

Effect of Aerobic Exercise Vs Surya Namaskar on Quality of Life in Postmenopausal Women Using Menopause Specific Quality of Life (MENQOL) Questionnaire

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Abstract: *Background: Menopause marks a significant change in a woman's quality of life, which is often associated with physical, psychological, and vasomotor symptoms that can affect overall quality of life of the women. Regular physical activity such as aerobic exercise and Surya Namaskar is known to improve physical fitness, improve hormonal balance, and mental well-being of the women. However, limited studies have compared their effects specifically on postmenopausal women's quality of life. By comparing these interventions, we would be able to put forward which approach may be more effective in improving the quality of life, decreasing symptoms and potentially preventing long term health issues in this population.*

Methods: 56 postmenopausal women aged 45–55 years were randomly divided into two groups. Group A practiced aerobic exercise, and Group B practiced Surya Namaskar. Both groups underwent their respective exercise protocol for 4 days a week for 4 weeks. The Menopause-Specific Quality of Life (MENQOL) questionnaire was filled before and after the intervention to evaluate changes across vasomotor, psychosocial, physical, and sexual domains.

Results: Both interventions showed significant improvement in MENQOL scores, indicating enhanced quality of life. However, the Surya Namaskar group demonstrated greater improvement in psychosocial and vasomotor domains compared to the aerobic exercise group, suggesting additional mind–body benefits.

Conclusion: Both aerobic exercise and Surya Namaskar effectively improve quality of life in postmenopausal women, with Surya Namaskar showing slightly superior results. Incorporating yoga-based movements into lifestyle interventions may offer holistic benefits for managing menopausal symptoms..

Keywords: Quality of life, Surya namaskar, Aerobic Exercises, Postmenopausal women, MENQOL Questionnaire

I. INTRODUCTION

Menopause is permanent cessation of menstruation at the end of reproductive life due to loss of ovarian follicular activities. It is the time when the last and final menstruation occurs.⁽¹⁾ The age of menopause ranges between 45 to 55 years, average being 50 years.⁽¹⁾ Post menopause can have a significant impact on women quality of life, and it's linked to several health condition associated with an increased risk of cardiovascular disease, dementia and breast cancer.⁽¹⁾ There is loss of bone mass by about 3% to 5% per year which is due to deficiency of estrogen. Postmenopausal women have a high risk of fracture of bones due to osteoporosis. Fracture of bones is a major health problem in osteoporosis which involves fracture of femoral neck and distal forearm that is Colle's fracture.⁽¹⁾



Risk of cardiovascular disease increases in post-menopausal women due to deficiency of estrogen. Estrogen prevents cardiovascular disease by several ways by increasing HDL (high density lipoprotein) and decreases LDL (low density lipoprotein) and total cholesterol. ⁽¹⁾ Ovaries - Shrink in size, become wrinkled, ovaries stop releasing eggs, decrease in producing estrogen and progesterone hormone that controls your mental cycle, there is thinning of cortex with increase in medullary components. Uterus- It becomes smaller and the ratio between the body and cervix reverts to 1:1 ratio, the endometrium becomes thin and atrophy. Vagina- It becomes narrow due to loss of elasticity, vaginal epithelium becomes thin, and pH becomes alkaline. Breast- Breast fat is reabsorbed and the glands atrophy, nipples decrease in size ultimately the breast become flat. Bladder And Urethra - Epithelium becomes thin and is more prone to damage and infection, there may be dysuria, urge / even stress incontinence. ⁽¹⁾ Psychological changes- There is an increase in frequency of anxiety, headache, insomnia, irritability, dysplasia and depression also suffers from mood swings and inability to concentrate. Dementia and mainly Alzheimer disease are more common in post-menopausal women. ⁽¹⁾

Women who are going through menopause may have a variety of symptoms, including vasomotor and vulvovaginal symptoms, which can affect their general well-being as well as their physical, psychological, and sexual health. Moreover, it is extremely difficult for medical professionals, particularly physicians, and nurses to perform assessment, counselling, and support due to the complicated health issues this sizable population faces. ⁽²⁾ Clinically speaking, ovarian ageing and the ensuing decline in estrogen and progesterone production are the hallmarks of menopause. Changes in the bone density, muscles, uterus, breasts, urethra, vagina, skin, blood vessels, and brain occur along with this hormonal decrease. A woman has numerous physical changes as she moves from her reproductive years to menopause and beyond; many of these changes are typical effects of ageing and menopause. ⁽²⁾

Yoga is a great way to rediscover our ability to “feel ourselves.” Yoga encompasses not only physical and mental discipline but also emotional and spiritual exploration. Yoga works wonders on the inside of the body in addition to toning and conditioning outside. Lean muscles, good posture, better breathing, better sleep, improved digestion, better blood circulation, a relaxed nervous system, and a strengthened immune system are all the advantages of yoga practice. ⁽²⁾ Surya namaskar is a series of 12 yoga postures performed in a sequence. It consists of breathing control, meditation, joint movement and increase flexibility, strength and balance. Surya namaskar enhances mindfulness with some cardiovascular benefits depending upon the speed and intensity. Surya namaskar improves joint mobility, improves respiratory health, improves sleep quality, improves concentration and focus, and decreases stress and anxiety. ⁽³⁾

Aerobic exercises are a continuous rhythmic activity that increases heart rate and improves cardiovascular health. Aerobic exercise helps to improve bone density and decrease the risk of osteoporosis by enhancing weight bearing activities. It improves cardiovascular health and decreases blood pressure, decreases cholesterol levels and increases circulation. Aerobic exercise helps maintain a healthy weight, decrease body fat and manage symptoms like hot flushes. ⁽³⁾

II. METHODOLOGY

2.1 METHODOLOGY

- Study Design: Comparative study.
- Study Type: Randomized Controlled Trail
- Target Population: Postmenopausal Women
- Sample Size: 56
- Sampling Method: Simple Random Sampling
- Sampling Duration: 6 months
- Study Setup: Old Sangvi, Pune.

2.2 MATERIALS

- Pen
- Paper



- Consent Form
- MENQOL Questionnaire

2.3 SELECTION CRITERIA:

INCLUSION CRITERIA

- 1) Women between 45 to 55 years of age are included in the study. ⁽¹⁶⁾
- 2) Women who had her last menstrual cycle one year ago. ⁽¹⁶⁾

EXCLUSION CRITERIA

Women already practicing Surya namaskar for a month / more.

Women physically active exercising more than 2 times / week.

Women with surgical menopause (hysterectomy).

2.4 OUTCOME MEASURES

Menopause Specific Quality of Life Questionnaire [MENQOL]

It is a questionnaire which is designed to assist the quality of life in women going through menopause. It focuses on physical health emotional will being social life cognitive functioning. It has a score of 0 to 6, 0 is not at all bother and 6 is extremely bothered about the changes. ⁽⁹⁾

- Validity- 4.7
- Reliability- 0.81

III. REVIEW OF LITERATURE

Shobana Gangadharan, et al, 2024, Effectiveness of Yoga on Menopausal Symptoms and Quality of Life among Menopausal women: A Systemic review, 10 articles were randomized controlled trial it included 1463 menopausal women participants with sample size ranging from 30 to 335. Research evidence, based on 10 trials, proved yoga to be a safe effective intervention for managing menopausal symptoms.

Diana Taibi Buchanan, et al, 2024, Effect of yoga and aerobic exercise on actigraphy sleep parameters in menopausal women with hot flashes, randomized controlled trial the network conducted among 186 late transition and postmenopausal women aged 40–62 years with hot flashes. Women were randomized to 12 weeks of yoga, supervised aerobic exercise, or usual activity the interventions had no statistically significant effects on actigraphy measures, except for potentially improved sleep stability with yoga in women with poor self-reported sleep quality.

Susanti, et al, 2022, Effects of yoga on menopausal symptoms and sleep quality across menopause statuses: The intervention group was led by home yoga practice for 20 weeks, yoga exercise protocol consisted of 75 minutes sessions per week, total number of yoga training sessions were 60 starting with warmup practice, yoga and then relaxation exercise. A randomized controlled trial, significant differences were seen during postmenopausal period and was found between the intervention and control group at the post-test immediately after 16 weeks.

Djapardy V, Panay N, et al, 2022, Alternative and non-hormonal treatments to symptoms of menopause. A systematic survey in 2013 has shown that in the UK, The average age of menopause in the UK is 51 years, and it is a retrospective diagnosis after 12 months of amenorrhea was concluded that most of the studies on complementary medicine and practices are limited by their designs and small sample size and are therefore inconclusive. There is evidence of effectiveness on isoflavones and red clover extract, as well as CBT and clinical hypnosis.

Swain, et al, 2021, Impact of yoga intervention on menopausal symptoms specific quality of life and changes in hormonal level among menopausal women. 80 participants aged 40 – 50 were divided into two study aims that is Sudarshan Kriya Yoga and brisk walking for 20 weeks. The women reported no adverse events after practicing Sudarshan Kriya Yoga or brisk walking.

Thi Mai Nguyen, et al, 2020, Exercise and quality of life in women with menopausal symptoms: a systemic review and meta – analysis of randomized controlled trials, nine randomized controlled trials (RTC) were selected in which any



two types of exercise was selected. We assessed the risk of bias in the included studies using the Cochrane risk of bias 2.0 tool for RTC in which the systemic review found positive effects of exercise on physical, psychological and urinary system where pelvic floor muscles training on general QoL scores were not significant in women with menopausal symptoms.

IV. PROCEDURE

Ethical committee clearance and permission was obtained from Institutional ethical committee. Participants were included according to the inclusion and exclusion criteria, and consent was taken from the subjects by signing the consent form. Procedure was explained to the subjects. After filling in the consent form the assessment proforma was filled. The data collected is statistically evaluated.

4.1 Aerobic exercises

Aerobic exercise is a physical activity that keeps your heart, lungs and circulatory system healthy. ⁽³⁾

Warm up exercise - Arm circles, squats and hip rotations.

Exercise - Marching, sidewalks, V shape walk and knee bends.

Cool down exercise – Stretching and breathing exercises.

Duration- 4 times / week for 25 minutes.

4.2 Surya namaskar:

Surya namaskar consists of 12 steps designed in such a way that it enhances strength and flexibility in our muscles and joints. Breathing is also adjusted as per the posture and movement done while attaining the posture however Surya namaskar helps in increasing blood circulation which has an influence on the endocrine system. ⁽³⁾

Warm up exercise - Arm circles, squats and hip rotations.

Exercise – Surya namaskar.

Cool down exercise – Stretching and breathing exercises.

Duration- 4 times / week for 25 minutes

CONSORT DIAGRAM:

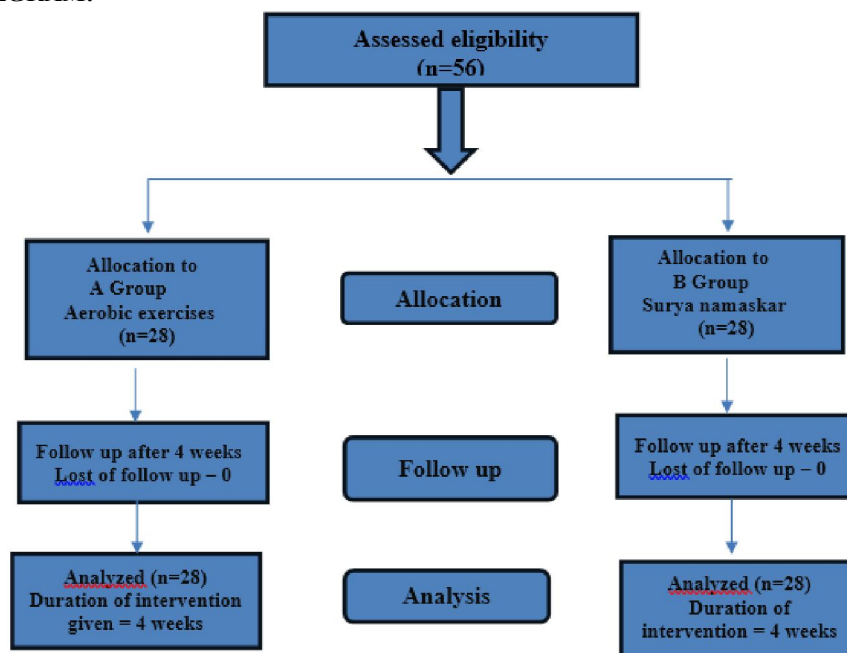




Fig 1: Arm Circles



Fig 2: Stretching



Fig3: Padahasthasana



Fig4: Adho Mukha Svanasana

V. DATA ANALYSIS AND INTERPRETATION

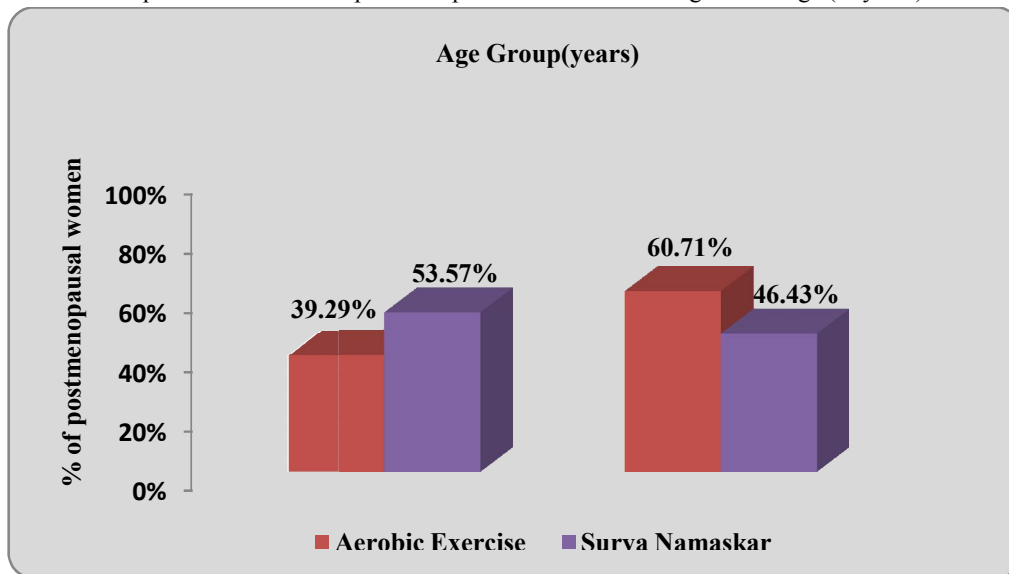
Statistical analysis was done by using descriptive and inferential statistics using Chisquare test, Mann Whitney U test and Wilcoxon signed rank test and software used in the analysis were SPSS 22.0 version and GraphPad Prism 7.0 version and $p < 0.05$ is considered as level of significance.

Table 1: Distribution of postmenopausal women according to their age (in years)

| | | Group | | Total | □2-value |
|----------------|-----------|------------------|------------------|------------------|--------------------|
| | | Aerobic Exercise | Surya Namaskar | | |
| Age Group(yrs) | 45-50 yrs | 11(39.29%) | 15(53.57%) | 26(46.43%) | 1.14 P=0.32, NS |
| | 51-55 yrs | 17(60.71%) | 13(46.43%) | 30(53.57%) | |
| Total | | 28(100%) | 28(100%) | 56(100%) | |
| Mean \pm SD | | 51.28 \pm 2.74 | 50.28 \pm 2.27 | 50.78 \pm 2.54 | |



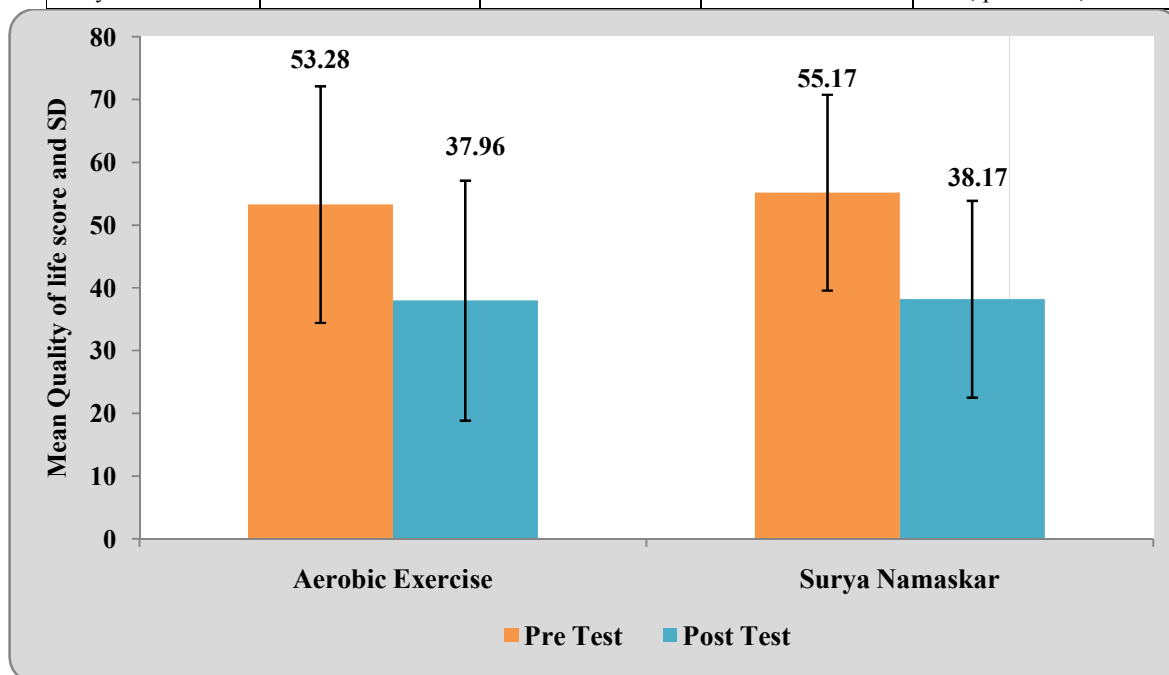
Graph 1: Distribution of postmenopausal women according to their age (in years)



INTERPRETATION : 39.29% of the post-menopausal women in aerobic exercise group and 53.57% in Surya namaskar group were in the age of 45.50 years and 60.71% in aerobic exercise group and 46.43% in Surya namaskar group were in the age group of 51-55 years By using Chi-square test statistically no significant difference was found in the ages of the post-menopausal women of two groups(χ^2 -value=1.14, $p=0.32$).

Table 2: Comparison of Quality-of-life score in two groups at pre and post treatment

| Group | Pre Test | Post Test | Mean Difference | z-value |
|------------------|-------------|-------------|-----------------|----------------------|
| Aerobic Exercise | 53.28±18.87 | 37.96±19.13 | 15.32±6.99 | 4.58, $p=0.0001$, S |
| Surya Namaskar | 55.17±15.61 | 38.17±15.68 | 17±6.98 | 4.62, $p=0.0001$, S |



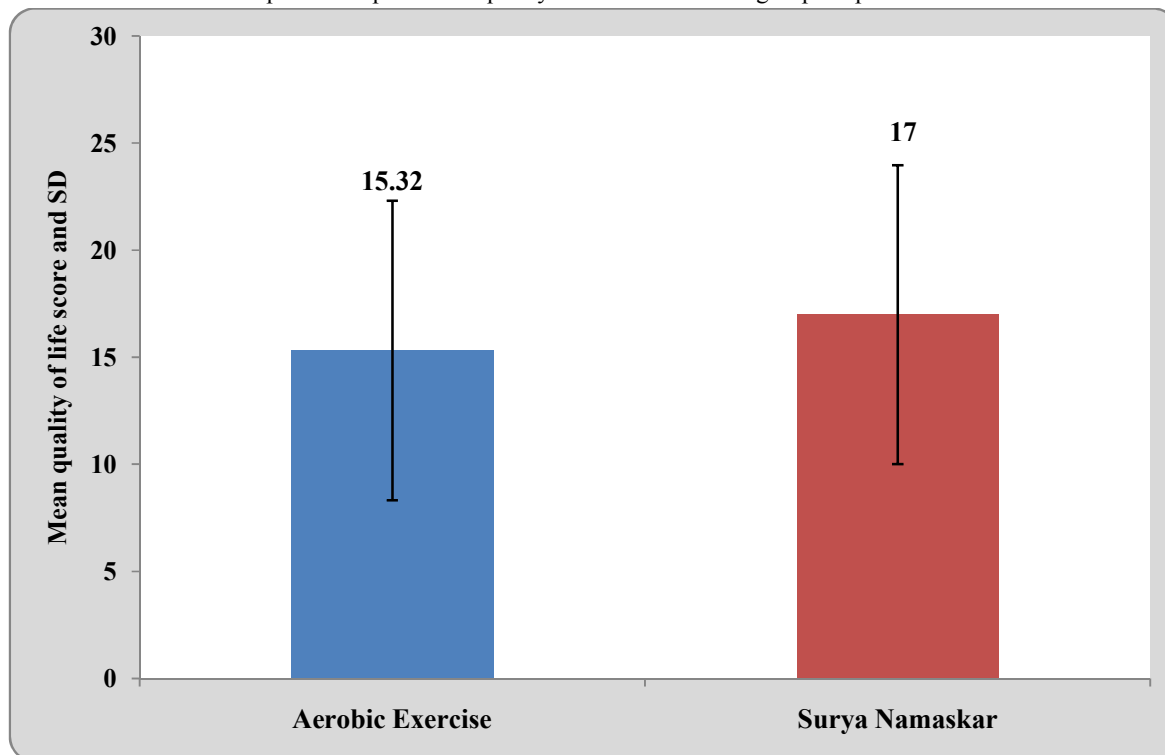
INTERPRETATION: Mean quality of life score among the postmenopausal women in aerobic exercise group at pretest was 53.28 ± 18.87 and at post-test it was 37.96 ± 19.13 . By using Wilcoxon Signed Rank Test statistically significant difference was found in quality-of-life score at pre and post treatment ($z=4.58$, $p=0.0001$).

Mean quality of life score among the postmenopausal women in Surya namaskar group at pretest was 55.17 ± 15.61 and at posttest it was 38.17 ± 15.68 . By using Wilcoxon Signed Rank Test statistically significant difference was found in quality-of-life score at pre and post treatment ($z=4.62$, $p=0.0001$).

Table 3: Comparison of quality-of-life score in two groups at pre and post treatment

| Group | Mean | SD | Standard Error of mean | z-value |
|------------------|-------|------|------------------------|----------------------|
| Aerobic Exercise | 15.32 | 6.99 | 1.32 | 0.62, $p=0.0001$, S |
| Surya Namaskar | 17 | 6.98 | 1.31 | |

Graph 3: Comparison of quality-of-life score in two groups at post treatment



INTERPRETATION: Mean difference in quality-of-life score at post treatment in aerobic exercise group was 15.32 ± 6.99 and in Surya namaskar group it was 17 ± 6.98 . By using Mann Whitney test statistically significant difference was found in mean difference in quality-of-life score among postmenopausal women of two groups ($z=0.62$, $p=0.0001$).

VI. RESULT AND DISSCUSION

RESULT

The study included 56 participants with an age ranging from 45 to 55 years 39.29% of the post-menopausal women in aerobic exercise group and 53.57% in Surya namaskar group were in the age of 45-50 years, and 60.71% in aerobic exercise group and 46.43% in Surya namaskar group were in the age group of 51-55 years. Mean quality of life score among the postmenopausal women in aerobic exercise group at pretest was 53.28 ± 18.87 and at posttest it was 37.96 ± 19.13 . There was significant difference found in quality-of-life score at pre and post treatment ($z=4.58$, $p=0.0001$). Mean quality of life score among the postmenopausal women in Surya namaskar group at pretest was



55.17±15.61 and at posttest it was 38.17±15.68 statistically significant difference was found in quality-of-life score at pre and post treatment ($z=4.62$, $p=0.0001$). Mean difference in quality-of-life score at pre and post treatment in aerobic exercise group was 15.32±6.99 and in Surya namaskar group it was 17±6.98 mean difference in quality-of-life score among postmenopausal women of two groups ($z=0.62$, $p=0.0001$). Thus, the study tells us that there is significant difference seen in Surya namaskar than aerobic exercise in quality of life of postmenopausal women.

DISCUSSION

Menopause is a natural physiological change that occurs at the end of a woman's reproductive life due to loss of ovarian follicular activities.⁽¹⁾ It is the time when the last and final menstruation occurs. It is a significant physiological milestone that brings about various physical, psychological, and emotional challenges due to decrease in estrogen levels. Post menopause has a significant impact on women quality of life, and it's linked to several health condition associated with an increased risk of cardiovascular disease, dementia and breast cancer.⁽¹⁾ However, the physiological and hormonal changes related with menopause often lead to symptoms such as hot flashes, sleep disturbances, mood swings, and musculoskeletal discomforts which puts a negative impact on women overall quality of life⁽¹⁾. Women who are going through post menopause may have symptoms, which may include vasomotor and vulvovaginal symptoms, which can affect their general well-being as well as their physical, psychological, and sexual health.⁽²⁾ It is extremely difficult for medical professionals, particularly physicians, and nurses to perform assessment, counselling, and support due to the complicated health issues which postmenopausal women faces⁽²⁾.

The study was aimed to compare the effects of Aerobic Exercise and Surya Namaskar on the quality of life in postmenopausal women using the Menopause-Specific Quality of Life (MENQOL) questionnaire. The changes were seen in women with hot flashes, sleep disturbances, joint pain, anxiety, irritability, and mood swings, leading to a decrease the symptoms. There are many studies indicating the negative effect of postmenopausal symptoms on quality-of-life Luis Cobero, the President of Spain Gynaecology and Obstetrics Association, had explained that the quality of life of post-menopausal women can be improved by modifying their diet, lifestyle and regular physical exercise.⁽¹⁶⁾

Surya Namaskar is a sequence of 12 yogic postures combined with rhythmic breathing, which offers both physical and psychological benefits. It works on flexibility, muscle strength, balance, and respiratory, also works on calming the nervous system.⁽⁴⁾ It is seen that Surya Namaskar enhances mindfulness, reduces cortisol levels in the body, and improves emotional stability. The improvement in MENQOL scores among the participant's performing Surya Namaskar was seen with not only physical but also psychological and spiritual dimensions of health. Studies by Bandyopadhyay et al. (2022) and Shobana Gangadharan et al. (2024) have similarly demonstrated that yoga practices, particularly Surya Namaskar has significantly decreased menopausal symptoms, improve sleep quality, reduce anxiety, depression and irritability in postmenopausal women.⁽⁶⁾

This approach promotes parasympathetic activation, which reduces cortisol levels and decrease stress and anxiety. The rhythmic flow while doing Surya namaskar improves postures, muscular flexibility, joint mobility, and postural alignment while enhancing respiratory efficiency. Regular practice of Surya Namaskar has been shown that, it stabilize hormonal fluctuations, and promote mental health which tells us about the better quality of life during the postmenopausal period. The Aerobic Exercise group can be attributed to the physiological effects of aerobic training, which includes improved cardiovascular endurance, better blood circulation, enhanced oxygen delivery, and regulation of lipid metabolism all over the body.⁽⁷⁾ Regular aerobic activity helps reduce fatigue, body weight, and muscle stiffness while boosting mood through releasing of endorphins. Whereas, aerobic exercise has been shown to increase bone mineral density and improve insulin sensitivity, which is lowering the risk of osteoporosis and metabolic disorders both common concerns in postmenopausal women⁽⁷⁾.

The improvements seen with Aerobic Exercise can be attributed to enhanced cardiovascular conditioning and improved circulation, which promotes better oxygenation of tissues, and regulate lipid metabolism, and reduces stress. Regular aerobic activity may stimulate endorphin release, leading to better mood regulation and reduced pain or fatigue in the body. Aerobic activities also reduces the risk of osteoporosis, which is a major concern in postmenopausal women due to estrogen deficiency.⁽⁴⁾ The study of Nguyen et al. (2020) and Kılıç et al. (2020) who found that regular aerobic training significantly improves physical and psychological health in postmenopausal women.⁽⁴⁾ Surya namaskar



significantly improves sleep quality in postmenopausal women. In addition, Afonso reported that yoga reduces the severity of insomnia in postmenopausal women. Buchanan found that the sleep quality improved in midlife women who were experiencing sleep difficulties after practicing Surya namaskar. ⁽⁶⁾ Further Vora & Dangi reported the reduction of menopausal symptoms in postmenopausal women. After practicing Surya namaskar for 12 weeks, statistically significant reduction of the levels of postmenopausal symptoms, stress levels, and depression symptoms were decreased. ⁽⁶⁾ The reduction in MENQOL scores reflects not only physical relief but also improves emotional stability. Regular physical activity promotes neurochemical changes, such as increased serotonin and dopamine levels in the body, which are associated with improved mood and reduced stress. Therefore, both Aerobic Exercise and Surya Namaskar can be considered for mindfulness that improve multiple aspects in post-menopausal women.

VII. CONCLUSION

The findings of the present study confirm that both Aerobic Exercise and Surya Namaskar show significant improvement in the quality of life in postmenopausal women but Surya namaskar has shown significant improvement than aerobic exercise in quality of life of postmenopausal women which encourages postmenopausal women to adopt such non-pharmacological lifestyle practices can serve as a powerful, safe, and improve their overall health and quality of life with physical exercise.

VIII. CLINICAL IMPLICATION

Aerobic Exercise and Surya Namaskar are cost-effective, it requires minimal equipment, and can be easily performed at home, making it accessible for large populations. Physiotherapists can add this as a part of lifestyle modification programs which can enhance physical health, emotional balance, and social functioning during menopause. Which will help in exercise-based management over pharmacological therapy and can be given as safe long-term option for postmenopausal women. The study tells us that regular physical activity plays a vital role in improving the quality of life of postmenopausal women.

IX. LIMITATION OF THE STUDY

The sample size was relatively small, which may limit the results.

The study did not control participants' lifestyles such as diet, sleep, and stress levels which may have affected the quality of life.

X. FUTURE SCOPE OF THE STUDY

Future research may include larger age groups.

Furthermore, the study relied self-reported MENQOL scores, without objective physiological measures such as hormonal levels or bone density.

Future research with larger sample sizes.

XI. ACKNOWLEDGEMENT

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