A Comparative Study Of Anthropometric Parameters In Healthy Sedentary and Non- Sedentary Male Subjects

Dr. Jayalakshmi MK*, Dr. Ravindra B Patil, Dr. Rajini S*****

*Assistant professor, Department of Physiology JJM Medical college,Davangere, **Associate professor,Department of Paediatrics, SIMS,Shivamogga, ***Associateprofessor, Department of Biochemistry, JJM Medicalcolle.Davanger.

Abstracts: **Background:** In sedentary life style, there is an excess of adipose tissue accumulation, an altered metabolic profile occurs along with a variety of adaptations / alterations in anthropometric parameters even in the absence of co-morbidities. Therefore, this study was undertaken to analyze the differences in certain anthropometric parameters in sedentary and non-sedentary male subjects in the age group of 25-55 years. **Methods:**53 healthy sedentary and 47 healthy non-sedentary male subjects were selected randomly from the general population of Davangere city. Anthropometric parameters such as weight, height, body mass index, waist circumference, hip circumference, waist to hip ratio were assessed. **Results:** In our study, there was statistically significant increase in body mass index, waist to hip ratio, mid arm circumference. Although our study is by no means exhaustive, it provides a glimpse into the variety of adaptations /alterations in anthropometric parameters that occurs due to sedentary life style, even in the absence of overt disease.

[Jayalakshmi MK NJIRM 2014; 5(4) :13-16]

Key Words: Body Mass Index, Sedentary lifestyle, Waist to Hip Ratio.

Author for correspondence: Dr.Jayalakshmi.MK Assistant Professor, Department of Physiology. JJM Medical College, Davangere -577004. Karnataka, India. Mobile-09448263090 **Email:** jayalakshmimalavar@gmail.com

Introduction: A sedentary life style includes less than 150 minutes of moderate physical activity or less than 60 minutes of vigorous physical activity per week .[1] Obesity can be defined as a state of excess adipose tissue mass.[2]

Currently over weight and obesity are classified by Body Mass Index (BMI) (weight in kilogram/square of the height in meter-kg/m^2). In adults, overweight is defined as BMI of 25.0 to 29.9kg/m^2; obesity is defined as BMI ≥ 30 m^2.[3]

Anthropometry deals with measurement of the of the actual stature, weight and body measurements (including skin folds and circumferences) of the human body. It reflects on inadequate or excess calories intake, insufficient exercise and pathological conditions. In developed and in many of the developing countries, sedentary life and obesity are the health problems, because of advancement of technology sedentary life style is increasing and due to faulty dietary habits and physical inactivity there is an imbalance between energy intake and expenditure which leads to obesity. Sedentary lifestyle is a major underlying cause of disease, disability and death.

The results of extensive research programs lead to the conclusion that physical activity increases longevity, to a large extent protect against development of the major non- communicable diseases such as coronary heart disease, hypertension, stroke, non-insulin diabetes mellitus, osteoporosis and colon cancer .[4]

There is increased risk of metabolic complications for men with waist circumference ≥ 102 cms and women with a waist circumference ≥ 88 cms.[5]

Visceral fat is more metabolically active than subcutaneous fat and hence may be more deleterious to health .[6]

Because of increased morbidity, mortality and diseases due to physical inactivity and obesity, we need to create awareness about the risk factors, complications and preventive measures among the respondent of the study groups. Hence, the present comparative study of anthropometric parameters of sedentary and non-sedentary subjects is being undertaken.

Aim Of The Study: To assess the differences in certain well defined anthropometric parameters in healthy sedentary and non-sedentary male subjects in the age group of 25-55 years.

Objectives of The Study: To asses certain anthropometric parameters such as height, body mass index, circumference of the waist, hip and

mid arm in sedentary subjects. To asses similar anthropometric parameters of appropriately matched controls (Non- sedentary subjects).

To compare the results of the sedentary and non-sedentary groups and to study the effect of sedentary life style on anthropometric parameters.

Methodology: The present study was conducted in the department of Physiology, J.J.M.Medical College, Davangere, after taking IRB permission

The study was undertaken to analyze the differences in certain anthropometric in healthy sedentary and non-sedentary subjects in the age group of 25 - 55 years. 53 sedentary and 47 healthy non-sedentary male subjects were selected from the general population of Davangere city randomly.Healthy males with BMI ≥30 (kg/m^2) were classified as obese. Healthy males with BMI 18.50-24.99 (kg/m^2) were included as non-obese subjects.For the purpose of analysis subjects were dividedinto three groups depending upon the age.

Group – I (26-35 years):— 15 sedentary, 12 non-sedentary subjects

Group – II (36-45 years):— 21 sedentary, 13 non-sedentary subjects

Group – III (46-55 years):— 17 sedentary, 22 non-sedentary subjects.

The exclusion criteria in this study were

- Subjects suffering from endocrinal disorders
- Hypertensive individuals
- Subjects with renovascular and cardiovascular
- Diseases.

All the subjects gave consent after explaining the procedure of the non-invasive technique to them. A brief personal history, childhood obesity, detailed history of exercise and a clinical examination of all the systems were done to exclude medical problems and to prevent confounding of results.

Physical Anthropometry: The circumference technique measures body shape using a flexible plastic measuring tape, subjects were required to wear minimal thin cloth, the measurement is typically conducted in the morning before eating and after emptying the bladder. Subjects were measured in standing position and they were asked to breath normally and gently which prevents the subject from contracting their abdominal muscles. Height was measured by a plastic measuring tape after marking the subject to stand straight against an even wall. A sliding wooden head piece was used for accurate work.[7]

Body weight of all the subjects was measured by using standardized weighing machine, which was calibrated in kilograms. The body mass index(BMI) was derived by Quetlet's index from body weight (kg) / Height (m^2).[8]

Mid Arm Circumference (MAC) was measured with a plastic tape at the midpoint between the olecranon and the acromion process on the right side of the arm, it is expressed in centimetres (cms).[9]

Waist Circumference (WC) was measured to the nearest centimetre with a plastic tape measure while the subjects were in the standing position at the end of gentle expiration. The following anatomical landmarks were used: laterally, midway between the lowest portion of the rib cage and iliac crest, and anteriorly midway between the xiphoid process of the sternum and the umbilicus.[10]

Hip Circumference (HC) was measured in centimetres (cms) in standing position with a plastic tape at the largest horizontal circumference around the buttocks.[11] After completing the measurements, the waist circumference was divided by the hip circumference to determine the waist to Hip ratio (WHR).[12]

Statistical analysis: The results were given as Mean ± Standard Deviation. Comparisons were made between sedentary and non-sedentary subjects separately for different age groups wherever necessary. Student's t-test (Unpaired) was used for comparisons between the groups. A p-value of 0.05 or less was considered as statistical significance.

Results: On analysis of parameters of the sedentary male subjects, there was statistically significant increase in all the anthropometric parameters except height in sedentary subjects

TABLE 1: Comparison of Anthropometric Parameters between Sedentary And non-sedentary subjects.

Anthropometry	Sedentary	Non-sedentary	Significance	
	Mean ± SD	Mean ± SD	t	p
Weight (kg)	80.22 ± 10.78	70.97 ± 7.53	8.2	< 0.001,HS
Height (cm2)	165.35 ± 6.46	169.92 ± 6.20	0.007	> 0.001,NS
BMI (kg/m2)	29.2 ± 4.5	24.6 ± 2.6	5.83	< 0.001,HS
Waist circumference(cms)	98.71 ± 9.3	86.64 ± 0.97	5.030	< 0.001,HS
Hip circumference (cms)	103.75 ± 6.89	94.73 ± 4.56	9.724	< 0.001,HS
Waist hip ratio (WHR)	0.95 ± 0.04	0.91 ± 0.04	4.02	< 0.001,HS
Mid arm circumference MAC (cms)	30.37 ± 2.33	26.80 ± 1.31	8.30	< 0.001,HS

All values are expressed as Mean ± SD. Analysis for all parameters done by unpaired't' test. HS-Highly Significant, S- Significant, NS- Not Significant.

On comparing the age related changes in BMI, WHR and MAC between sedentary and non-sedentary subjects, there was statistically significant increase in BMI, WHR and MAC in sedentary subjects in Group-II and in Group-III when compared with non-sedentary subjects in the same age group. In Group-I there was slight increase in mean BMI, WHR and MAC in sedentary subjects compared to non-sedentary subjects though statistically was not significant. (Table2).

Table 2: Comparison of Age Related Changes in Anthropometry Between Sedentary Andnon - Sedentary Subjects.

Anthropometry	Group	Sedentary	Non-sedentary	Significance	
		Mean ± SD	Mean ± SD	t	P
BMI (kg/m2)	Group-1	25.8 ± 5.5	23.1 ± 2.4	1.50	0.15,NS
	Group-11	29.9 ± 2.7	24.4 ± 2.5	7.08	< 0.001,HS
	Group-111	31.0 ± 4.2	25.6 ± 2.7	4.38	< 0.001,HS
WHR	Group-1	0.92 ± 0.05	0.91 ± 0.03	0.62	0.55,NS
	Group-11	0.96 ± 0.04	0.90 ± 0.05	3.61	< 0.01,S
	Group-111	0.96 ± 0.02	0.92 ± 0.04	3.62	< 0.01,S
MAC (cms)	Group-1	29.3 ± 2.6	27.2 ± 1.6	2.05	0.07,NS
	Group-11	31.3 ± 2.0	26.8 ± 1.2	8.85	< 0.001,HS
	Group-111	30.2 ± 2.2	26.8 ± 1.6	5.13	< 0.001,HS

All values are expressed as Mean ± SD. Analysis for all parameters done by unpaired't' test. HS-Highly significant, S- Significant, NS- Not significant.

Discussion: Many studies have shown the health burden of a sedentary lifestyle. This is an analysis and discussion of the anthropometric and cardiovascular parameters assessed in sedentary and non-sedentary male subjects in the age group of 25-55 years. The differences in the mean value of each parameter for each subgroup was analysed and discussed. In our study BMI was increased in sedentary subjects when compared to non-sedentary subjects and it was statistically significant. Recent studies in adolescents and adults have demonstrated significant relationship between physical inactivity and other adverse health practices, such as consumption of less-healthy foods or increased fat intake. Inactive individuals tend to consume more quantities of dietary fat. These data suggest that inactivity tends to cluster with other health behaviours that have adverse effect on the quantity and location of body fat deposition which results in obesity [13]. Modern

life style associated with easy access to food, lack of exercise, sedentary life style, calories dense food, and excessive television viewing is among the identified contributes to the obesity epidemics[14].

In our study the mean WHR in sedentary female subjects was increased by 0.04 which was statistically significant this may be due to lack of physical exercise leading to an increased deposition of fat in the abdomen in sedentary subjects. Abdominal obesity is defined as waist circumference >102 cms in men and > 88 cms in women.

Conclusion: Sedentary lifestyle was associated with increased inanthropometric parameters such as BMI, WHR and MAC. It was also noticed in our study that anthropometric parameters were increased in sedentary subjects but there was statistically significant increase after the age of 35 years. Those who are sedentary, an exercise program are an excellent way to significantly improve their health. Maintaining a healthy lifestyle, including exercise, will result in increased energy levels throughout working period. The benefits of regular physical activity are numerous, people who exercise live longer and healthier.

Future Recommendation: Hormonal assay and lipid profile estimation along with fat parameters would have given a better understanding about sedentary life style and its consequences. We need to evaluate the strategies andefficacy of physical activity in various diseases.

Acknowledgements: Authors are grateful to the Principal J.J.M.Medical College, Davanger for his support and encouragement, to the statistician and to all the volunteers who participated in this study.

References:

1. Sandrine Bertrais , Jean-Paul Beyume-Ondoua, SebasteinCzernichow, Pilar-Galan, Serge Hercberg, Jean- Michel Oppert. Sedentary behaviours, physical activity and metabolic syndrome in middle aged French subjects. Obes Res J 2005; 13 : 936-44.
2. Kasper DL, Wald BE, Fauci AS, Hauser SL, Longo DL, Jameson JL. Harrison's principles of internal medicine. Vol-1 16th ed. United States of America : The McGraw Hill Companies ; 2005:422-9.
3. Clinical Guidelines on the identification, evaluation, and treatment of overweight and obesity in adults : The evidence report : National Institutes of Health Obes Res 1998;suppl 2:51S-209S.
4. World Health Organization. Exercise for health. Bulletin of the World Health organization 1995;73(2):135-6.
5. Park K. Park's textbook of preventive and social medicine. 19thedn. Jabalpur: M/S BanarasidasBhanot; 2007; 332-6.
6. Montagu CT, O'Rahilly S. The perils of portliness: Causes and consequences of visceral adiposity. Diabetes 2000;49:883-8.
7. National Health and Nutrition Examination Survey. 2005:3-6
8. Tanphaichitr V. "Clinical needs and opportunities in assessing body composition." Asia Pacific J ClinNutr 1995; 4: 23-24.
9. Khalid MEM, Mahmoud MSW, Ahmad MEK. " Fat indices in high and low altitude populations in South-Western Saudi Arabia". Ann Saudi Med 1997; 17(3).
10. Lohman TG. Applicability of body composition techniques and constants for children and youth. Exerc Sport SciRev 1986;14:325-57.
11. Stefanick M L, Mackey S, Sheehan M, Ellsworth N, Haskell LW, Wood DP. " Effects of Diet and Exercise in men and post menopausal women with low levels of HDL cholesterol and high levels of LDL cholesterol". New Engl J Med 1998; 339(1):12-19.
12. Powers, Scotts K, Dood Stephen. "Fitness Evaluation: Self Testing", Chapter 2. In: Total fitness, Exercise, Nutrition, Wellness. 34-40.
13. The role of lifestyle in health: epidemiology and consequences of inactivity. Proceedings of the Nutritional Society.1996; 55:829-40.
14. Vippaldadhiam H, Talwar k k. Healthy weight, healthy shape. Indian J Res 2005; 122: 187-90.

Conflict of interest: None
Funding: None