



## BMI AND VITAL DATA IN ADULT FEMALES WITH SEDENTARY AND ACTIVE LIFESTYLES-A COMPARITIVE STUDY

### Physiology

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### ABSTRACT

**Objective:** The study was done between 50 female individuals living sedentary life styles and 50 individuals with active life styles matched for age group and sex and to see the comparison between BMI, vital data in the two different groups.

**Materials and Methods:** The study was conducted among 100 healthy female individuals in age group of 25-45 years, working at different schools, colleges, banks and government / non-government organizations and also house-wives, at Vijayawada. A self-administered questionnaire was used for subjective and objective assessment. The weight, height and blood pressure of subjects were measured and BMI was calculated by standard formula. Vital data was recorded in all individuals. Informed consent was obtained from each subject.

**Results:** The BMI was positively correlated with, heart rate, respiratory rate, systolic and diastolic blood pressure ( $P < 0.001$ ;  $< 0.001$ ;  $< 0.001$ ;  $< 0.001$  respectively). There is a significant increase ( $P=0.001$ ) in the mean levels of BMI and vital data in the female sedentary subjects when compared with the active subjects.

**Conclusion:** This study confirmed that among the middle aged women there is a relationship between physical activity, BMI and vital data. The worldwide increase in the prevalence of metabolic disorders can be attributed to a more sedentary lifestyle.

### KEYWORDS

Body mass index, vital data, physical activity, sedentary, active.

### INTRODUCTION :

Obesity is a state of excess adipose tissue mass. The human physiologic system in the presence of nutritional abundance and a sedentary lifestyle, and influenced importantly by genetic endowment, this system increases adipose energy stores and produces adverse health consequences. Although often viewed as equivalent to increased body weight, Obesity is therefore more effectively defined by assessing its linkage to morbidity or mortality (1).

The increasing prevalence of medically significant obesity raises great concern. Obesity is more common among women and in the poor. Data from the National Health and Nutrition Examination Surveys (NHANES) show that the percentage of the American adult population with obesity (BMI >30) has increased from 14.5% (between 1976 and 1980) to 33.9% (between 2007 and 2008). (1)

Obesity has major adverse effects on health. Obesity is associated with an increased risk of multiple health problems, including hypertension, Type 2 diabetes, dyslipidemia, degenerative joint disease, and some malignancies and the prevalence of obesity is increasing rapidly in most of the industrialized world.

Obesity is associated with an increased risk in mortality, particularly when obesity is associated with increased intra-abdominal fat. Life expectancy of a moderately obese individual could be shortened by 2-5 years, with a 50-100% increased risk of death from all causes compared to normal-weight individuals, mostly due to cardiovascular causes. Obesity and overweight together are the second leading cause of preventable death in the United States, accounting for 300,000 deaths per year. (1)

**BMI and waist circumference:** Three key anthropometric measurements are important to evaluate the degree of obesity: weight, height, and waist circumference. Although not a direct measure of adiposity, the most widely used method to gauge obesity is the body mass index (BMI). BMI is used since it provides an estimate of body fat and is related to risk of disease.

The individual's current diet and physical activity patterns may reveal factors that contribute to the development of obesity in addition to identifying behaviors to target for treatment. This type of historic information is best obtained by using a questionnaire in combination with an interview.

Several prospective studies have demonstrated that physical fitness,

reported by questionnaire is an important predictor of all-cause mortality rate independent of BMI and body composition. These observations highlight the importance of taking an exercise history during examination as well as emphasizing physical activity as a treatment approach. (2)

The present study focuses on collecting data from middle aged females with active lifestyle and the same compared with females of sedentary lifestyle of same age group.

### MATERIALS AND METHODS:

The subjects in this study included 100 healthy individuals working at different schools, colleges, banks and government / non-government organizations and also house-wives. All subjects were females and within the age group of 25-45 years. Fifty subjects selected at random with sedentary lifestyle and the other fifty subjects with non-sedentary / active lifestyle. A validated, structured questionnaire was used to collect demographic, socio-economic, life style information and physical activity pattern during individual interview. An extensive questionnaire documenting age, height, weight, BMI, vital data including temperature, heart rate, respiratory rate, systolic and diastolic blood pressure, dietary habits, exercise habits and monthly income, number of dependants, position held and occupational history has completed in the case of each employee. Informed consent was taken in all subjects that participated for the study.

### INCLUSION CRITERIA:

1. All the subjects with regular physical activity for a period of 1 year with minimum 30 min activity / day for 5 days in a week are active adult females.
2. The individuals who do not follow the above activity are said to be sedentary.

### EXCLUSION CRITERIA:

All the subjects excluded from the study were those with history of Diabetes mellitus, high blood pressure ( $>160/90$ mm Hg), coronary heart disease, obesity, renal impairment, hepatic impairment, hypothyroidism.

### ANTHROPOMETRIC MEASUREMENT:

Height was taken using a height scale, graduated to measure up to 2m, readings were taken at eye level. Height measurements were taken to the nearest 0.1cm. Weight of each subject was measured using a standard weighing machine. The weight measurements were read to

the nearest 0.lkg. BP was recorded using mercuric sphygmomanometer. Both systolic and diastolic blood pressures were recorded by palpatory and auscultatory methods, after taking rest for a period of 30minutes in a quiet room.

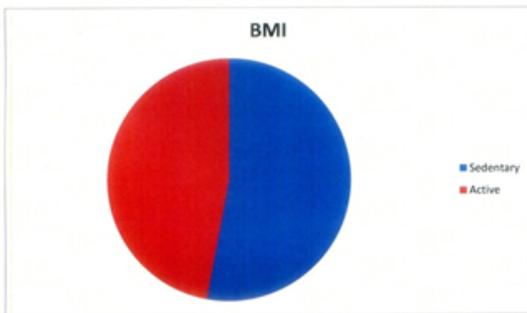
BMI was calculated by dividing weight in kilograms by the square of the height in meters. For these individuals, as per WHO guidelines, the current value settings are as follows: a BMI 18.5 to 25 is considered as optimal weight, less than 18.5 as underweight, while above 25 is considered overweight; and above 30 is considered obese.

**RESULTS :** The results (mean ± SD) obtained from the study are as shown below.

**Table I: Shows a significant increase (P=0.001) in the mean levels of BMI in the female sedentary subjects when compared with the non-sedentary or active subjects.**

| Variable | Mean ± SD sedentary | Mean ± SD Active | P value | Inference   |
|----------|---------------------|------------------|---------|-------------|
| BMI      | 28.1±4.12           | 25.06 ± 1.45     | <0.001  | Significant |

**Graph I**



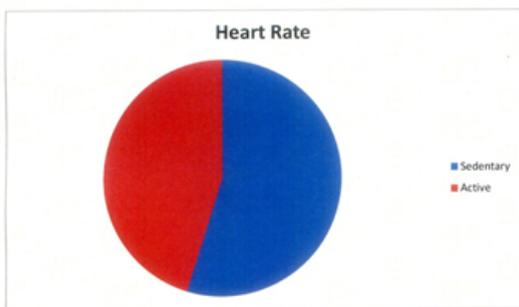
**Table II: Shows a non-significant difference (P>0.05) in the mean levels of temperature in the female sedentary subjects when compared to their active counterpart.**

| Variable    | Mean ± SD Sedentary | Mean ± SD Active | P value | Inference       |
|-------------|---------------------|------------------|---------|-----------------|
| TEMPERATURE | 98.43± 0.13         | 98.44 ±0.10      | >0.05   | Not Significant |

**Table III: Shows a significant increase (<0.001) in the mean levels of Heart Rate in female sedentary subjects, when compared to female non-sedentary/active subjects.**

| Variable   | Mean ± SD Sedentary | Mean ± SD Active | P value | Inference   |
|------------|---------------------|------------------|---------|-------------|
| Heart Rate | 78.92 ± 5.32        | 65.08 ± 4.66     | <0.001  | Significant |

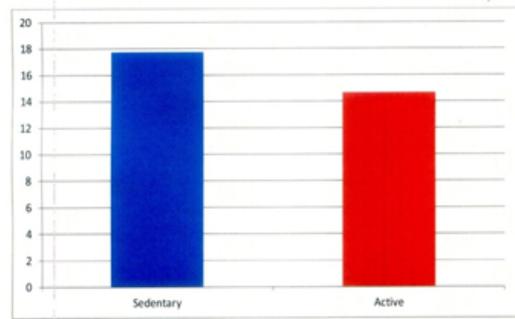
**Graph III**



**Table IV: A Comparison of the female sedentary and non-sedentary workers, show a significant increase (P<0.001) in the mean levels of Respiratory Rate in the sedentary counterpart.**

| Variable         | Mean ± SD Sedentary | Mean ± SD Active | P value | Inference   |
|------------------|---------------------|------------------|---------|-------------|
| Respiratory Rate | 17.74 ± 3.47        | 14.64 ± 2.04     | <0.001  | Significant |

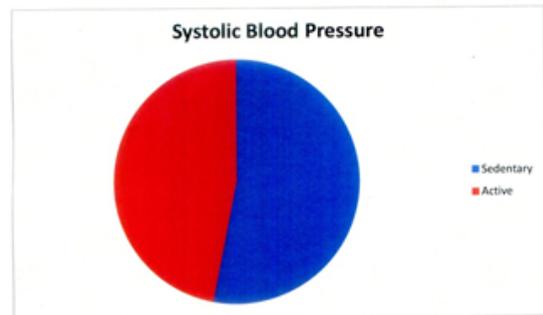
**Graph IV Respiratory Rate**



**Table V : A significant increase (P<0.001) was observed in the mean levels of systolic blood pressure in the sedentary female subjects, as compared with those of active females.**

| Variable | Mean ± SD Sedentary | Mean ± SD Active | P value | Inference   |
|----------|---------------------|------------------|---------|-------------|
| SBP      | 126.8 ± 10.96       | 112.0 ± 9.26     | <0.001  | Significant |

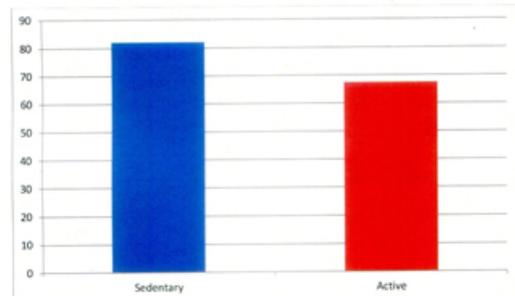
**Graph V**



**Table VI: Shows a significant increase (P<0.001) in the mean levels of diastolic blood pressure of the sedentary females, when compared to their active counterpart.**

| Variable | Mean ± SD Sedentary | Mean ± SD Active | P value | Inference   |
|----------|---------------------|------------------|---------|-------------|
| DBP      | 82.0 ± 9.03         | 67.26 ± 17.38    | <0.001  | Significant |

**Graph VI Diastolic Blood Pressure**



**DISCUSSION :**

Due to a more sedentary lifestyle, the risk of metabolic syndrome and chronic diseases is increasing worldwide. The prevalence of overweight and obesity is in increasing. Obesity is now estimated to be the second leading cause of mortality and morbidity, causing an estimated 2.6 million deaths worldwide and 2.3% of the global burden of disease. The WHO estimates that by 2015, the number of overweight people worldwide will increase to 2.3 billion, whilst more than 700 million will be obese.

A clear and well-documented association exists between obesity and hypertension. Obesity is not only associated with an increased risk of developing hypertension, but also has an increased risk of developing

other non-communicable diseases, such as coronary heart disease, diabetes and stroke.

In the present study, BMI and vital data of sedentary adult female subjects were analyzed and the results revealed a statistically significant increase ( $P < 0.001$ ) in BMI, heart rate, respiratory rate, systolic and diastolic blood pressures, when compared with the active / non-sedentary subjects. This observation is similar with the previous study done by Alhaj A, Sana'a (3). This study evaluated the systolic and diastolic BP values, the difference in the two groups as expressed by the P value ( $P = 0.001$ ) was found to be statistically significant. BMI was positively correlated with systolic and diastolic blood pressure ( $P < 0.002$ ;  $0.002$ , respectively). The association of BMI with systolic and diastolic blood pressure was more pronounced among women than in men subjects ( $P = 0.012$ ;  $0.008$ , respectively). The mean of systolic and diastolic blood pressure were higher in overweight and obese subjects (3). This study did not find any significant change in the values of temperature among active subjects as compared to the sedentary subjects ( $P > 0.05$ ).

A study done by Annamma Mathew et al., among middle aged women showed that there was no significant difference in the BMI between women who had moderate physical activity and those who had a sedentary life-style, whereas women with physical activity of vigorous type showed significant difference in the BMI when compared to those performing moderate activity (4)

A study performed by Annette N. Boles et al., among adult subjects showed significant difference for weight, BMI in females. The data among males was found as normal while females had some variables (5)

The present study has once again shown that sedentary lifestyle is a predisposition factor to obesity and some metabolic disorders of lipid and lipoprotein metabolism such as coronary heart disease.

Physical activity helps the circulation in body; it accelerates the body metabolism as against sedentary lifestyle habits. Adopting healthy, adequate, regular physical activity such as walking, running, doing physical work will nullify the bad effects of sedentary lifestyle in women. The American Heart Association recommends that individuals should perform moderately-intense exercise for at least 30 minutes on most days of the week. This recommendation supports similar exercise guidelines issued by the Centre for Disease Control and Prevention and the American College of Sports Medicine.

#### CONCLUSION :

A striking finding of this study was adult females with sedentary lifestyles are at a higher risk of developing metabolic disorders. The data showed a statistically significant increase in BMI and vital data in sedentary adult females when compared with non-sedentary subjects. From the study it appears that for women, sedentary life style predisposes to the risk of CHD and other comorbid conditions. So all females of middle age group should be encouraged for regular exercise.

#### LIMITATIONS :

1. The data were sampled from only one area in limited subjects
2. No data on possible changes in physical activity during follow up

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