

## Effect Of Aerobic And Yogic Training On Body Composition Among Sedentary Women Of Manipur

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**Abstract:** The current trends of lifestyle purposely makes people suffer from various non communicable diseases . Social barrier was another hindrance in participation. It need to take up several studies to motivate involvement of women. Objective: To assess the effect of aerobic and yogic training on body composition among sedentary women of Manipur. Methods: Forty women of average age  $50.07 \pm 6.3$  who lead a sedentary lifestyle from Lairikyengbam Leikai, Imphal East District Manipur were randomly minimized into two groups and assigned to aerobic and yoga training respectively . Body weight, Body mass index and Fat percent measurement was obtained before the commencement of training as baseline using bioelectrical impedance analyzer (BIA) methods and after 8 weeks training, the same measurement was taken as final measurements. Analysis and Results: Data was analyzed using SPSS statistical software by running paired t test for each group and then independent t test for comparing between group variables. Data indicates significant decrease in Body weight, Body mass Index and fat percent in both aerobic and Yoga for pretest and posttest compares ( $p < 0.05$ ), Significant difference was observed in between group comparison in body weight and body mass index. No difference was observed in between group comparisons of fat percent ( $P > 0.05$ ), however Cohen's d shows that aerobic has more effect size than yoga. Conclusion: These findings suggest that both aerobic and yoga can be practices for reduction of bodyweight, body mass index and fat percent

**Keywords:** Body Mass Index, Body Weight, Body fat percent, Bio electrical impedance analysis, Cohen's d

### 1. Introduction

Lifestyle related physical fitness of Manipuri needs constant research and study to motivate the women to participate in the physical fitness movement. Earlier days women experience at least some amount of physical activity as women of every household used to pound rice, fetch water, gathering of firewood etc. Nowadays, all these were replaced by gadgets and machines. So, they had least chances to explored in physical movements. Participation in physical activity has certain health benefits on women related to heart disease, diabetes, blood pressure, osteoporosis insomnia, stress, menstrual disorder etc (World Health Organization, n.d). Women usually face gender issues regarding social participation and physical activity . The main constraint factors contributing lagging in such participation was due to daily schedule, economic, cultural ,non supportive, household demands and social norms set etc .It has been reported that physical inactivity was 4<sup>th</sup> leading cause of cardiovascular diseases (CVD) and contribute risk of all cause mortality rate by 20-30% (World Heart Federation, 2017) Study reveals that women generally don't have confidence in their physical appearance and experience the fear of being judged by others and are unlikely to take part in physical activity and sport . Another factors hindered Participation of women in sports and physical activity was Lack of funding, support and sponsorship thus involvement in sports and physical activity does not sustain long among women but decline with ages (Women Sports Fitness Foundation ,2008)

Women in general prefer more attractive, feminine, desirable morphological characteristics (Boguslaw & Grazyna ,2008) so, in physical fitness regime women tend to focus more on weight loss or fat loss rather than lean body mass which may be the outcome of gender stereotyping (Inbody USA ,2017). However the increase or decrease in body weight was played by various components inside our body, total decrease in fat does not potentially mean we have ideal body composition. Our body needs the right proportion of body fat, muscles and body water etc that build up ideal body physique. An ideal fat percentage of women range from 23-33% for women within 40-59 years (Lindberg, 2019).

Women have higher body fat than men by 6-11 % and the fat does not burn off easily owing to hormonal intervention, thus women (Eureka Alert, 2009) get high chances to get fatter quickly without exercises than men. Body fat serves as an insulator to protect from temperatures and cushion to organs, to absorb vitamins and minerals, energy storage etc (National Institute of Health , 2013).

Physical activity rate in general was reduced as an outcome of increase in screen time and technology. Obesity and other non communicable diseases grade up as an outcome of such unhealthy lifestyles. To keep in trace of our fitness, it needs to keep in track health related fitness variables like BMI. One efficient and easiest way to gauge our body weight related to height is BMI measurement It indicate our health status into different categories as

normal, obese, overweight, underweight. An ideal BMI for adults 18.5-24.9 (Center for Disease Control and Prevention, 2020) and enable us to identify the possible threat that may arise on our health

Aerobic and yoga was one fitness trend becoming popular among people all over the countries. Manipur too has increase in establishment of several local Aerobic and Yoga studios . Aerobic requires working with an optimal oxygen supply for a longer period of time at least for 30 minutes. It reduces the risk of heart diseases, obesity ,hypertension ,cancers etc (Mayo Clinic ,2020). Aerobic in the form of dance increases the vital stamina, serve as effective weight loss programme and improves our respiration, circulation, muscular strength(TNN.E-Times of India,2019) Study by( Camakci et al .,2011) found that aerobic dance exercises for 8 weeks can significantly decrease the Lean Body Weight, Fat percentage , Total body Weight. Study by (Stosic et al., 2016) conducted an overview study on several scientific researches on the effect of dance aerobics on body composition, they found that aerobic dance intervention can successfully reduce the body weight and its related variables however the degree of significance depends on the nature of training.

Generally Yoga focuses more on breathing while aerobics on heart rate. Our study needs to explore the changes in body composition brought by Yoga. Several research study also suggest that practicing Hatha Yoga can be equated with walking on treadmill at 3.2 kph (Hagins et al.,2007) Ashtanga Yoga can increase heart rate and burns calories. (Fit Athletic Club,2018).Certain yoga asanas such as Plank pose (Chaturanga Dandasana), warrior pose (Virabhadrasana), Triangle pose(Trikonasana), Bow pose ( Dhanurasana) etc reduces body weight.(Shamlee, 2018)These reduction in body weight is be related to change in proportion of fat mass, lean mass and BMI.

To break such stereotyping and culminate mass participation, it needs to take up a variety of studies regarding women's health benefits through physical activity.. Therefore, the main objective of this study was to determine the effect of aerobic and yogic training on body composition among sedentary women of Manipur. This study will bring out the associated changes of aerobic and yoga training on body weight, body mass index and fat percent for Manipuri women leading a sedentary lifestyle.

## 2.Methods

### 2.1. Participants:

Forty women who volunteered to participate in the training program from Lairikyengbam Leikai, Imphal East District, Manipur was included in the study .The women had an average age of  $50.07 \pm 6.3$ , height  $156.1 \pm 9.02$  and weight  $62.7 \pm 5.74$ . Physical checkup was done by practiced nurses prior to training to ensure any possible risk that may come up during training. The personal consent, approval and declaration were taken from participants before commencement of training. All the participants confirmed that they were not doing any physical activity that met ACSM,American College of Sports Medicine physical activity guidelines (ACSM,2018) The study has no control over the diets, habits or schedules etc. of the participants.

### 2.2.Experimental design and procedure

The study was two group pre-test post-test designs. The total 40 participants were randomly(R) minimised into two groups (20 each) Group A and Group B and given different training intervention as Aerobic training ( $X_1$ ) and Yoga training ( $X_2$ ) and measurement pretest  $O_1$  and post test  $O_2$ . The measurement was taken pre training as baseline and after 8 weeks final measurements were taken. The variables measured were Body weight (Kg), BMI(Kg) and Fat percent (%). The measurement was taken using Bioelectric Impedance Analyzer Tanita TBF 300.Karvonen Formula determines the target heart rate zone for training  $\{(MHR-RHR) \times \text{training\%} + RHR\}$ .This study was approved by the institutional board of studies.

Group AR		$O_1$		$X_1$		$O_2$	
Group	B	R	$O_1$	$X_2$		$O_2$	

R= Random assignments,  $O_1$  and  $O_2$  = pre test measurement and post test measurement,  $X_1$  and  $X_2$  = Aerobic and Yoga training.

**Fig 1:** Two group pretest –posttest study design for study.

### 2.3.Training programme

Every participant's target heart rate was predicted before training as per Karvonen formula( Kent ,2007).Aerobic and Yogic training was given to the participant for a continuous series of 8 weeks, 3 days/weeks. Each training session lasted for about 45-60 minutes with 10 minutes warm up and 5 minutes cooling down and 25-35 minutes main activity .The load of training progressed gradually after completion of every 4 weeks. The training begins from 50-60% intensity during the first- four weeks and increases up to 60-70% in the second- four weeks while maintaining the heart Rate. Aerobic training was composed by a sequence of aerobic exercises steps practiced at rhythm of music and yogic training composes of asanas and pranayama only.

Aerobic exercises	intensity	Duration
Mambo Step L Step, Step Touch Leg Curl, Grape Vine, Jump Jack	50-60% (1-4weeks)	25-30 minutes
Standing Oblique Crunches Right, Standing Oblique Crunches Left, Knee Side To Side Lunges And squat	60-70% (5-8 weeks)	30-35 minutes

**Fig no 3:** Aerobic training programmes for 1-8 weeks.

Yoga asanas + Pranayama	Intensity	duration
Asanas: Trikonasana, Hasta Uttanasana,Konasana, Padmasana,Vajrasana, Paschimottanasa, Makarasana, Bhujangasana, dhanurasana. Naukasana,halasana,pavan mukta asanas	50-60% (1-4weeks)	25-30 minutes
Pranayama : Kapal bhati Anulom- Vilom, Ujjayi, Bhastrika	60-70% (5-8 weeks)	30-35 minutes

**Fig 3:** Yogic training programmes for 1-8 weeks.

The main aim of training was to determine the changes brought by training intervention to participants and the differences effect of each training. All data was analyzed using IBM SPSS software 20. Paired t test was analyzed for each variable to determine pre and post mean changes. Independent t test was also analyzed for the mean differences of all selected variables for both aerobic and yoga to observe Cohen's d effect size. The significance level was set at 0.05.

### 3.Results:

Tables 1 show the paired t test output of all variables. The mean difference of aerobic training pre test and post test on body weight,BMI and fat percent was  $1.72 \pm 1.5$ ,  $.68 \pm .63$  and  $2.22 \pm 4.9$  respectively. The reduction in body weight, BMI and fat percent was highly significant ( $P < 0.05$ )

Tables 2 shows the pair t test output of all variables The mean difference of yoga training pre test and post test on body weight,BMI and fat percent was  $.79 \pm .67$ ,  $.25 \pm .45$  and  $2.1 \pm 3.1$  respectively. The reduction in body weight, BMI and fat percent was highly significant ( $p < 0.05$ )

Table 3 shows the mean differences of pre and post aerobic and yogic training on all variables.The mean difference of the participants body weight, BMI and fat percent was  $.93, 43$  and  $.087$  respectively .The t statistic for body weight and BMI show significance difference between aerobic and yoga training ( $P < 0.05$ ) and .The t statistic for fat percent shows not significance difference between aerobic and yogic training ( $P > 0.05$ ) . Cohen's d shows high effect size in body weight (.79)and body mass(.77) .This means that Aerobic causes more significant

decrease in body weight and BMI than the Yogic training group. The Cohen's d for fat percent shows trivial effect size of .02 and the difference is not significant; however the Cohen's d denotes that aerobic has more effect to decrease in fat percentage than yogic training group.

Table 1: Comparison of pre and post test mean for aerobic training group

Aerobic variables	Pretest M±SD	Posttest M±SD	MD	SD	SE M	t	p
BW	63.8±3.9	62.1±4.6	1.7	1.5	.34	5.06	.00
BMI	25.2±2.02	24.5±2.05	.68	.63	.14	4.8	.00
F%	34.8±5.3	32.6±4.5	2.2	4.9	.70	2.01	.05

BW= Body Weight, BMI=Body Mass Index ,B F%= Body fat percent, M= Mean of group SD=Standard Deviation ,MD= Mean Difference , p= probability, SEM= Standard error of mean

Table 2: Comparison of pre and post test mean of yogic training group

Yoga variables	Pretest M±SD	Posttest M±SD	MD	SD	SEM	t	p
BW	61.5±7.02	60.7±6.6	.79	.67	.15	5.2	.00
BMI	26.5±4.4	26.3±4.3	.25	.45	.10	2.4	.02
F%	35.3±4.6	33.1±4.5	2.1	3.1	.70	2.9	.007

Table 3: Comparisons of the mean difference of aerobic and yogic training.

	aerobic	yoga				
Morphological variables	MD(SD)	MD(SD)	DM	t	P	d
BW	1.7(1.5)	0.79(.6)	.93	2.5	.016	.79
BMI	.68(.63)	.25(.45)	.43	2.4	.018	.77
BF%	2.2(4.9)	2.1(3.1)	.087	0.67	.947	.02

BW= Body Weight, BMI=Body Mass Index ,B F%= Body fat percent, MD= Mean difference of group SD=Standard Deviation ,DM= Difference of mean, p= probability ,d= Cohen's d

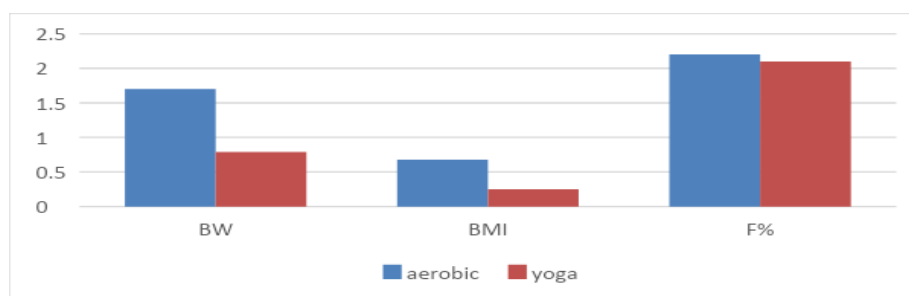


Fig 2: Comparison of mean changes on pre and post (1-8 weeks) training .

#### 4. Discussion:

Manipur's population comprises of 32.59% from below the poverty line (NITI Aayog, n.d.). The health condition of the people also contributed to the economic condition of the region. By improving the health and fitness of the people, our economic status can also be improved (Collin, 2015). Women in particular were mostly excluded from such fitness and health attention, they take themselves as granted giving more priority to family and surroundings. This study will show how exercises and physical training brought changes on one's body composition. Present study done on 8 weeks aerobic and yoga training to determine effect on the body composition of the participants. The analysis of pre test and post test means of each variables shows significant reduction in all variables however the independent test for the pre and post test mean difference shows how much extend the training differ in the effects of the training.

The study reveals that there is a significant difference between aerobic and yoga training in body weight and body mass index ( $p < 0.05$ ). BMI depends on body weight and fat percent depend on the Fat mass. Significant difference in body weight and BMI in aerobic and yoga must be due to difference in the distribution of fat mass and fat free mass and body water. In case of fat percentage, it observe that aerobic and yogic training group shows no significant differences in decreasing body fat percentage, thus either yoga and aerobic may equally be intervene to reduce body fat percentage as the paired t statistic of pre and post for both aerobic and yoga shows significance results ( $P < 0.05$ ), however aerobic shows more potential to reduce fat percent reading from Cohen's d.

It may also bring in other studies to support the finding that yoga decreases body weight, BMI and fat percentage, seven days yoga intervention can cause some reduction in body weight, BMI and fat percentage (Upadhyay et al., 2019). It has been reported that yoga work slower but for long term weight loss it works wonders than aerobic activity (Pharmeasy, n.d.). 8 weeks yoga training in obese boy at 40-60% heart rate reserve (HRR) shows significant decreases in body weight, BMI and body fat percentage (Seo et al., 2012). (Zorofi et al., 2013) also prove that Yoga can brings significant reduction of body fat percentage.

Comparing the mean difference of both groups in body weight and BMI aerobic has greater impact in reduction of Body Weight. It may also extent support to other studies finding that aerobic brings significant reduction of body weight, BMI and fat percent in sedentary females brought by aerobic exercise intervention (Stojiljkovic et al., 2012). In present study, the training frequency is 3 days/week thus the changes indicated was supported by several literature that training for 3 days/weeks can bring significant changes (Marandi et al., 2013) even on obese individuals in Body weight, BMI and fat percent ( $p < 0.05$ ) (Manthujwa et al., 2013). This was also supported by Wilmore study as (cited by Pantelic S et al., 2013) that involvement in physical activity for at least 30 minutes thrice a week can bring trivial to significant changes in the body composition parameters. It has described that exercise intensity from 50-80% for upto 12 weeks at least 3 /week was effective in maintenance of body mass, BMI and fat reductions (Hadzovic et al., 2020).

The study has positive influence in reduction of body weight, BMI and percentage of body fat. The achievement depends on participant ability to perceive and execute movements of exercise. The study has also got a limitation that researchers are not able to control the daily diets, schedule, habits and off training activities of the participants. The results have confirmed that 8 week aerobic and yoga training at an intensity of 50-70 % can decrease the body weight, BMI and fat percent. Aerobic shows more effective in reduction of body weight and BMI however in case of fat percent aerobic and yoga shows reduction but Cohen's d effect sizes differentiate the training, aerobic showing more potential to decrease than yoga. It may say that the difference in observation on body composition between aerobic and yogic training may be due to the variation in nature of exercises.

The result have confirmed that the applied training programme at an intensity of 50-70% can brings positive significant changes on the body weight and BMI, though the outcomes for fat percent was not significant, it has the potential to improve upon training as reflected from Cohen's d. Thus, it can be used for reduction of body weight, BMI and body fat among women by different fitness clubs. This can be effective programmes for improving the conditions of our body cardio vascular system (Changela et al., 2013). More significant changes can be expected if the training is extended or load is increased. Further more changes may observe, if the training puts more control on diets and habits or the training was combined.

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