: yoga, walking, and no physical activity. Purposive sampling was used for data collection. Participants with a known history of significant physical or mental health issues were excluded from the study.

Table: 1 Sample breakup on the basis of physical activity groups:

Physical Activity Group	n	%
Yoga	19	4.74%
Walking	106	26.43%
No Physical Activity	276	68.83%
Total	401	100%

Table: 2 Sample breakup according to mindfulness Scores

Mindfulness Group	n	%
Low Mindfulness	194	48.38%
High Mindfulness	207	51.62%
Total	401	100%

Measures

1. The Philadelphia Mindfulness Scale ((PHLMS; Cardaciotto et al., 2008), is a brief questionnaire used to evaluate acceptance and present-moment awareness, two essential elements of mindfulness. Cardaciotto, Herbert, Forman, Moitra, and Farrow (2008) created the PHLMS to directly measure trait mindfulness, specifically present-moment awareness and acceptance as two independent but related factors, based on the theoretical work of Kabat-Zinn (1994) and Bishops et al. (2004)'s two-factor approach to mindfulness. Twenty items in the original PHLMS are assessed on a 5-point Likert-type scale (1= never, 2= rarely, 3= occasionally, 4 = often, and 5 = very often) reflecting how frequently the participant experienced each item over the past week.
2. Perimenopausal Biopsychosocial Health Index (PBHI) is a comprehensive tool developed by Gliby, Sylaja, and Jayan in 2024 to assess the overall well-being of perimenopausal women, moving beyond a single dimension of health. The tool consists of 77 items grouped under 15 sub-dimensions: psychological well-being, physical symptoms, sleep quality, stress levels, mindfulness, cognitive function, sexual health, social support, self-esteem, body image, energy levels, emotional regulation, relationship quality, coping skills, and life satisfaction. The scale includes both positive and negative items to ensure a balanced evaluation. The scale demonstrated high internal consistency, with a Cronbach's alpha of .910. For validity, the test was correlated with Remya and Jayan's Menopausal Symptom Checklist (r = .87).

Procedure

The Philadelphia Mindfulness Scale (PHLMS) and the newly developed Perimenopausal Biopsychosocial Health Index (PBHI) were selected to assess mindfulness and overall well-being, respectively. Participants completed both questionnaires. Based on their self-reported physical activity levels, participants were categorized into three groups: yoga practitioners, walkers, and those with no regular physical activity. Additionally, based on their mindfulness scores, they were divided into two groups: low and high mindfulness. The data were analyzed using SPSS, with a two-way ANOVA conducted to examine both the main effects and interaction effects of mindfulness and physical activity on perimenopausal bio-psycho-social health.

Table 3: Descriptive Statistics

phy_act	mf_median	Mean	Std. Deviation	N
1.00	1.00	292.8000	51.21230	5
	2.00	258.2143	18.75829	14
	Total	267.3158	32.89048	19
2.00	1.00	247.7213	41.66899	61
	2.00	250.1333	40.01965	45
	Total	248.7453	40.80127	106
3.00	1.00	249.8438	32.70518	128
	2.00	258.2432	20.31206	148
	Total	254.3478	27.05782	276
Total	1.00	250.2835	36.70181	194
	2.00	256.4783	25.88320	207
	Total	253.4813	31.69488	401

Table 4: Two-Way ANOVA for the Interaction Between Mindfulness and Physical Activity on Perimenopausal Bio-Psycho-Social Health

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	15621.372[a]	5	3124.274	3.195	.01
Intercept	7467686.343	1	7467686.343	7637.752	.01
phy_act	9384.259	2	4692.130	4.799	.01
mf_median	1741.186	1	1741.186	1.781	.18
phy_act * mf_median	6735.655	2	3367.828	3.445	.03

Table 5: Post Hoc Comparisons Using Tukey HSD for Physical Activity Groups on Bio-Psycho-Social Health Scores

					95% Confidence Interval	
(I) phy_act	(J) phy_act	Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
1.00	2.00	18.5705*	7.78997	.046	.2440	36.8970
	3.00	12.9680	7.41634	.189	-4.4796	30.4155
2.00	1.00	-18.5705*	7.78997	.046	-36.8970	-.2440
	3.00	-5.6025	3.57301	.261	-14.0083	2.8033
3.00	1.00	-12.9680	7.41634	.189	-30.4155	4.4796
	2.00	5.6025	3.57301	.261	-2.8033	14.0083

Main effect

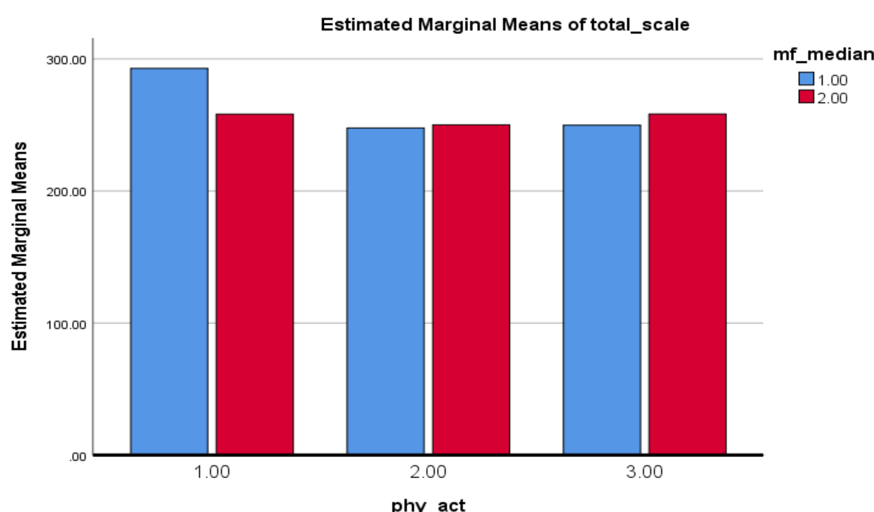
From the results (Table 4), it is evident that there are significant main effects for both mindfulness and physical activity. Participants in the yoga group had the highest Perimenopausal Bio-Psycho-Social Health Index (PBHI) scores (M = 267.32), followed by the no physical activity group (M = 254.35), and then the walking group (M = 248.75). Additionally, individuals with high levels of mindfulness (M = 256.48) scored significantly higher on the PBHI than those with low mindfulness levels (M = 250.28), as presented in Table 3.

Interaction effect

A significant interaction effect between mindfulness and physical activity was found. The interaction indicates that the impact of physical activity on PBHI scores was influenced by the level of mindfulness. Interestingly, yoga participants with low mindfulness levels had the highest PBHI scores overall (M = 292.80), though the sample size was small (n = 19), suggesting the need for further investigation. Participants in the no physical activity group with high mindfulness also scored high (M = 258.24), even surpassing those in the walking group across both mindfulness conditions. The walking group recorded the lowest PBHI scores overall, especially among participants with low mindfulness levels (M = 247.72).

The two-way ANOVA results indicate that both main effects and interaction effects were significant. The main effect of physical activity was particularly notable, especially in the case of the yoga group, which showed the highest scores on the Perimenopausal Biopsychosocial Health Index (PBHI). Each physical activity category demonstrated distinct outcomes. Interestingly, participants in the no physical activity group exhibited high mindfulness scores, which whereas the walking group consistently showed lower PBHI scores which compared to

the yoga group. This was further confirmed by the Tukey HSD post hoc analysis (Table 5), which which revealed a significant mean difference which between the yoga and walking groups (Mean Difference = 18.57, p = .046). These findings are further supported by a study conducted by Streeter et al. (2010), in which the yoga participants (n = 19) showed greater improvements in mood and greater reductions in anxiety compared to the walking participants (n = 15). Positive correlations were observed between improved mood, reduced anxiety, and increased thalamic GABA levels in the yoga group. Specifically, changes in mood scales were positively associated with changes in GABA levels among yoga practitioners. Lower psychological stress and greater dispositional mindfulness are connected to greater mental well-being. Lower levels of psychological stress and greater dispositional mindfulness are associated with higher mental well-being. Stress and well-being share an inverse relationship, particularly when there is a mismatch between an individual's environmental demands and their coping capacity—under such conditions, stress tends to be elevated while well-being is diminished. Conversely, higher levels of dispositional mindfulness have been consistently correlated with greater well-being (Fincham et al., 2023).



There was a significant main effect observed for mindfulness. Interestingly, participants with low mindfulness scores in the yoga group recorded the highest PBHI scores (M = 292.80). This suggests that these individuals may have derived substantial benefits from the physical practice of yoga, irrespective of their dispositional mindfulness level. Regular practice of yoga promotes strength, endurance, flexibility and facilitates characteristics of friendliness, compassion, and greater self-control, while cultivating a sense of calmness and well-being (Woodyard, 2011). Furthermore, participants with higher mindfulness scores in the no physical activity group reported higher PBHI scores than those in the walking group. These findings challenge conventional assumptions regarding the independent and combined roles of mindfulness and physical activity, and points to the complex role of baseline mindfulness. According to Goyal (2014), mindfulness meditation moderately reduced anxiety, pain, and depression and, to a lesser extent, improved mental well-being and reduced psychological stress.

Physical exercise's impact on PBHI scores was contingent upon the degree of mindfulness, as seen by the substantial interaction effect between physical activity and mindfulness. For instance, compared to women in the same group who practiced yoga with high mindfulness, those who practiced yoga with poor mindfulness had noticeably higher PBHI ratings.

This interaction provides insightful information. It suggests that the advantages of exercise vary and rely on psychological traits such as mindfulness. In particular, yoga seemed to be particularly beneficial for improving the overall bio-psycho-social health of women who lacked mindfulness. This could point to a compensation mechanism, whereby people who are less naturally mindful might benefit more from organized mind-body exercises.

Furthermore, the findings suggest that although mindfulness and physical exercise both improve biopsychosocial health on their own, their combined impact is complex. Yoga, as a form of mindful physical activity, may be more integrative and impactful for those who are not inherently mindful but are open to structured intervention. According to Woodyard (2011), Yoga is recognized as a form of mind-body medicine that integrates an individual's physical, mental and spiritual components to improve aspects of health, particularly stress related illnesses. On the other hand, those with high mindfulness levels may maintain bio-psycho-social health irrespective of physical activity.

Limitations and Future Research

The unequal group sizes across the physical activity categories—Yoga (n = 19), Walking (n = 106), and No Physical Activity (n = 276). This imbalance may have influenced the statistical power and generalizability of the findings, particularly with the smaller yoga group, which may limit the reliability of comparisons across groups.

The findings emphasize the value of incorporating mindfulness-based interventions and structured physical activities—particularly yoga—into health programs. These practices may serve as effective strategies to improve the psychological and physical health of women undergoing perimenopausal transitions.

The results of the study highlight the importance of drawing attention to the unique needs of perimenopausal women—a population that often normalizes their transitional phase, even while experiencing significant physical, emotional, and social challenges. The findings emphasize how mindfulness—being present without judgment—and structured physical practices like yoga and other activities positively influence the bio-psycho-social health of women during this important life stage. These insights offer a strong foundation for health professionals, educators, and community planners to design holistic, effective, and targeted intervention programs that support the well-being of midlife women.

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Conflict of Interest

The author(s) declared no conflict of interest.

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