

Correlation Of Physical Activity With Aerobic Capacity In Post Menopausal Women

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Abstract:

Introduction: Aerobic capacity is seen to have positive mental benefits in reducing symptoms like anxiety, depression, and stress in postmenopausal women. It can also be important adjunct to a weight-loss program. Aerobic exercises have significant cardiovascular benefits which include reduction of incidence of coronary artery disease. Most health problems in women after midlife are linked to the declining estrogen levels and also may be contributed to by physical inactivity. Physical activity leads to a 30-50 % reduction in cardiovascular disease in women. Moderate activities such as walking, gardening or light sports appear to have beneficial effects. Moderate-intensity activities constitute a key recommendation for primary prevention. Vigorous intensity activity may render additional benefits. The objective of the study was to find correlation between level of physical activity with aerobic capacity in post-menopausal women

Methods: A correlational survey study with 40 participants fulfilling the inclusion and exclusion criteria was conducted in community of Ahmedabad. Physical activity was measured using International Physical Activity Questionnaires (IPAQ) short last 7 days, self-administered format. Aerobic capacity was measured using 6 minute walk test. MET was calculated using IPAQ and VO_2max was calculated using 6 minute walk test. Correlation of physical activity with aerobic capacity was done.

Results: The median value of IPAQ was 530.50 and the mean value of VO_2max was $29.34 \pm 6.78 mL \cdot kg^{-1} \cdot min^{-1}$. Correlation coefficient between IPAQ and VO_2max was $r=0.649$, $p<0.001$.

Conclusion: There is moderate positive correlation between physical activity and aerobic capacity in post-menopausal women which is statistically significant.

Keywords: Menopause, aerobic capacity, and physical activity

I. INTRODUCTION

The word menopause is derived from Greek word menopausis, men means month and pausis means pause. Menopause is defined as permanent cessation of menstruation at the end of reproductive life due to loss of ovarian follicle activity. It is the point of time when the last and final menstruation occurs. The mean age at attaining menopause in Indian women is 46 years, with a range from a minimum age of 38 years to a maximum age of 53 years. According to Indian Menopause Society, there were about 65 million Indian women over age of 45 years in the year 2006. Hence,

menopausal health demands even higher priority in Indian scenario.

Menopause is associated with a worsening of cardiovascular disease and decreased aerobic fitness compared with premenopausal women. Other menopausal symptoms include hot flushes and night sweats, loss of libido (sex drive), vaginal dryness and pain, itching or discomfort during sex, palpitations, headaches, mood changes such as depression, anxiety or tiredness, sleeping problems such as insomnia and urinary tract infections.

Physical activity is defined as any bodily movement produced by skeletal muscles that results in energy expenditure it may include anything from walking and

gardening to recreational sport. Physical activity can be categorized in a variety of ways. A commonly used approach is to segment physical activity on the basis of the identifiable portions of daily life during which the activity occurs. The simplest categorization identifies the physical activity that occurs while sleeping, at work, and at leisure.

Aerobic capacity is the highest amount of oxygen consumed during maximal exercise in activities that use the large muscle groups in the legs or arms and legs combined. Aerobic capacity is the maximum amount of oxygen (VO₂max) that the body can utilize during an exercise session and it decreases with advancing age. The lungs and cardiovascular system work in tandem to deliver oxygen to the body. Low levels of aerobic capacity are independently associated with an increased risk of cardio-vascular disease mortality. Cardio-vascular disease is the leading cause of death of women in developed countries, but very little is known about atherosclerotic disease progression in women. Traditional risk factors of cardio-vascular disease are hypertension, hyperlipidemia, and cigarette smoking. In women cardio-vascular disease risk is increased with high levels of total triglycerides (TC) and low density lipoprotein (LDL-C) cholesterol and with low levels of high density lipoprotein cholesterol (HDL-C).

There is strong and consistent evidence from studies that physical inactivity and poor cardiorespiratory fitness are associated with higher morbidity and mortality from all causes, including cardiovascular disease (CVD) Nicole AL, Sonia MN and Modi H et al reported that VO₂max is higher in perimenopausal women compared with similarly aged postmenopausal women and so post-menopausal women have less aerobic capacity than pre-menopausal women. Javadivala Z et al (2013) studied relationship between physical activity and intensity and duration of menopausal symptoms and they concluded that regular physical activity is effective in decreasing menopausal symptoms and improves health.

The objective of the study was to assess physical activity and aerobic capacity in post-menopausal women and find correlation between them.

II. METHODOLOGY

Forty participants from the community of Ahmedabad were selected in the cross sectional survey study by purposive sampling. The duration of study was one month. Post-menopausal women, 45-60 years of age were included in the study. Females having history of hysterectomy, orthopedic conditions with severe pain, diabetes and hypothyroidism, cardiac, neurological, and pulmonary diseases were excluded from the study.

Females fulfilling the inclusion criteria were selected. Nature and purpose of study was explained to the participants. The questionnaire was explained to the participants. Oral consent was taken from the participants. Demographic data of the subjects was collected along with the outcome measures. They filled the questionnaire and performed the 6 minute walk test. Physical activity was measured using International Physical Activity Questionnaire (IPAQ) short version and MET was calculated according to the scale.

The 6 minute walk test (6MWT) was performed indoors in a thermo neutral environment, on a flat noncarpeted hard walking surface according to a standardized protocol. All subjects performed the 6-MWT for the first time with no warm-up period and no encouragement. Subjects were told to avoid vigorous exercise in the 2 h prior to testing and to wear comfortable clothes and appropriate walking footwear and the distance between two poles was kept as 22m. The subject was made to walk for 6 minutes and the number of rounds were noted and the distance was calculated Distance, Resting Heart rate, weight, height and age was noted. Aerobic capacity was calculated using 6 min walk test. VO₂ max was calculated using the formula.

$$VO_2 \text{ max} = 70.161 + (0.023 * 6MWD \text{ (m)}) - (0.276 * \text{wt. (kg)}) - (6.79 * \text{sex}) - (0.193 * \text{Resting HR}) - (0.191 * \text{age})$$

Analysis was done using SPSS version 16. Level of significance was kept 5%.

III. RESULTS

Forty females with a mean age of 53.275±4.62 years participated in the study. Thirty seven females were housewives and three females were working.

Table 1 shows the mean and median of IPAQ and 6MWT. Table 2 shows correlation between IPAQ and 6MWT. Spearman's correlation coefficient was used to perform statistical analysis for correlation of physical activity with aerobic capacity. There is moderate positive correlation between physical activity and aerobic capacity in post-menopausal women.

OUTCOME MEASURES	MEAN±STANDARD DEVIATION	MEDIAN
IPAQ	681.08±695.43	530.50
VO ₂ max(mL/kg/min)	29.34±6.78	29.03

Table 1: Mean And Median Of Ipaq And 6mwt

OUTCOME MEASURES	CORRELATION COEFFICIENT (r)	p VALUE
IPAQ and VO ₂ max	0.649	<0.001

Table 2: Correlation Between Ipaq And 6mwt In Post Menopausal Women

IV. DISCUSSION

The above study shows moderate positive correlation between physical activity and aerobic capacity in post-menopausal women which is statistically significant.

The present study found the 6MWD to be 372.5m. This is slightly reduced compared to normal values. Normal value of 6MWD is 400-700 m. Menopause is associated with progressive reductions of estradiol, progesterone, and 17-hydroxyprogesterone in plasma, along with increased gonadotropin concentrations. Cross-sectional studies have shown that postmenopausal women have higher triglyceride, very low density lipoprotein cholesterol (VLDL-C), and LDL-C levels than do their premenopausal counterparts. It is also

associated with reduced lean body mass (muscle) and this appears to be related to decrease physical activity.

An etiological relation between menopause and increased risk of cardiac disease is corroborated by a higher age-adjusted rate of this disease among post-menopausal women and by the finding that postmenopausal women have a two-fold higher risk of developing the disease than premenopausal women, after adjustment for age. Adverse changes in other factors that mediate the risk of coronary heart disease, such as sedentary lifestyle, physical inactivity, insulin resistance, increased thrombotic tendency, and less favorable hemodynamic profiles, may also lead to increased cardiac risk with the menopause.

The present study found that the majority of the surveyed women did not meet the criterion of the frequency of vigorous- and moderate-intensity physical activity as the mean physical activity was 681.08 ± 695.43 MET. This may be considered to be a low level of physical activity as normal range is 1060 ± 323 .

In 2016 Mendoza N conducted a systemic review in Spain which states that physical inactivity increases menopausal problems with increase in health risk in women. Physical activity is a principal strategy for preventing and treating sarcopenia. Modi H et al conducted a comparative study in 2016 in Ahmedabad among 35-55 years females divided into Group A (Pre-menopausal group) and group B (Post-menopausal) which concluded that maximal oxygen consumption ($\dot{V}O_2$ max) is known to decline with age at a rate of approximately 10% per decade from age 30 years this is similar to findings of present study.

The above study shows moderate positive correlation between physical activity and aerobic capacity in post-menopausal women which is statistically significant. The physical activity level was low to moderate; which means that the women were not involved in a lot of physical activity on a regular basis. And the walking capacity and thus aerobic capacity was also reduced compared to the normal value for their age. Similar to this study in 2011 César Augusto et al who conducted a study to evaluate the effect of physical activity from the "Menopause in Form" program on physical aptitude, functional capacity, corporal balance and Quality of Life among elderly women found that physical activities employed during the "Menopause in Form" program resulted in significant improvements in the functional capacity and Quality of Life of post-menopausal elderly women.

In 2008 Sammel MD and Freeman EW conducted a cohort study in US in 401 urban post-menopausal women which concluded that in community-dwelling women, high levels of physical activity were related to lower levels of stress during an 8-yr follow-up period. In addition, levels of anxiety, stress, and depression were lowest among physically active postmenopausal women compared with inactive women in the same menopausal grouping.

Clinical Implication of the study is increasing physical activity may improve aerobic capacity in post-menopausal women. This may help them in daily activity and will also help in improving dyslipidemia and flexibility. It may help in increasing bone mass and will help in reducing chances of osteoporosis.

Limitation of the present study is range of data for IPAQ was wide, and correlation was not done between urban and rural women as well as employed and unemployed women. Future studies can be done by analyzing various functional outcome measures in the post-menopausal women.

V. CONCLUSION

Physical activity is correlated with aerobic capacity in post-menopausal women.

REFERENCES

- [1] Sherwin B.(2001) Menopause: Myths and realities. Psychological aspects of women's health care. In: Stotland NL, Stewart DE, editors. *The Interface Between Psychiatry and Obstetrics and Gynecology*. Arlington: American Psychiatric Publishing; pp. 241–59.
- [2] Spinelli MG. Depression and hormone therapy. *Clin Obstet Gynecol*. 2004; 47:428–36. [PubMed]
- [3] Singh, A. and Pradhan, S. (2014) Apr-Jun Menopausal symptoms of post menopausal women in rural community of Delhi, India, A cross-sectional study. *Journal of Mid-life Health* ; 5(2), p-62
- [4] New Delhi: Indian Menopause Society; Making Menopause Easier. Available from: <http://www.indiatogether.org/2006/0ct/were-menopause.html>
- [5] Molly C.C. (2013) The Emergence of the Metabolic Syndrome with Menopause. *The journal of clinical endocrinology and metabolism*. Volume 88, Issue 6
- [6] Menopause Symptoms; <http://www.nhs.uk/Conditions/Menopause/Pages/Symptoms.aspx>
- [7] Davidson, S., Passmore, R., Brook, J. F., and Truswell, A. S. (1979): *Human nutrition and dietetics*. Ed. 7. Churchill Livingstone, New York.
- [8] ACSM's Resource Manual for Guidelines for Exercise Testing and Prescription (third edition). 1998: Williams & Wilkins
- [9] Thorn TJ (1987); Cardiovascular disease mortality in U.S. women. *Coronary Heart Disease in Women*. pages 33-41
- [10] Eaker ED, Castelli WP (1987): Coronary heart disease and its risk factors among women: *Coronary Heart Disease in Women*., pp 122-130
- [11] Kannel WB, Castelli WP, Gordon T: Cholesterol in the prediction of atherosclerotic disease: 1979;90:85-91
- [12] Wilson PWF, Castelli WP, Kannel WP: Coronary risk prediction in adults (the Framingham Heart Study). 1987; 59:916-946
- [13] Jacqueline CM. (1989) Mar 11 Increased risk of atherosclerosis in women after the menopause. *BMJ*; 298(6674): 642–644
- [14] Nicole A.L. (2002) Comparison of $\dot{V}O_2$ max and disease risk factors between perimenopausal and post-menopausal women. *Journal of menopause*.;9(6);456-462

- [15] Sonia M.N. (2005) Cardiovascular Risk Factors Emerge After Artificial Selection for Low Aerobic Capacity: January, 307
- [16] Haimov – kohman,R, Constantini N.,Brzezinski,A. and Hochner- Celnikier, D. European Journal of Obstetris and Gyneology and Reproductive Biology, 2013,170(1), pp229-234 17 Bushman, B. A. (2012). How can I use METS to quantify the amount of aerobic exercise. ACSM's Health & Fitness Journal, 16(No. 2), 5-7.
- [17] Burr, JF., Bredin, S., Faktor,M., Warburton,D., May (2011)The Physician and Sportsmedicine, Volume 39, Issue 2, , ISSN – 0091-3847
- [18] Van Poppel MNM, Chinapaw MJM, Mokkink LB, van Mechelen W, Terwee CB. Physical activity questionnaires for adults (2010): A systematic review of measurement properties. Sports Medicine.; 40:565–600. doi: 10.2165/11531930-000000000-00000. [PubMed]
- [19] Boutcher SH and Stein P. (1995) Association between heart rate variability and training response in sedentary middle-aged men. Eur J Appl Physiol Occup Physiol.; 70(1):75-80.
- [20] W.J. Gibbons, N. Fruchter, S. Sloan, R.D. Levy(1995), Reference values for a multiple repetition 6-minute walk test in healthy adults older than 20 yearsJ Cardpulm Rehabil, 15 (pp. 394-405)
- [21] Barret-Conner E, Wingard DL, Criqui MH: Postmenopausal estrogen use and heart disease risk factors in the 1980s. JAMA 1989;261:2095-2100
- [22] Badawy SZA, Elliott LJ, Elbadawi A, Marshall LD 1979: Plasma levels of estrone and estradiol-17 (beta) in postmenopausal women.:56-6
- [23] Campos H, McNamara JR, Wilson PW. (1988) Differences in low density lipoprotein subfractions and apolipoproteins in premenopausal and postmenopausal women. 67:30-35
- [24] Hallberg L, Svanborg A (1967): Cholesterol, phospholipids, and triglycerides in plasma in 50-year old women: Influence of menopause, body-weight, skin-fold thickness, weight-gain, and diet in a random population sample.;181:185-194
- [25] Poehlman ET. (2002) Menopause, energy expenditure, and body composition. Acta Obstet Gynecol Scand 81:603–611
- [26] Greendale GA. (1999) The menopause. THE LANCET. February 13. Vol 353 The Journal of Clinical Endocrinology & Metabolism | Oxford Academic
- [27] The Journal of Clinical Endocrinology & Metabolism | Oxford Academic
- [28] Mendoza, N. , Teresa, C. , Cano, A., Godoy, D., Hita, F., Lapotka, M., Benefits of physical exercise in postmenopausal women J of the European Menopause and Andropause Society (EMAS) Volume 93, Pages 83–88
- [29] ACSM's Guidelines for Exercise Testing and Prescription, 8th ed. 2010 available at <https://books.google.co.in/books>
- [30] Department of Public Health, College of Health Professions, Temple University, Philadelphia, PA 19122, USA
- [31] César Augustode Souza Santos (2011) Archives of Gerontology and Geriatrics ,Volume 53, Issue 3, Pages 344-349