

# Effects of Light-Intensity Stretching on Menopausal and Depressive Symptoms in Middle-Aged Women: Experimental Study

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## ABSTRACT

**Introduction:** Natural menopause, characterized by the cessation of menstruation due to ovarian follicular inactivity, often leads to various symptoms, including hot flashes and depressive mood. Exercise has shown promise in alleviating these symptoms, with light-intensity stretching being a potential solution. This study examines the effects of light-intensity stretching on menopausal and depressive symptoms in middle-aged women, exploring physiological mechanisms involved.

**Objectives:** To evaluate impact of light-intensity stretching on menopausal and depressive symptoms and quality of life in middle-aged women. Specific objectives include assessing changes in symptom severity using the Menopause Rating Scale (MRS) and Hamilton Depression Rating Scale (HDRS).

**Method:** Employing experimental design and convenient sampling, 58 women aged 45-55 are divided into control and stretching groups based on inclusion and exclusion criteria. Measures include MRS, HDRS, and International Physical Activity Questionnaire (IPAQ). A 3-week intervention involves sham stretching for controls and group-based light-intensity stretching for the others.

**Results:** The stretching group experiences significant reductions in menopausal symptoms and improved quality of life, evident in MRS domain sub-scores and total scores. HDRS scores also show substantial decreases in depressive symptoms compared to the control group

**Conclusion:** Light intensity stretching notably alleviates menopausal and depressive symptoms in middle-aged women. Enhanced parasympathetic activity, reduced sympathetic activity, improved circulation, muscle relaxation, stress reduction, altered pain perception, and endorphin release are key physiological mechanisms. Positive effects extend to urogenital symptoms, underscoring its holistic benefits for women's overall quality of life.

**Keywords:** Menopausal Symptoms, Light-Intensity Stretching, Depressive Symptoms, Quality of Life, Middle-Aged Women, Physiological Mechanisms

## INTRODUCTION

According to the World Health Organization natural menopause is defined as the permanent cessation of menstruation

resulting from the loss of ovarian follicular activity without an obvious intervening cause and is confirmed only after 12 consecutive months of amenorrhea.<sup>[1]</sup>

Natural menopause occurs between 45 and 55 years of age. A variety of symptoms have been attributed to menopause. Hot flushes and night sweats are the most common vasomotor symptoms experienced during menopause and are caused due to thermoregulatory disturbances.

Hot flushes arise as a sudden feeling of heat in the face, neck and chest and is associated with flushing of skin, profuse perspiration, palpitations and acute discomfort which lasts for about 3 minutes. The feeling of heat is initially centred in the upper part of the body and further spreads upwards and downwards throughout the body. Hot flushes have shown to be triggered by tension and nervousness. These symptoms can be treated with hormone therapy. The prevalence of hot flushes varies in different cultures and different lifestyles among women.

Night sweats are nighttime manifestations of hot flushes experienced during the waking hours. Night sweats are usually the reason behind the complaint of insomnia in menopausal women.

There is a significant increase in the risk of occurrence of new-onset depression in women during the menopausal transition compared with their premenopausal years. The risk factors responsible for development include poor sleep, stressful or negative life events, higher body mass index, race, lifestyle of individuals and hormonal changes occurring during menopause.

Exercise may alleviate menopausal and depressive symptoms among middle-aged women. Previous studies have shown that physical activity decreases hot flashes and night sweats, improves sleep, physical health and psychological well-being in perimenopausal and menopausal women. [2, 3]

Light-intensity exercise is shown to have a positive impact on psychological well-being without increasing the occurrence of hot flashes. [4] Light-Intensity exercise requires less than 3 Metabolic Equivalents (METs) and usually includes activities like shuffling, indoor walking, household chores, occupational tasks, or incidental daily living movement.

Compared to Moderate-Intensity physical activity which is mostly done during leisure-time, light-intensity physical activity is inherently a larger component of waking times. It may be the most acceptable form of physical activity since it mainly comprises unstructured movement that can easily be incorporated into everyday activities and comparatively requires less time, energy, skills, costs, facilities, and has lower risk of injury. Engaging in light intensity may be a more enjoyable way of staying active and requires less motivation as it is mostly accumulated through incidental daily living, it may therefore be a key target to enhance behaviour activation. [5]

Stretching is a common light-intensity exercise, which is shown to suppress sympathetic nervous activity and increase parasympathetic activity [6]

Static Stretching involves slowly stretching a muscle/tendon group and holding the position for a period of 10-30 seconds. Static stretching can be active or passive. Active Static Stretching involves holding the stretched position using the strength of the agonist muscle as is common in various positions of yoga.

The root cause of menopausal and depressive symptoms is related to a disorder of the autonomic nervous system along with the decline in oestrogen levels.

Stretching may therefore be beneficial in improvement of both physical and mental health in middle-aged women.

### **NEED FOR STUDY**

Previous studies have shown an increase in vasomotor symptoms like hot flashes in menopausal women after moderate - to - high intensity aerobic training.

Also, there is paucity of literature on the effect of light-intensity stretching in alleviating menopausal and depressive symptoms in middle-aged women.

There is a dissimilarity in the lifestyle of Indian and Japanese women which affects the occurrence of menopausal and depressive symptoms.

There is a lack of evidence available to suggest the impact of light-intensity stretching on menopausal and depressive symptoms in Middle-aged women.

Thus, our intention is to study the effect of light-intensity stretching on Menopausal and Depressive symptoms In Middle-aged women.

To promote awareness about possible lifestyle modification interventions that alleviate menopausal and depressive symptoms and to promote the practice and continuation of the stretching program.

### **AIM & OBJECTIVES**

- To study the effect of light-intensity stretching on menopausal symptoms, depressive symptoms and the quality of life in middle-aged women using the Menopause Rating Scale and the Hamilton Depression Rating Scale.

### **MATERIALS & METHODS**

The methodology employed in this study involved an experimental design with convenient sampling. The sample size consisted of 58 subjects, divided equally into two groups: a control group (n=29) and a stretching group (n=29). Inclusion criteria for female participants specified an age range of 45-55 years, a sedentary lifestyle characterized by a low level of physical activity on the International Physical Activity Questionnaire, and a Hamilton Depression Rating Scale score of 20 or higher, indicating at least moderate severity of depression. Exclusion criteria encompassed uncontrolled diabetes, hypertension, or thyroid conditions, recent history of fracture or dislocation, hypermobility, acute inflammatory or infectious conditions like rheumatoid arthritis, as well as various cardiovascular, respiratory, neuromuscular, or musculoskeletal disorders. Additionally, participants currently undergoing hormone therapy, psychotropic medications, sleeping pills, or with a history of surgical menopause were excluded.

The outcome measures for the study included the Hamilton Depression Rating Scale (HDRS), the Menopause Rating Scale (MRS), and the International Physical Activity Questionnaire (IPAQ).

The study received ethical approval from the Institutional Ethical Committee of TMV's Lokmanya Tilak College of Physiotherapy, and informed consent was obtained from all participants meeting the inclusion criteria. Participants were then divided into control and stretching groups through convenient sampling. Both groups received counseling to educate them about the potential benefits of light-intensity stretching in managing menopausal and depressive symptoms.

For the control group (N=29), a sham stretching routine was implemented, with participants engaging in supervised sham stretching sessions three days a week for three weeks. Depressive symptoms, menopausal symptoms, and quality of life were reassessed using the Hamilton Depression Rating Scale and Menopause Rating Scale after this intervention period.

The stretching group (N=29) underwent a three-week supervised intervention, involving a group-based, light-intensity stretching routine lasting 10 minutes, performed three days a week. This routine targeted major muscle groups including the shoulder girdle, neck, trunk, lower back, hips, posterior and anterior legs, and ankles. Similar to the control group, depressive symptoms, menopausal symptoms, and quality of life were reassessed using the Hamilton Depression Rating Scale and Menopause Rating Scale after the three-week intervention period.

Statistical analysis was conducted to evaluate the outcomes for both the control and stretching groups.

### **STATISTICAL ANALYSIS**

Scoring for the Menopause Rating Scale and the Hamilton Depression Rating Scale was conducted using pre-intervention and post-intervention data from both the stretching and control groups. The Menopause Rating Scale assessment encompassed the three

domains: Somatic, Psychological, and Urogenital. These domains were graded for both groups before and after the intervention, providing insights into the severity of menopausal symptoms. Additionally, the total scores from the Menopause Rating Scale and the Hamilton Depression Rating Scale were graded for both groups before and after the intervention. This evaluation aimed to understand the impact of menopausal symptoms on the quality of life of middle-aged women and to assess the severity of depression.

Qualitative comparisons were made to analyse the distinct characteristics of both groups. Mean and Standard Deviation values for the pre-intervention and post-intervention scores on the Menopause Rating Scale and Hamilton Depression Rating Scale for participants in both groups were calculated using appropriate formulae in Excel. Furthermore, the characteristics of both groups were compared using a paired t-test, focusing on continuous data, to identify significant differences and variations in the study parameters.

## RESULT

The baseline parameters were evaluated before the intervention using Menopause Rating Scale (MRS) and Hamilton Depression Rating Scale (HDRS).

The Menopause Rating Scale (MRS) is a comprehensive assessment tool consisting of 11 items designed to capture a range of symptoms or complaints. It employs a scoring system that spans from 0 (indicating the absence of complaints) to 4 (indicating the presence of severe symptoms), with scores reflecting the severity of symptoms. The total MRS score provides valuable information about the overall symptom presentation, ranging from 0 (indicating an asymptomatic state) to 44 (indicating the most significant level of complaints).

Interpreting MRS scores involves categorising them as follows:

Somatic Domain (includes symptoms like hot flashes, heart discomfort, sleep problems, joint and muscular discomfort):

- 0-2: No/little symptoms
- 3-4: Mild severity
- 5-8: Moderate severity
- $\geq 9$ : Severe symptoms

Psychological Domain (includes symptoms like depressive mood, irritability, anxiety, physical and mental exhaustion):

- 0-1: No/little symptoms
- 2-3: Mild symptoms
- 4-6: Moderate symptoms
- $\geq 7$ : Severe symptoms

Urogenital Domain (includes symptoms such as sexual problems, bladder problems, and vaginal dryness):

- 0: No/little symptoms
- 1: Mild symptoms
- 2-3: Moderate symptoms
- $\geq 4$ : Severe symptoms

The total MRS score reflects the impact of menopausal symptoms on an individual's quality of life and is graded as follows:

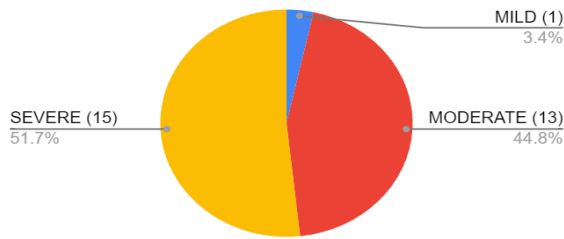
- 0-4: No/little impact
- 5-8: Mild impact
- 9-16: Moderate impact
- $\geq 17$ : Severe impact

This scoring system allows for a comprehensive assessment of menopausal symptoms and their impact on an individual's quality of life, with specific criteria for categorising symptom severity across different domains.

Pre-intervention data from the Menopause Rating Scale (MRS) revealed significant differences between the stretching group and the control group across various domains. As shown in Graph 1 and 2, in the Somatic domain, 3.4% of participants in the stretching group had mild symptoms, while 44.8% experienced moderate symptoms, and 51.7% had severe symptoms. In contrast, the control group exhibited 3.4% with mild symptoms, 72.4% with moderate symptoms, and 24.1% with severe symptoms in the same domain.

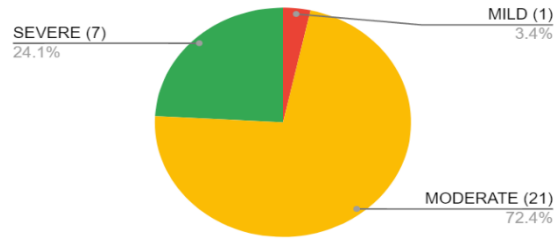
**Graph 1 - Somatic Domain**

Stretching Group - Pre-Intervention



**Graph 2 - Somatic Domain**

Control Group - Pre-Intervention

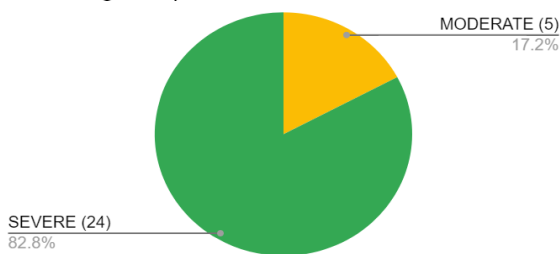


As presented in Graph 3 and 4, in the psychological domain, both groups showed similar patterns, with 17.2% of participants

reporting moderate symptoms and 82.8% experiencing severe symptoms.

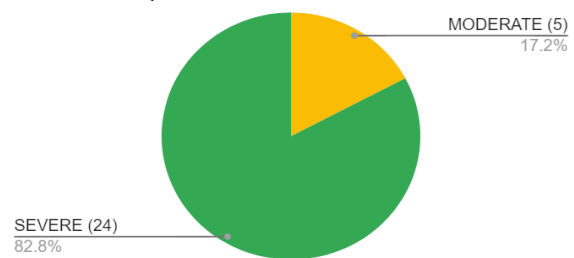
**Graph 3 - Psychological Domain**

Stretching Group - Pre-Intervention



**Graph 4 - Psychological Domain**

Control Group - Pre-Intervention

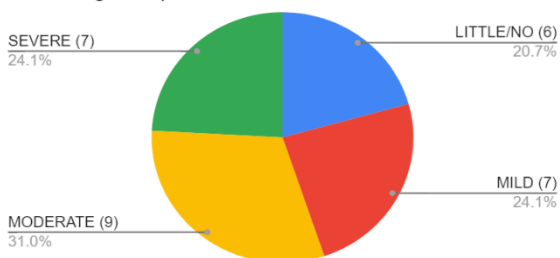


As shown in Graph 5 and 6, the Urogenital domain indicated variations between the groups as well. In the stretching group, 20.7% had no/little symptoms, 24.1% had mild symptoms, 31.0% had moderate symptoms, and 24.1% had severe symptoms.

Conversely, the control group had 20.7% with no/little symptoms, 31% with mild symptoms, 44.8% with moderate symptoms, and 3.4% with severe symptoms in this domain.

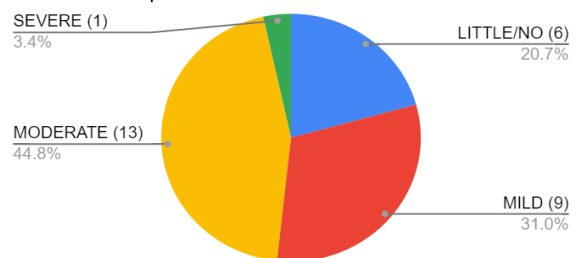
**Graph 5 - Urogenital Domain**

Stretching Group - Pre-Intervention



**Graph 6 - Urogenital Domain**

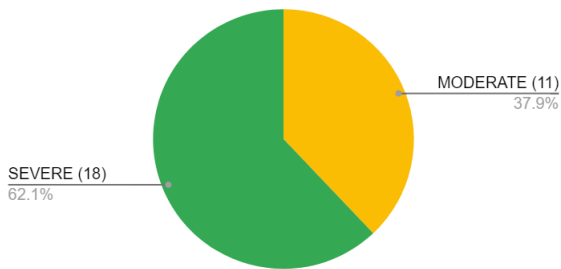
Control Group - Pre-Intervention



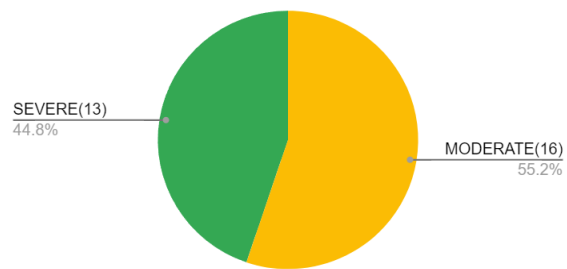
The total MRS score, reflecting the impact of menopausal symptoms on quality of life, demonstrated notable differences. As per Graph 7 and 8, pre-intervention, the stretching group had 37.93% of participants

experiencing a moderate effect and 62.07% experiencing a severe effect, while the control group had 55.17% with a moderate effect and 44.83% with a severe effect.

**Graph 7 - Total Score of Menopausal Rating Scale**  
Stretching Group - Pre-Intervention



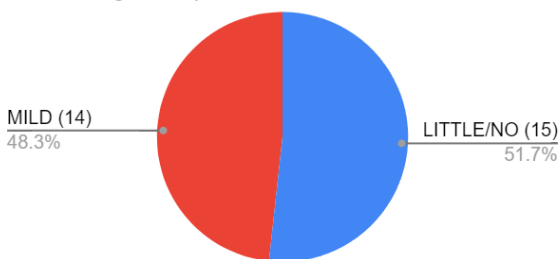
**Graph 8 - Total Score of Menopausal Rating Scale**  
Control Group - Pre-Intervention



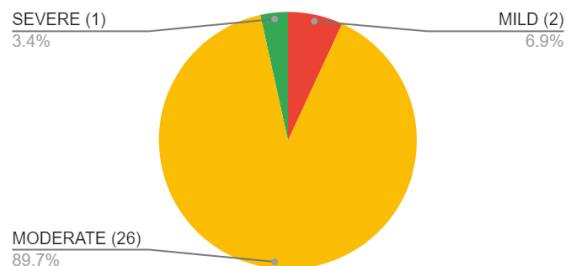
Post-intervention, changes were observed in the Somatic domain as shown in Graph 9 and 10, with the stretching group showing 51.72% of participants having little/no symptoms and 48.28% with mild symptoms.

In contrast, the control group had only 6.90% with mild symptoms, but a significant 89.66% with moderate symptoms and 3.45% with severe symptoms in the same domain.

**Graph 9 - Somatic Domain**  
Stretching Group - Post-Intervention



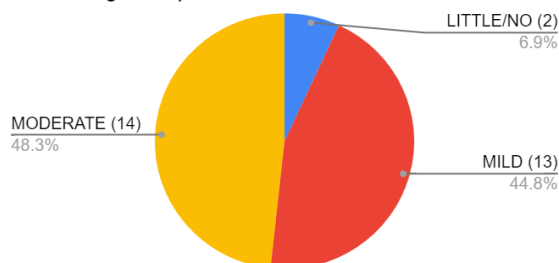
**Graph 10 - Somatic Domain**  
Control Group - Post-Intervention



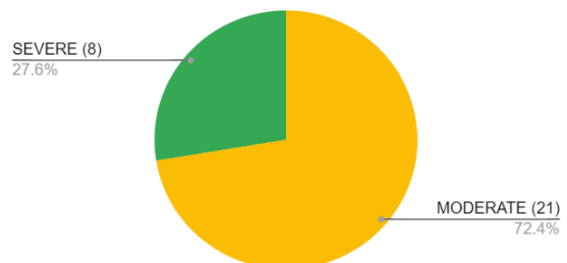
As presented in Graph 11 and 12, in the psychological domain post-intervention, the stretching group displayed a shift with 6.9% reporting little/no symptoms, 44.8% experiencing mild symptoms, and 48.3%

with moderate symptoms. Meanwhile, the control group continued to exhibit a high proportion of participants with moderate symptoms (72.4%) and 27.6% with severe symptoms.

**Graph 11 - Psychological Domain**  
Stretching Group - Post-Intervention



**Graph 12 - Psychological Domain**  
Control Group - Post-Intervention

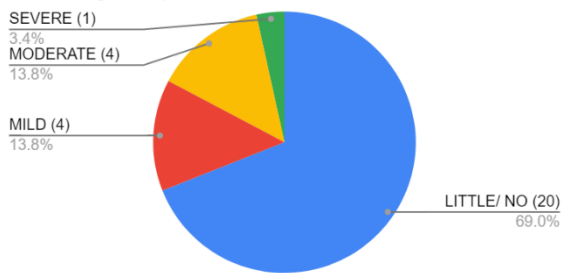


As shown in Graph 13 and 14, within the urogenital domain post-intervention, the stretching group showed improvement, as 69% had no/little symptoms, 13.8% reported mild symptoms, 13.8% had moderate symptoms, and 3.4% had severe symptoms.

In contrast, the control group maintained similar proportions to the pre-intervention phase, with 20.7% experiencing no/little symptoms, 31% having mild symptoms, 44.8% with moderate symptoms, and 3.4% with severe symptoms.

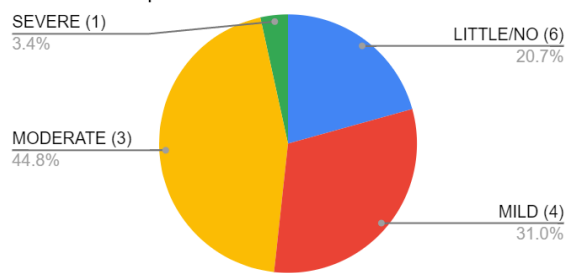
**Graph 13 - Urogenital Domain**

Stretching Group - Post-Intervention



**Graph 14 - Urogenital Domain**

Control Group - Post-Intervention

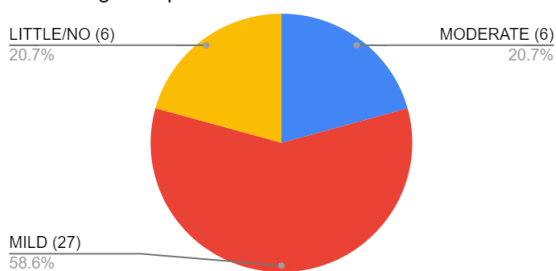


As per Graph 15 and 16, Total MRS scores post-intervention indicated a favourable trend in the stretching group, with 20.69% of participants experiencing little/no effect, 58.62% with mild effect, and 20.69% with a moderate effect. In contrast, the control

group showed no participants with little/no effect, with 100% experiencing a moderate effect. These findings suggest that the stretching intervention had a positive impact on menopausal symptomatology and quality of life compared to the control group.

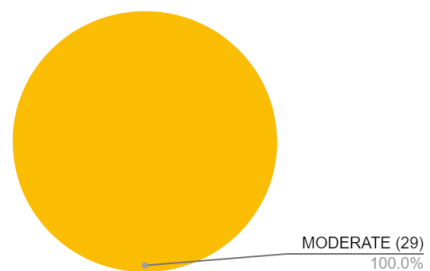
**Graph 15 - Total Score of Menopausal Rating Scale**

Stretching Group - Post-Intervention



**Graph 16 - Total Score of Menopausal Rating Scale**

Control Group - Pre-Intervention



The Hamilton Depression Rating Scale (also known as Ham-D) is a clinician-administered depression assessment scale. The original version contains 17 items pertaining to symptoms of depression experienced over the past week.

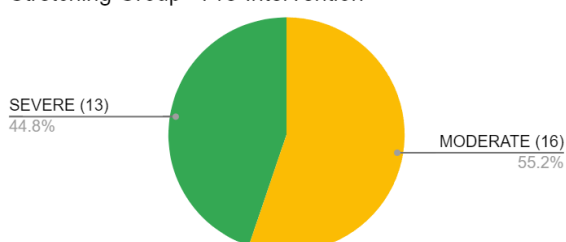
The Hamilton Depression Rating Scale classifies scores as follows: 0-7 indicates the absence of depression, 8-16 signifies mild depression, 17-23 suggests moderate

depression, and a score of 24 or higher indicates severe depression.

As presented in Graph 17 and 18, before the intervention, the HAMD scores revealed that in the stretching group, 55.7% of participants were classified as having moderate depression, while 44.83% were categorised as having severe depression. In contrast, in the control group, 72.41% had moderate depression, and 27.59% had severe depression.

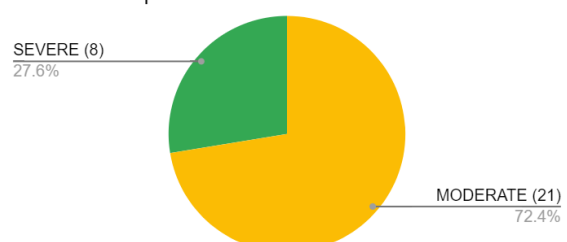
**Graph 17 - Total Score of Hamilton Depression Rating Scale**

Stretching Group - Pre-Intervention



**Graph 18 - Total Score of Hamilton Depression Rating Scale**

Control Group - Pre-Intervention

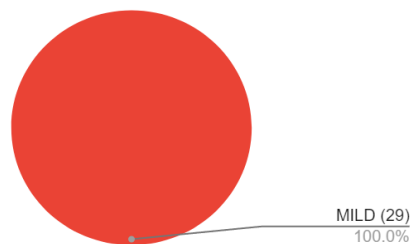


After the intervention, the picture changed as shown in Graph 19 and 20. In the stretching group, a noteworthy 100% of participants experienced an improvement in their depression levels, shifting to the category of

mild depression. However, in the control group, only 41.38% of participants reached the mild depression category, while 58.62% remained in the moderate depression category.

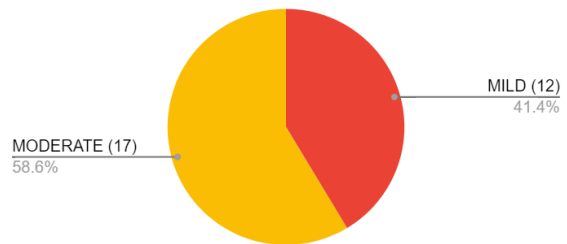
**Graph 19 - Total Score of Hamilton Depression Rating Scale**

Stretching Group - Post-Intervention



**Graph 20 - Total Score of Hamilton Depression Rating Scale**

Control Group - Post-Intervention



The stretching intervention had a significant positive impact on the depression levels of the stretching group, where all participants improved to mild depression. In contrast, the control group showed less uniform improvement, with a substantial portion still experiencing moderate depression after the intervention.

Specifically, for the assessment using the Menopausal Rating Scale (MRS), the pre-intervention mean score within the Stretching Group was calculated at  $21.41 \pm 6.71$ , in contrast to the Control Group's pre-intervention mean of  $16.24 \pm 2.42$ . Upon post-intervention analysis, the Stretching Group's mean score showed a significant reduction to  $6.62 \pm 2.88$ , while the Control Group displayed a mean score of  $13.17 \pm 1.91$ .

Table No. 1 offers a comprehensive overview of the mean values along with their corresponding standard deviations, both before and after the intervention, for both the Stretching Group and the Control Group.

**Table 1: Comparative assessment of mean menopause rating scale score before and after intervention among the study groups**

	Pre intervention (Mean ± SD)	Post intervention (Mean ± SD)	p-value
Stretching group	21.41 ± 6.71	6.62 ± 2.88	0.016*
Control group	16.24 ± 2.41	13.17 ± 1.91	0.001*

**Graph 21: Comparative assessment of mean menopause rating scale score before and after intervention among the study groups**

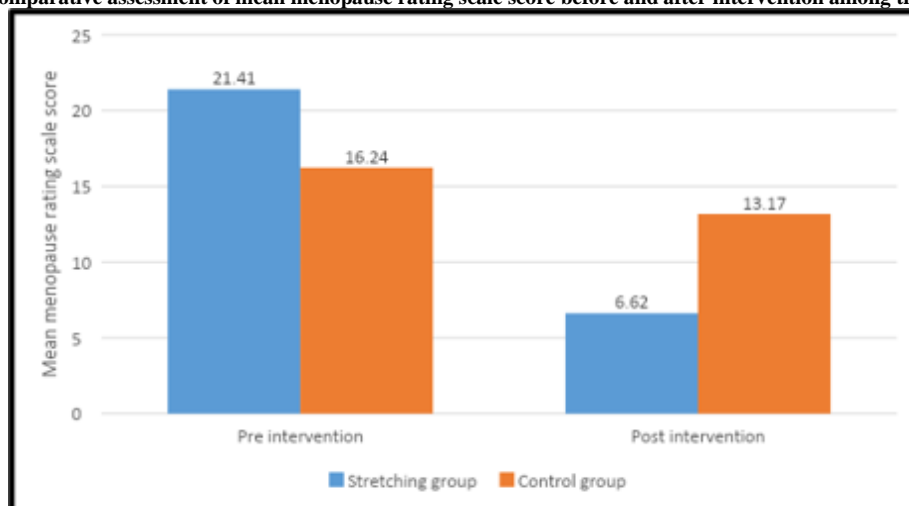




Table 1 and graph 21 shows a significant reduction in mean menopausal rating scale score in stretching ( $p=0.016$ ) and control ( $p=0.001$ ) groups. However, the mean difference was higher among the stretching group as compared to the control group. Similarly, in terms of the Hamilton Depression Rating Scale (HDRS)

assessment, the pre-intervention mean score for the Stretching Group was determined to be  $23.59 \pm 2.01$ , whereas the Control Group exhibited a pre-intervention mean score of  $22.34 \pm 1.88$ . Following the intervention, the Stretching Group displayed a reduced mean score of  $11.62 \pm 1.52$ , while the Control Group's mean score increased to  $17.10 \pm 3.11$ .

Table 2: Comparative assessment of mean Hamilton depression rating scale score before and after intervention among the study groups

	Pre intervention (Mean + SD)	Post intervention (Mean + SD)	p-value
Stretching group	$23.59 \pm 2.01$	$11.62 \pm 1.52$	0.026*
Control group	$22.34 \pm 1.87$	$17.10 \pm 3.11$	0.004*

Graph 22 - Comparative assessment of mean Hamilton depression rating scale score before and after intervention among the study groups

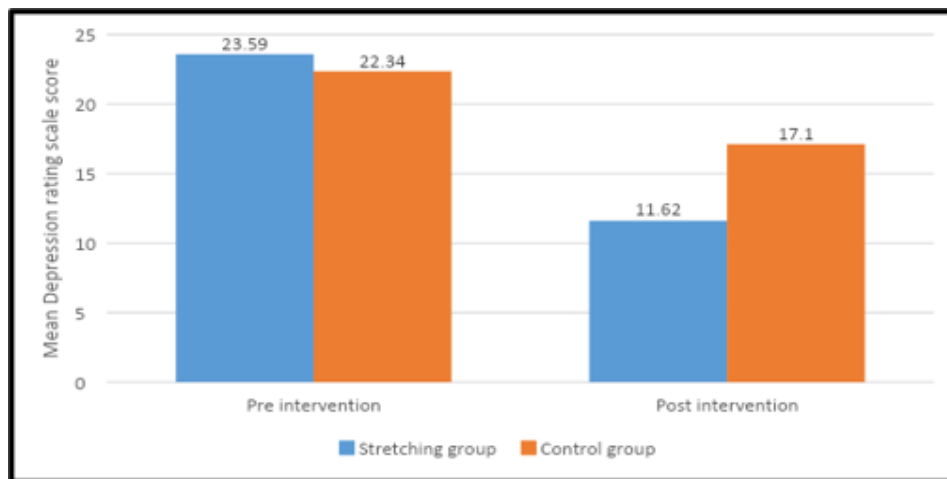


Table 2 and graph 22 shows a significant reduction in mean Hamilton Depression Rating Scale score in stretching ( $p=0.026$ ) and control ( $p=0.004$ ) groups. However, the mean difference was higher among the stretching group as compared to the control group.

## DISCUSSION

The improvement in menopausal and depressive symptoms observed in middle-aged women because of light-intensity stretching can be attributed to several physiological mechanisms, with a focus on the role of the autonomic nervous system (ANS). Menopausal women often experience a range of symptoms due to autonomic dysfunctions, which contribute to these symptoms. Light - intensity stretching exercises alleviate the menopausal and depressive symptoms by enhancing

parasympathetic activity and reducing sympathetic activity.

The activation of the parasympathetic nervous system leads to a decreased heart rate, promoting relaxation.<sup>[8]</sup> In contrast, menopausal women often experience increased heart rates associated with anxiety and stress. The reduction in heart rate brought about by parasympathetic activity counteracts these elevated heart rates, contributing to a sense of calm and well-being.

Parasympathetic stimulation during stretching exercises can enhance heart rate variability, indicating the adaptability of the autonomic nervous system. Improved HRV is associated with better emotional regulation and symptom modulation.<sup>[8]</sup> It allows the body to respond more flexibly to stressors, reducing the severity of emotional responses and improving overall emotional well-being.

Another important effect of increased parasympathetic activity is vasodilation, the expansion of blood vessels. This physiological response enhances blood flow to various tissues, potentially alleviating hot flashes. Hot flashes are often triggered by changes in blood flow and skin temperature. By promoting vasodilation, stretching exercises help regulate blood flow and skin temperature, leading to a reduction in the intensity and frequency of hot flashes.<sup>[9]</sup>

Hot flashes are believed to result from the instability of the thermoregulatory centre in the brain, which leads to sudden changes in blood flow to the skin and an inappropriate perception of temperature changes. Enhanced parasympathetic activity can impact vascular tone and contribute to vasodilation. When blood vessels in the skin expand, blood flow to the skin's surface increases, facilitating heat dissipation and promoting cooling.

By promoting vasodilation, increased parasympathetic activity can help regulate blood flow and skin temperature, potentially mitigating the intensity and frequency of hot flashes. The improvement in blood flow and the resultant cooling effect may contribute to a greater sense of comfort for menopausal women experiencing hot flashes.

Parasympathetic activation during stretching can trigger the release of endorphins, natural chemicals in the body known for their mood-enhancing properties. These endorphins promote mood regulation and reduce stress, which can alleviate mood swings and depressive symptoms. As a result, women who engage in stretching exercises may experience improved emotional well-being. The parasympathetic response induced by stretching aids in the body's recovery and repair mechanisms. This can lead to reduced fatigue and enhanced energy levels. Women experiencing menopausal and depressive symptoms often report feeling fatigued and lacking energy. Stretching exercises may help address these issues by supporting the body's natural recovery processes.

Additionally, it's worth noting that the Control Group in the study showed marginal

improvements in depressive symptoms. This could be attributed to the benefits of group exercise. Engaging in group activities and receiving social support have been shown to have positive effects on mental well-being. Social interactions and the sense of belonging to a group can contribute to reduced feelings of depression and improved mood.<sup>[10]</sup>

The improvement in somatic symptoms, including hot flashes, heart discomfort, sleep problems, joint, and muscular discomfort, in response to light-intensity stretching can be attributed to several key physiological changes in the body.

Firstly, light-intensity stretching enhances blood circulation throughout the body. This is achieved through the rhythmic contraction and relaxation of muscles during stretching exercises. Improved blood circulation plays a vital role in mitigating hot flashes, a prevalent menopausal symptom. Hot flashes are partly triggered by fluctuations in blood vessel dilation and constriction. Enhanced blood circulation helps regulate body temperature more effectively, reducing both the intensity and frequency of hot flashes. Furthermore, it contributes to the maintenance of steady blood flow, potentially alleviating heart discomfort that can sometimes accompany hormonal fluctuations during menopause.

Secondly, stretching promotes muscle relaxation by gently stretching and elongating muscle fibres. This relaxation occurs through the stimulation of muscle spindles and the Golgi tendon organ. Joint and muscular discomfort often stem from muscle tension and stiffness. Stretching helps alleviate this tension, leading to reduced discomfort. Additionally, it enhances joint flexibility, which can alleviate joint pain, contributing to an overall sense of physical comfort.

Moreover, stretching exercises induce a reduction in stress levels through the activation of the parasympathetic nervous system, responsible for the "rest and digest" response. Stress is a known contributor to sleep problems, including insomnia. By

reducing stress hormone production, particularly cortisol, stretching creates a conducive environment for better sleep quality. Additionally, stress can exacerbate muscle and joint discomfort by causing muscle tension. The stress-reducing effect of stretching not only promotes improved sleep but also helps alleviate tension in these areas. Lastly, stretching exercises stimulate the release of endorphins, the body's natural painkillers. Endorphins bind to receptors in the brain that reduce the perception of pain. This is particularly relevant to joint and muscular discomfort, which is often associated with an increased perception of pain. The release of endorphins during stretching can help individuals perceive less discomfort and pain in these areas, further enhancing their physical well-being.

The improvement in psychological symptoms, such as depressive mood, irritability, anxiety, and physical and mental exhaustion, in response to light-intensity stretching can be attributed to several key physiological effects on the body.

Firstly, stretching, like other forms of exercise, triggers the release of endorphins, which are neurotransmitters known for their natural painkilling and mood-elevating properties. When released, endorphins bind to receptors in the brain, reducing the perception of pain and inducing feelings of pleasure. This neurochemical response has a profound impact on psychological well-being. Endorphins released during stretching exercises can elevate mood, reduce feelings of sadness and depression, and contribute to an overall more positive emotional state.

Secondly, stretching exercises activate the parasympathetic nervous system, promoting a state of physical and mental relaxation. This activation leads to a decrease in the production of stress hormones, particularly cortisol. Lower stress levels have a direct impact on psychological symptoms. They can help manage symptoms of irritability by reducing restlessness and nervousness associated with anxiety. This stress reduction fosters a calmer emotional state, aiding in the management of anxiety-related symptoms.

Furthermore, stretching enhances sleep quality through various mechanisms. It can help relax tense muscles and reduce physical discomfort, making it easier for individuals to fall asleep and stay asleep. Better sleep quality results in reduced physical and mental exhaustion.

Adequate sleep allows for physical and mental recovery, leading to increased energy levels and a significant reduction in feelings of exhaustion.

Lastly, engaging in a regular stretching routine can improve flexibility, strength, and balance. Achieving stretching goals and witnessing physical progress leads to a sense of accomplishment. This heightened sense of accomplishment can boost self-esteem and self-efficacy, which, in turn, has a positive impact on overall psychological well-being. It reduces feelings of exhaustion and enhances one's mental state, contributing to improved emotional health.

The improvement in urogenital symptoms, encompassing sexual problems, bladder problems, and vaginal dryness, in response to light-intensity stretching can be attributed to several key physiological effects on the body.

Firstly, stretching exercises play a crucial role in enhancing blood circulation throughout the body, including the pelvic region. This heightened blood flow promotes the health and function of pelvic organs, such as the sexual and urinary organs. Improved blood circulation to the genital area can have a positive impact on sexual problems by enhancing sexual arousal and responsiveness. It may address issues like reduced libido or discomfort during intercourse. Additionally, this increased blood flow supports urogenital health by aiding the function of the bladder and urethra, potentially reducing the frequency of bladder problems such as urinary incontinence.

Secondly, regular physical activity, including stretching, contributes to hormonal regulation within the body. Hormonal imbalances, particularly a decrease in oestrogen during menopause, can lead to

vaginal dryness, a common urogenital symptom. Hormonal regulation achieved through physical activity may alleviate this symptom, promoting urogenital health and comfort.

Furthermore, stretching exercises induce a relaxation response in the body, reducing stress levels. Lower stress levels have a positive impact on various bodily functions, including sexual and urinary function. Stress can exacerbate bladder problems, such as urinary incontinence, and contribute to sexual problems. Stress reduction from stretching can help manage these symptoms by lowering stress-induced exacerbations.

Lastly, the release of endorphins and the reduction of stress hormones through stretching have a significant impact on overall psychological well-being. Improved mood and reduced stress can contribute to a more positive perception of urogenital symptoms. Women may experience these symptoms as less bothersome or distressing, which can lead to an improved overall quality of life.

## CONCLUSION

In this study, we've found compelling evidence supporting the benefits of light-intensity stretching for menopausal and depressive symptoms in middle-aged women. This suggests that incorporating stretching exercises into daily routines can be a practical, non-pharmacological way to improve their quality of life.

Light-intensity stretching is a safe and effective approach, enhancing circulation, mood, and relaxation, leading to significant symptom reduction without side effects like heightened hot flashes.

The improvements observed can be attributed to increased parasympathetic activity and decreased sympathetic activity, reducing heart rate, enhancing heart rate variability, and potentially boosting mood. Psychosocial benefits from group exercise and social support may also have played a role.

Physiological changes like improved blood circulation, muscle relaxation, stress

reduction, and altered pain perception contribute to relief from somatic symptoms during menopause, such as hot flashes, heart discomfort, sleep issues, and joint/muscular discomfort.

Stretching has effects on endorphin release, neurotransmitter regulation, stress reduction, and sleep quality which also help alleviate depressive symptoms, enhancing overall mood and emotional well-being. Additionally, stretching has an impact on pelvic blood flow, hormonal balance, stress reduction, and psychological well-being contributes to alleviating urogenital symptoms associated with menopause.

Overall, these findings underscore the holistic benefits of light-intensity stretching, improving sleep, pain relief, bowel movements, energy levels, mood, and exercise adherence, and ultimately enhancing the quality of life for middle-aged women experiencing menopausal and depressive symptoms.

## Declaration by Authors

**Ethical Approval:** Approved

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