ORIGINAL ARTICLE

Assessment of obesity indices in known population- A clinical study

[1]Dr Sanjay Kumar Agarwala, [2]Dr Jayanti Singh

[1]Assistant Professor, Department of Biochemistry, Major S D Singh Medical College, Farrukhabad, Uttar Pradesh, India;
[2]Associate Professor, Department of Physiology, Major S D Singh Medical College, Farrukhabad, Uttar Pradesh, India

ABSTRACT:
Background: The obesity is an abnormal and excessive accumulation of fat, which may impair health. India contributes a substantial proportion of obese/overweight population. The present study was conducted to assess obesity indices in known population. **Materials & Methods:** 230 subjects of both genders were included. Body weight was measured by digital weighing machine. Height and BMI was calculated by Quetelet's formula i.e., weight (kg) divided by height (m2). Mid abdominal WC, Waist-to-height ratio (WHtR), skin fold thickness (SFT) was measured. **Results:** Out of 230, males were 130 and females were 100. The mean weight was 67.3 Kg, BMI was 23.8 Kg/m^2, WC was 90.2, WHtR was 0.54 and fat% was 22.8. **Conclusion:** Authors found that there is need to change life style and food habits. Obesity can lead to various serious diseases.
Key words: Food, Obesity, Overweight

Corresponding author: Dr Jayanti Singh, Associate Professor, Department of Physiology, Major S D Singh Medical College, Farrukhabad, Uttar Pradesh, India

INTRODUCTION

The obesity is an abnormal and excessive accumulation of fat, which may impair health. India contributes a substantial proportion of obese/overweight population. Approximately 135 million people suffer from obesity. Age, gender and genetic susceptibility are important non-modifiable risk factors of obesity.[1] Apart from genetics, poor maternal nutrition induces the foetus to reduce metabolic capacities of vital organs such as pancreas, liver and kidney. On exposure to availability of dense calorie food in later life leads to storage of fat and other metabolic compensations. Nutrition transition from staple food to westernised diet, carbohydrate rich diet and decreased physical activity are some other important contributors of fat deposition.[2]

The cause of obesity is multifaceted, brought about by an interaction between predisposing genetic and metabolic factors and a rapidly changing modern environment. There is a strong selection bias in favor of regulatory systems that vigorously defend against deficits in body weight.[3] The regulatory changes with weight loss include significant reductions in levels of leptin and the gastrointestinal hormones peptide YY, cholecystokinin, and amylin and increases in the levels of ghrelin, hormonal changes that are associated with increased hunger and urges to eat. Energy expenditure with weight loss is disproportionately reduced, attributable largely to increased skeletal muscle work efficiency and reduced physical activity. As a result of these underlying adaptive physiological factors and the behavioral challenges of balancing caloric intake and expenditure, weight loss maintenance is difficult.[4] According to self-report data from >14 000 participants in the 1999 to 2006 National Health and Nutrition Examination Survey (NHANES), only 17.3% of adults reported losing 10% of maximum body weight and keeping it off for at least 1 year. For these reasons, obesity should be considered a chronic relapsing disease in which we use multiple modalities of treatment, including lifestyle counseling, pharmacotherapy, and surgery.[5] The present study was conducted to assess obesity indices in known population.

MATERIALS & METHODS

The present study comprised of 230 subjects of both genders. All were informed regarding the study and their written consent was obtained. Subjects with history of diabetes, peripheral arterial disease, cardiovascular disease, hypertension or other chronic diseases, any history of prolonged hospitalisation and immobility were excluded from the study.

Data such as name, age, gender etc. was recorded. Body weight was measured by digital weighing machine. Height and BMI was calculated by Quetelet's formula i.e., weight (kg) divided by height (m2). Mid abdominal WC, Waist-to-height ratio (WHtR), skin fold thickness (SFT) was

measured. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of subjects

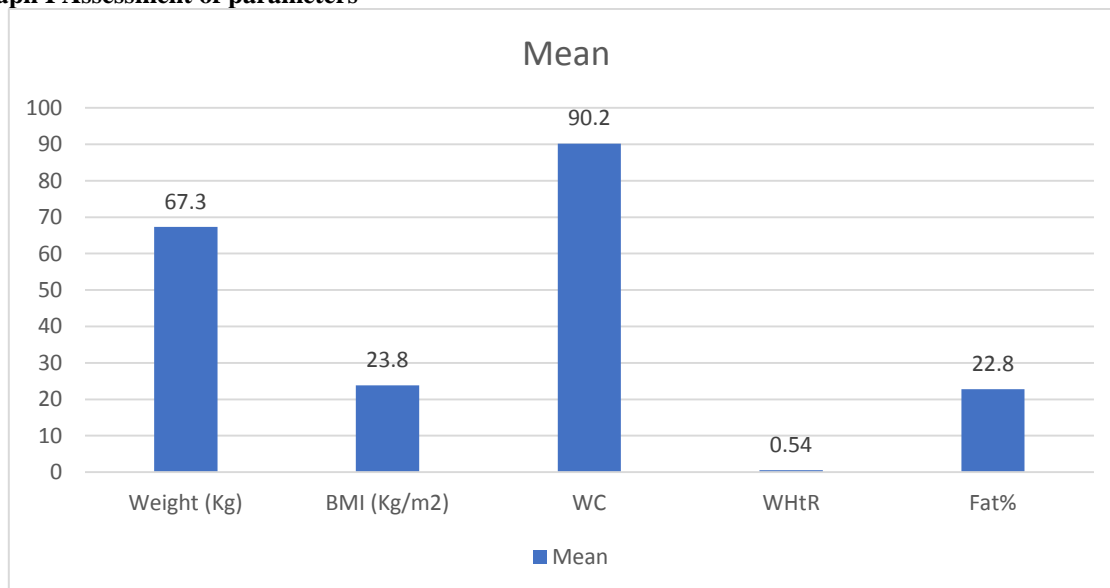| Total- 230		
Gender	Male	Female
Number	130	100

Table I shows that out of 230, males were 130 and females were 100.

Table II Assessment of parameters

Parameters	Mean
Weight (Kg)	67.3
BMI (Kg/m^2)	23.8
WC	90.2
WHtR	0.54
Fat%	22.8

Table II, graph I shows that mean weight was 67.3 Kg, BMI was 23.8 Kg/m^2, WC was 90.2, WHtR was 0.54 and fat% was 22.8.

Graph I Assessment of parameters

DISCUSSION

Obesity is a multifactorial disease that results from a combination of both physiological, genetic, and environmental inputs. Obesity is associated with adverse health consequences, including T2DM, cardiovascular disease, musculoskeletal disorders, obstructive sleep apnea, and many types of cancer.[6] The probability of developing adverse health outcomes can be decreased with maintained weight loss of 5% to 10% of current body weight. Body mass index and waist circumference are 2 key measures of body fat.[7] The present study was conducted to assess obesity indices in known population.

We found that out of 230, males were 130 and females were 100.

Ononamadu et al[8] conducted a study to assess eight anthropometric indices of obesity: body mass index (BMI), ponderal index (PI), waist circumference (WC), hip circumference (HC), waist–hip ratio (WHR), waist–height ratio (WHtR), body adiposity index (BAI) and conicity index (CI) among 436 male and 476 female. MI, WC, HC and CI were significantly higher (p < 0.05) in females than males. They observed that BMI, WHtR, WC and PI emerged the best predictors of hypertension risk, and BMI, WC and PI of prehypertension risk in this study. They recommend the simultaneous but independent use of BMI and either WC or WHtR for predicting hypertension, and BMI and WC for prehypertension risk, bearing in mind that both types of index (abdominal and general obesity) account for different forms of obesity.

We found that mean weight was 67.3 Kg, BMI was 23.8 Kg/m2, WC was 90.2, WHtR was 0.54 and fat% was 22.8. With the high prevalence of obesity and the imprecision of BMI and waist circumference alone to

135

estimate individual risk, identifying which patient to treat is an important clinical decision. Among US adults, 51.3% of overweight adults and 31.7% of obese adults are metabolically healthy, defined as having 0 or 1 cardiometabolic abnormality.[9] Obesity increases the risk for CVD predominantly through its effects on other risk factors. According to a meta-analysis of 21 cohort studies including >300 000 persons, the adverse effects of overweight on blood pressure and cholesterol levels account for ≈45% of the increased risk of coronary heart disease.[10] Conflicting data exist on whether BMI or waist circumference independently contributes to cardiovascular outcomes in addition to the predicted Framingham Risk Score. It is suggested that overweight patients with clinical markers of insulin resistance would benefit most by losing weight. Specific markers include elevated triglyceride concentration, a low high-density lipoprotein cholesterol concentration, a high ratio of triglycerides to high-density lipoprotein cholesterol, or a combination of an enlarged waist and elevated triglyceride concentration.[11]

Katiyar et al[12] estimated the risk factors leading to obesity among study population. Materials & methods: This study was conducted on 300 college students in year 2015. Subjects were informed regarding the study and consent was taken. Out of 300 subjects, males were 140 and females were 160. The difference was non - significant (P – 0.1). Subjects were underweight (males- 21, females- 24), normal weight (males- 68, females- 77), over weight (males- 20, females- 22), preobese (males- 23, females- 25) and obese (males- 8, females- 12). The difference among both genders was non- significant (P > 0.05). Thus, the prevalence of overweight subjects was 14% and obese was 6.6%. Out of 140 males, 60 were from rural and 80 were from urban population. Out of 160 females, 70 were from rural and 90 were from urban population. The difference was non - significant (P> 0.05). Subjects were of Indian origin and chinese origin. Among Indians, they were underweight (41), normal (139), over weight (37), pre- obese (46) and obese (17). Among Chinese, they were underweight (4), normal (6), over weight (5), pre-obese (2) and obese (3).

CONCLUSION
Authors found that there is need to change life style and food habits. Obesity can lead to various serious diseases.

REFERENCES
1. Sturm R. The effects of obesity, smoking, and drinking on medical problems and costs. Health Aff (Millwood) 2002; 21: 245-53.
2. Shashikiran U, Sudha V, Jayaprakash B .What is Obesity? The Medical Journal of Malaysia. 2004; 59: 10-4.
3. Ismail MN, Chee SS, Nawawi H, Yusoff K, Lim TO, James WP. Obesity in Malaysia. Obes Rev. 2002; 3: 203-8.
4. Rampal L, Rampal S, Khor GL, Zain AM, Ooyub SB, Rahmat RB, Ghani SN, Krishnan J. A national study on the prevalence of obesity among 16,127 Malaysians. Asia Pac J Clin Nutr 2007; 16: 561-6.
5. Martorell, R., Khan, L.K., Hughes, M.L. et al. 2000. Obesity in women from developing countries. Eur. J. Clin. Nutr. 54; 247- 252.
6. Boo NY, Chia GJQ, Wong LC, Chew RM, Chong W, Loo RCN. The prevalence of obesity among clinical students in a Malaysian medical school. Singapore Med J. 2010; 51: 126.
7. Gupta S, Ray TG, Saha I. Overweight, obesity and influence of stress on body weight among undergraduate medical students. Indian J Community Med. 2009; 34: 255-7.
8. Ononamadu, Godwin Okwudiri Ihegboro, PhD, Chinwe Nonyelum Ezekwesili, PhD, Onyemaechi Faith Onyeukwu, MSc, Uchenna Francis Umeoguaju,, MSc, and Obiajulu Christian Ezeigwe, Comparative analysis of anthropometric indices of obesity as correlates and potential predictors of risk for hypertension and prehypertension in a population in Nigeria. Cardiovasc J Afr. 2017; 28(2): 92–99.
9. Bogers RP, Bemelmans WJE, Hoogenveen RT, Boshuizen HC, Woodward M, Knekt P, van Dam RM, Hu FB, Visscher TLS, Menotti A, Thorpe RJ, Jamrozik K, Calling S, Strand BH, Shipley MJ. Association of overweight with increased risk for coronary heart disease partly independent of blood pressure and cholesterol levels: a meta-analysis of 21 cohort studies including more than 300,000 persons. Arch Intern Med. 2007; *167*:1720–1728.
10. Chhabra P, Grover VL, Aggarwal K, Kanan AT. Nutritional Status and Blood Pressure of Medical Students in Delhi. Ind J Comm Med. 2006; 31: 248-5.
11. Kahn HS, Valdez R. Metabolic risks identified by the combination of enlarged waist and elevated triacylglycerol concentration. Am J Clin Nutr. 2003; *78*:928–934.
12. Katiyar YC, Mishra PK. Assessment of risk factors leading to obesity among the college students: A community programme. J Adv Med Dent Scie Res 2017;5(1):59-61.