



## EFFECT OF AEROBIC EXERCISE ON MENOPAUSAL SYMPTOMS IN POST-MENOPAUSAL WOMEN OF VADODARA

### Physiotherapy & Rehabilitation

**Dr. Ankita Shah**

PhD Scholar, Gujarat University

**Dr. Hardini  
Prajapati**

Senior Lecturer, AIMS College, PhD Guide Gujarat University

### ABSTRACT

During the menopausal transition, women experience various physical, psychosomatic changes that may affect their quality of life. Several symptoms, including hot flushes, night sweats, vaginal dryness, depression, irritability, headache, and sleep disturbance, can occur more frequently in this period. The Menopause Rating Scale (MRS) is a standardized HRQoL scale with good psychometric characteristics. Many women are now seeking alternatives to hormonal therapy and it is increasingly important to identify other evidence-based interventions that have the potential to reduce the prevalence and/or severity of menopausal symptoms associated with menopause. **Objective-** The purpose of this study was to determine the effects of a 6-weeks home based aerobic exercise program on Post menopausal women to look at its effects on menopausal symptoms through Menopause rating scale (MRS). **Result & Conclusion:** there was significant reduction in somatic and psychological symptoms of menopause was found in all participants ( $p < 0.05$ ). Urogenital symptoms were found not to be significant ( $p = 0.27$ ) but overall post-menopausal symptoms were significantly reduced in participants.

### KEYWORDS

Menopause, aerobic exercise, menopausal symptoms, post-menopausal women, Menopause rating scale (MRS)

### INTRODUCTION

Menopause is defined as permanent cessation of menstrual periods in women or cessation of menstrual cycle for more than 12 months.<sup>(1)</sup> During the menopausal transition, women experience various physical, psychosomatic changes that may affect their quality of life. Several symptoms, including hot flushes, night sweats, vaginal dryness, depression, irritability, headache, and sleep disturbance, can occur more frequently in this period. Mean age at menopause ranges in Indian women from 40.32 to 48.84 yrs and in developed countries from 48.0 to 51 yrs. The average age of menopause in Indian women is 47.5 years according to Indian Menopause Society (IMS).<sup>(2)</sup> The prevalence of menopausal symptoms varies widely not only among individuals of the same population but also between different ethnic populations. Even there is a great diversity in nature of symptom and frequencies across countries, even in the same cultures.<sup>(3,4)</sup> Although these symptoms may be troublesome for these women, they are usually underestimated by care givers.

The Menopause Rating Scale (MRS) is a standardized HRQoL scale with good psychometric characteristics. The scale is a self-administered standardized questionnaire for complaints in menopausal women. MRS is a well-known and validated instrument for assessing the frequency and intensity of menopausal symptoms. Reliability measures (consistency and test-retest stability) were found to be good in all countries.<sup>(5,6,7)</sup>

Most commonly adopted treatment for menopausal symptoms is hormone replacement therapy (HRT).<sup>(8)</sup> Current guidance also recommends that HRT should be taken for as short a period as is necessary, at the lowest effective dose and also it cannot be prescribed for long durations and routinely as such therapy does not appear to reduce cardiac risk or prevent osteoporosis and may be associated with endometrial cancer, cerebrovascular accidents (stroke), and perhaps breast cancer. However, hormones may be prescribed on a short-term basis (1 to 2 years) if a woman has symptoms so severe that they interfere with her life quality so badly.<sup>(9,10)</sup> moreover, not all women, for example those who have had breast cancer, are candidates for HRT.

As large numbers of women are choosing not to take HRT, it is increasingly important to identify evidence-based lifestyle modifications, which can have a positive effect on menopausal symptoms.<sup>(11)</sup> For this reason, exercise can be preferred as a natural method with no side effects in order to reduce menopausal symptoms.

Similar studies are available from different literatures but still no such study is available from this region. Hence, aim of the present study is this study was planned to evaluate the effect of homebased aerobic training on menopausal symptoms in post-menopausal women from Vadodara, India.

### MATERIALS & METHODS

**Subjects:** A convenience sample of 50 Postmenopausal women having age group 40 to 60 years from Vadodara city, having Pre hypertension, Stage 1 hypertension not requiring antihypertensive medicines, Diabetes type 2 but do not require insulin, willingness to participate in study was included in study. Women with history of using oral contraceptives pill/HRT, phytoestrogens, attained premature/surgical menopause or having any serious orthopaedic, cardiovascular, pulmonary, neurological, metabolic disorder and h/o or having cancer, history of smoking, drug or alcohol abuse were excluded.

### Measurement Tool

A predesigned form was used to collect the Socio demographic data which included age, height, weight, menopause duration, marital status, educational level, occupation and average household income, Reproductive history such as: gravidity, parity, number of abortions and number of living children.

Written consent of all the subjects was taken after explanation of research purpose, keeping her privacy, anonymity and right to withdraw at any time as well as assuring confidentiality of her data.

For assessing Menopausal symptoms Menopausal rating scale (MRS) was used. The scale is translated and validated in multiple languages. English and Gujarati version of the questionnaire was used after taking permission from the author. MRS scale was used for assessing menopausal symptoms pre training and after completing 6-week home exercise to see the effect of exercise on menopausal symptoms. The MRS is composed of 11 items and is divided into three sub scales: Somatic- hot flushes, heart discomfort/palpitation, sleeping problems and muscle and joint problems. Psychological- depressive mood, irritability, anxiety and physical and mental exhaustion. Urogenital- sexual problems, bladder problems and dryness of the vagina. Each of the 11 symptoms contain a scoring scale from "0" (no complaints) to "4" (very severe symptoms). Women were asked whether or not they had experienced the 11 menopausal symptoms and depending upon the severity of these symptoms they were marked from "0" to "4". All the women were interviewed. They were explained the various menopausal symptoms and face to face communication with the women was done by the author only.

### Exercise Program

After taking written consent and approval from the ethical committee 50 women fulfilling the inclusion criteria were enrolled for home exercise program. Frequency of exercise was 4-5 days/week. for 6 weeks. Intensity: 60-80% according to the Karvonen method, RPE 11-13. Time: The total exercise program was of 45 minutes composed of 5-7 minutes of warm-up exercises, 30 minutes of aerobic exercise, 5-7 minutes of cool down exercises. Type: home exercise program was given to all women that included walking on ground, stretching of all long muscles and ROM exercise was given as warmup and cool down.

All women used smart watch to track their intensity heart rate and exercise time. Regular follow up and monitoring of home exercise was done either telephonic or personal interviews throughout the 6 weeks

### Statistical Analysis and Result

50 women willingly participated and completed the training. According to Table:1 Mean age of the participants was 51 years ( $\pm 4.8$ ). Mean BMI was 26.13( $\pm 5.5$ ) kg/m<sup>2</sup>. All participated women were post-menopausal having menopause duration of 3.6( $\pm 3.8$ ) years. The average age of women at menopause was 48.08 ( $\pm 3.2$ ) years

**Table:1 Characteristics of Subject:**

| Age (year)      | BMI (kg/m <sup>2</sup> ) | Menopause age (year) | Duration of Menopause (year) |
|-----------------|--------------------------|----------------------|------------------------------|
| 51.62 $\pm$ 4.8 | 26.13 $\pm$ 5.5          | 48.08 $\pm$ 3.2      | 3.6 $\pm$ 3.8                |

According to table no:2 60% of women participated in study had experienced menopause between age group 45-49 years, 28% of women experienced menopause between 50-54 years, 10% women experienced menopause at 40-44 years of age and only 2% women from 50 participants have experienced menopause between 55-59 years of age.

**Table :2 Age at Menopause (n=50)**

| Age group | No of women (n=50) | %   |
|-----------|--------------------|-----|
| 40-44     | 5                  | 10% |
| 45-49     | 30                 | 60% |
| 50-54     | 14                 | 28% |
| 55-59     | 1                  | 2%  |

Out of total score of 44, the mean score of Menopause symptoms was 14.37  $\pm$  6.96 pre-exercise training and after 6 weeks of exercise training the mean score of menopause symptoms was 12.22  $\pm$  4.37. which is reduced after training. Fuhrer looking into the sub scores of menopause symptoms, the mean of somatic symptoms was 7.34  $\pm$  2.7 out of 16 which is also reduced after training to 6  $\pm$  1.7. the mean of psychological symptoms was 6.24  $\pm$  4.15 out of 16 and after training it was 4.06  $\pm$  1.95. The mean score of urogenital symptoms in pre-exercise was 2.5  $\pm$  4.29 out of 12 and post exercise training it was found to be 2.22  $\pm$  2.29 as shown in table no:3

**Table:3 Mean Score of Menopause Symptoms After Aerobic Exercise Training and Results of T test.**

|   | Menopausal symptoms | PRE              | POST            | P value |
|---|---------------------|------------------|-----------------|---------|
| 1 | Somatic             | 7.34 $\pm$ 2.7   | 6 $\pm$ 1       | 0.00    |
| 2 | Psychological       | 6.24 $\pm$ 4.1   | 4.06 $\pm$ 1.9  | 0.00    |
| 3 | Urogenital          | 2.5 $\pm$ 4.2    | 2.22 $\pm$ 2.2  | 0.27    |
| 4 | Total Score         | 14.375 $\pm$ 6.9 | 12.22 $\pm$ 4.3 | 0.01    |

For the comparison of pre- and post-menopausal symptoms paired t test was used. There was statistically significant difference found in Somatic symptoms (hot flushes, heart discomfort/palpitation, sleeping problems and muscle and joint problems) before and after exercise p=0.000. There was also statistically significant difference P=0.000 found in psychological symptoms (depressive mood, irritability, anxiety and physical and mental exhaustion,) before and after exercise training. While testing the Urogenital symptoms there wasn't any statistically significant difference in Urogenital symptoms p=0.27 (sexual problems, bladder problems and dryness of the vagina) before and after exercise training.

The total score was found to be statistically significant before and after exercise training as p value is 0.01. with confidence interval of 95% that shows overall severity of menopause symptoms were significantly reduced after 6 weeks of exercise training.

### DISCUSSION

The menopause is a natural event in a woman's life after the reproductive years. It is associated with a number of physical, psychological, and social changes<sup>(12)</sup> Although menopausal symptom rates change from woman to woman, it is estimated that 80-85% of them experience bad symptoms during this period<sup>(13,14)</sup>

Our study hypothesized that home based aerobic exercises programme given for 6 weeks period resulted in a significant reduction in the somatic symptoms which are - hot flushes, night sweats, cardiac symptoms, muscle and joint pain and sleeping disorder symptom, psychological symptoms like- depressive mood, irritability, anxiety symptoms, and exhaustion and urogenital symptoms which are- sexual problems like dryness in vagina and urinary symptoms like

incontinence in post-menopausal women.

In present study we found that the mean age at menopause was 48.08  $\pm$  3.2 years which is somewhat earlier when compared to western counter parts which is around 51.14 $\pm$ 2.11 years worldwide<sup>(15)</sup> However it is slightly higher than the average age of menopause as found by Indian menopause society which is around 47.5 years<sup>(16)</sup> In various other studies, the mean age of menopause fell between 49.4 to 51.1 years. While comparing with the studies done in Thailand (48.7 years) Singapore (49.1 years) and other studies on Asian women our findings also show similar age of menopause<sup>(14,18-21)</sup>

There are various tools available to assess the menopausal symptoms but we used MRS questionnaire as this tool has been widely used in many epidemiological studies. These questionnaires have been validated and used in many languages after translation also it short so that can be used pre and post treatment because long questionnaire is hindering patients' responses.

It is estimated that 80% of perimenopausal women suffer somatic or vasomotor symptoms (VMS) (eg, palpitations or hot flashes) which negatively affect their quality of life.<sup>(22)</sup> Moreover, changes in female sex hormone levels are said to be causative factor for hot flashes. Specifically, VMS are associated with decreased estradiol and greater FSH concentrations.<sup>(23)</sup> that appear to be associated to vascular endothelial dysfunction.<sup>(24,25)</sup> In contrast, androgen levels are inversely related to Vasomotor symptoms (VMS).<sup>(26)</sup>

In observational studies, physically active women reported fewer and less severe somatic symptoms than an age-matched control group with sedentary lifestyles; significant decreases of more than 50% were noted. However, exercise, especially strenuous exercise that causes perspiration, may trigger hot flushes in symptomatic women. Present study concludes that regular home-based moderate intensity walking exercise resulted in significant reductions in the vasomotor symptoms of the women who do not undergo any hormone therapy.

Depressive disorders, including premenstrual dysphoric disorder, postpartum depression, and perimenopausal depression, have been linked to changes in hormonal status in women<sup>(27)</sup> Estrogen increases serotonin availability in the synapse by various pathways. It increases the rate of degradation of monoamine oxidase; monoamine oxidase enzymes are responsible for catabolizing serotonin, dopamine, and norepinephrine. Estrogen also increases tryptophan hydroxylase expression (rate-limiting enzyme in serotonin synthesis) and promotes intraneuronal serotonin transport in brain regions associated with affect regulation by increasing gene expression of the serotonin reuptake transporter. Studies have linked brain-derived neurotrophic factor (BDNF) to increased serotonin turnover and proposed that estrogen may influence depression by increasing BDNF levels within the brain.<sup>(28)</sup>

Symptomatic menopause transition occurs in at least 20% of women, and a retrospective cohort study suggests that symptomatic menopause transition might increase the risk of new-onset depressive disorders, bipolar disorders, anxiety disorders, and sleep disorders.<sup>(27)</sup>

Research examining peripheral blood levels has found elevations in  $\beta$ -endorphins and adrenocorticotrophic hormones after various types of exercise and associated reductions in anxiety.<sup>(28,29)</sup> Finally, exercise down-regulates the hypothalamic-pituitary-adrenal axis and sympathetic nervous system—systems that tend to become dysregulated as a function of chronic stress—thereby normalizing release of cortisol and catecholamines and reducing arousal and distress<sup>(30,31)</sup> That also reflects in present that there is significant reduction in psychological symptoms after exercise training.

In urinogenital symptoms the first and most common complaint is vaginal dryness, symptoms of lost control of micturition and urge incontinence are frequent. Recurrent infections of the lower urinary tract are common, as well as dyspareunia and a sensation of burning and itching<sup>(32,33)</sup>.

Urogenital atrophy due to estrogen deficiency happens in late menopause life. Because of estrogen deficiency syndrome occur relatively late in a women's life when endogenous estrogen levels decline. At age 60 and above symptoms are common and progress with advancing age. So, these complaints tend to occur later in the post-menopausal period, usually 5–6 years after the menopause<sup>(34)</sup> We also

found that prevalence of urogenital symptoms in present study was very less (mean  $2.5 \pm 4.2$ ) out of total score of 12 as the mean duration of menopause was 3.6 years  $\pm$  3.8 years. Also, as the pre-exercise training scores of urogenital symptoms was low, we didn't find significant improvements in post training scores of the same.

## CONCLUSION

In present study, 6 weeks aerobic exercise 30-45 minutes per 4-5 days was given and at the end of the program, there was significant improvement in somatic symptoms and psychological symptoms but there wasn't significant difference found in urogenital symptoms. Although total score of MRS was found significant.

## REFERENCES

- 1) Unni J. Third consensus meeting of Indian Menopause Society (2008): A summary. *J Midlife Health*. 2010;1(1):43-7.
- 2) Daley A, MacArthur C, McManus R, Stokes-Lampard H, Wilson S, Roalfe A, Mutrie N: Factors associated with the use of complementary medicine and non-pharmacological interventions in symptomatic menopausal women. *Climacteric* 2006; 9:336-346.
- 3) Nelson HD, Humphrey LL, Nygren P, Teutsch SM, Allan JD: Postmenopausal hormone replacement therapy: scientific review. *JAMA* 2002; 288:872-881.
- 4) Physical Activity Guidelines Advisory Committee: Physical Activity Guidelines Advisory Committee Report. Washington, DC: U.S. Department of Health and Human Services; 2008.
- 5) Schneider HPG. The quality of life in the post menopausal women, *Best Practice & Research. Clin Obstet Gynaecol* 2002;16(3):395-409
- 6) Schneider HPG, Schultz-Zehden B, Rosemeier HP, Behre HM. Assessing Well-Being in Menopausal Women, the Management of the Menopause the Millennium Review. In: Studd J, editor. London: The Parthenon Publishing Group; 2000, p. 15.
- 7) Kakkar V, Kaur D, Chopra K, Kaur A, Kaur IP. Assessment of the variation in menopausal symptoms with age, education and working/non-working status in north-Indian sub population using menopause rating scale (MRS). *Maturitas* 2007;57:306-14.
- 8) Daley A, MacArthur C, McManus R, Stokes-Lampard H, Wilson S, Roalfe A, Mutrie N: Factors associated with the use of complementary medicine and non-pharmacological interventions in symptomatic menopausal women. *Climacteric* 2006; 9:336-346.
- 9) Nelson HD, Humphrey LL, Nygren P, Teutsch SM, Allan JD: Postmenopausal hormone replacement therapy: scientific review. *JAMA* 2002; 288:872-881.
- 10) Physical Activity Guidelines Advisory Committee: Physical Activity Guidelines Advisory Committee Report. Washington, DC: U.S. Department of Health and Human Services; 2008.
- 11) Vehid S, Aran SN, Koksai S, Isiloglu H, Senocak M. The prevalence and the age at the onset of menopause in Turkish women in rural area. *Saudi Med J* 2006;27:13816.
- 12) Kumari M, Stafford M, Marmot M. The menopausal transition was associated in a prospective study with decreased health functioning in women who report menopausal symptoms. *J Clin Epidemiol* 2005;58:719-27
- 13) Elavsky S, McAuley E. Physical activity and mental health outcomes during menopause: a randomized controlled trial. *Ann Behav Med* 2007;33(2):132-42.
- 14) North American Menopause Society. Treatment of menopause-associated vasomotor symptoms: position statement of The North American Menopause Society. *Menopause* 2004;2:11-33
- 15) World Health Organisation (WHO). Scientific Group on Research on the Menopause. Geneva: WHO. 1990:866.
- 16) Unni J. Third consensus meeting of Indian Menopause Society (2008): A summary. *J Midlife Health*. 2010;1(1):43-7.
- 17) Rahman SASA, Zainudin SR, Mun VLK. Assessment of menopausal symptoms using modified Menopause Rating Scale (MRS) among middle age women in Kuching, Sarawak, Malaysia. *Asia Pac Fam Med*. 2010 Feb;9(1):5.
- 18) Peeyanjarassri K, Cheewadhanaraks S, Hubbard M, Zoa Manga R, Manocha R, Eden J. Menopausal symptoms in a hospital-based sample of women in southern Thailand. *Climacteric*. 2006 Feb;9(1):23-9.
- 19) Pan HA, Wu MH, Hsu CC, Yao BL, Huang KE. The Perception of Menopause among women in Taiwan. *Maturitas*. 2002;41(4):269-74.
- 20) Boulet MJ, Oddens BJ, Lebert P, Vemer HM, Visser A. Climacteric and menopause in seven South-east Asian countries. *Maturitas*. 1994 Oct;19(3):157-76.
- 21) Harvay C, Bee HT, Chia CA, Ee Mc, Yap SC, Seang MS. The prevalence of menopausal symptoms in a community in Singapore. *Maturitas*. 2002;41:272-82
- 22) Avis NE, Crawford SL, Green R. Vasomotor symptoms across the menopause transition: differences among women. *Obstet Gynecol Clin North Am* 2018;45:629-640
- 23) Guthrie JR, Dennerstein L, Hopper JL, Burger HG. Hot flushes, menstrual status, and hormone levels in a population-based sample of midlife women. *Obstet Gynecol* 1996;88:437-442
- 24) Moore DJ, Gonzales JU, Tucker SH, Elavsky S, Proctor DN. Exercise-induced vasodilation is associated with menopause stage in healthy middle-aged women. *Appl Physiol Nutr Metab* 2012;37:418-424.
- 25) El Khoudary SR, Santoro N, Chen HY, et al. Trajectories of estradiol and follicle-stimulating hormone over the menopause transition and early markers of atherosclerosis after menopause. *Eur J Prev Cardiol* 2016;23:694-703.
- 26) Overlie I, Moen MH, Holte A, Finset A. Androgens and estrogens in relation to hot flushes during the menopausal transition. *Maturitas* 2002;41:69-77.
- 27) Hu LY, Shen CC, Hung JH et al. Risk of psychiatric disorders following symptomatic menopausal transition: a nationwide population-based retrospective cohort study. *Medicine (Baltimore)*. 2016;95(6):e2800. doi: 10.1097/MD.0000000000002800
- 28) Borrow AP, Cameron NM. Estrogenic mediation of serotonergic and neurotrophic systems: implications for female mood disorders. *Prog Neuropsychopharmacol Biol Psychiatry*. 2014;54:13-25.
- 29) de Meirleir K, Naaktgeborne N, Van Steirteghem A, Gorus F, Olbrecht J, Block P. Beta-endorphin and ACTH levels in peripheral blood during and after aerobic and anaerobic exercise. *Eur J Appl Physiol Occup Physiol* 1986;55:5-8.
- 30) Salmon P. Effects of physical exertion on anxiety, depression, and sensitivity to stress: a unifying theory. *Clin Psych Rev* 2001;21:33-61.
- 31) Ross A, Thomas S. The health benefits of yoga and exercise: review of comparison studies. *J Altern Complementry Med* 2010;16:3-12. doi: 10.1089/acm.2009.0044.
- 32) Brand S, Gerber M, Beck J, Hatzinger M, Pühse U, Holsboer-Trachsler E. High exercise levels are related to favourable sleep patterns and psychological functioning in adolescents: a comparison of athletes and controls. *J Adolesc Health* 2010;46:133-141
- 33) Iosif CS, Bekassy Z. Prevalence of genitourinary symptoms in late menopause. *Acta Obstet Gynaecol Scand* 1984;63:257-60.
- 34) Samsioe G. Medical and surgical strategies for treating urogynecological disorders. *Int J Fertil Menopausal Stud* 1996;41:136-41.