Research article

A COMPARATIVE STUDY ON LIFESTYLE AND METABOLIC PROFILE IN NORMAL AND OBESE INDIVIDUALS

* Revathi R[1], Swetha S[2], MeghalathaTS[1,] Arunakumari R[3]

[1]Lecturer, [2]Assistant professor , [3]Professor and Head , Department of Biochemistry, Karpaga Vinayaga Institute of Medical Sciences, Chinna Kolambakkam, Palayanoor, Madhuranthakam, Tamil Nadu

*Corresponding author email: revathi_3aug@yahoo.co.in

ABSTRACT

Background/Aim: The aim of the present study was to evaluate the lifestyle and metabolic profiles in normal and obese. **Material and Methods:** A cross sectional study design was employed. Information on body weight, height, body fat, food choices, diet and physical activity behavior were collected by a questionnaire among 100 obese adults aged 18-35 years and compared with healthy individuals as controls. Blood samples were collected to analyze blood glucose, heamoglobin and total cholesterol. **Result:**   Mean BMI for obese were 36.2 ± 5 About 50% reported consuming no fruits or vegetables, while 80% preferred fried food over other forms of cooked food. The majority (60%) engaged in <40 min of physical activity a day. Significant number of adults had Hb>13mg/dl. Blood glucose levels (>100) & total cholesterol levels (>200) significantly higher ($p<0.05$) in obese individuals compared to control. **Conclusions**: Dietary and physical activity behaviour of the participants were generally poor. High blood glucose and cholesterol levels found among obese compared to normal. Innovative ways to improve consumption of fruits and vegetables and increase physical activity among the obese are needed.

Keywords: BMI, Waist circumference, Obesity

INTRODUCTION

Obesity has reached epidemic proportions in India in the 21st century with morbid obesity affecting 5% of the country's population [1]. India is following a trend of other developing countries that are steadily becoming more obese. The rate of growth alarming considering that overweight and obesity is a major health problem among adults, but weight and dietary problems usually start when people are children or adolescents. There has been a steady increase in the prevalence of overweight since the mid 1960's and the drastic increase is particularly notable in recent years.[2] If obesity extends into adulthood, it puts individuals at risk for serious health consequences, including type 2 diabetes, osteoporosis and some cancers[3-6].

There are several eating patterns developed during childhood and adolescence that can have an immediate impact on overall health as well as the noted long term consequences, such as type2

diabetes. A high consumption of soft drinks and juices may contribute to an imbalance between intake and expenditure due to reduced effect on satiety as compared to solid foods. Other dietary patterns, which may be associated with increased risk of obesity in adolescents, include skipping breakfast and a low intake of fruits and vegetables. Moreover, research indicates that unhealthy dietary patterns (eg. dieting, high fat diet, fast food, limited fruits and vegetables and skipping breakfast) are linked to other high-risk activities such as tobacco and drug use. [7,8]

This study therefore sought to assess lifestyle and metabolic profile overweight/obesity as well as their nutritional status.

MATERIALS AND METHODS

The study was conducted in the department of biochemistry in Karpaga Vinayaga Institute of Medical Sciences, after the permission of the Institutional Ethics Committee, Karpaga Vinayaga Institute of Medical Sciences and further sample processing has been done after getting approval from the patient.

Study design: A cross sectional study

Study population: 100 overweight/obese individuals aged 18-35yrs were randomly selected from sub rural hospital. Normal healthy individuals with age matched controls were taken.

Exclusion criteria: Hypertension, aneamia, diabetes mellitus and other endocrine disorders.

A semi-structured questionnaire was administered to solicit information on socio-demographic variables like age and gender of individuals, educational and occupational status of parents as well as on food choices, diet and physical activity.

To assess overweight and obesity in different age groups, including adolescents, weight for height is considered statistically valid measure[9]. The preferred measure of weight for height is body mass index (BMI).

BMI is accepted internationally as a standard for the assessment of overweight and obesity in adults because it correlates very highly with body fat[10], and it is especially well suited for adolescents[9] and adults. Waist circumference was measured midway between the lowest rib and the superior border of the iliac crest with a flexible tape.

Dietary habits: To evaluate dietary habits, a semi structured questionnaire was used to solicit information on frequency of meal (breakfast, lunch, supper and snacks) consumption.

Physical activity (PA) behavior: To estimate the PA habits, individuals were asked about the number of minutes spent watching television, walking, running, skipping, bicycle riding, dancing or any indoor games.

Collection and preparation of samples:

Blood samples were collected after a twelve hour fasting period (Overnight fasting) under aseptic conditions, the obtained blood sample was centrifuged and plasma was separated.

The plasma was analysed for the metabolic parameters that includes, Glucose estimated by GOD-POD method[11], Lipid profile analysis[12], Haemoglobin by Acid Haematin method[13](SAHLI'S Haemoglobinometer).

Statistical analysis:

All the data was analyzed by using SPSS (version 16 for windows).continues variables are presented as mean values and their standard deviations (SD) and categorical variables as frequencies, percentages or proportions. For all comparisons-values<0.05 was considered statistically significant.

RESULT

Table 1: Physical profile of the participants

Variables	Normal (n=100)	Obese (n=100)	P- value
Age (years)	29.8 ±10.3	29.5 ± 9.8	0.04
BMI (kg/m²)	21.5 ± 2.0	36.2 ± 5.0	0.010
Waist circumference (cm)	35.5 ± 2.0	120.2 ± 9.0	0.010
Hip (cm)	45.2 ± 0.72	130.0 ± 8.0	
Waist/hip ratio	0.77 ± 0.05	0.92 ± 0.03	

Table 1 shows increased BMI & waist/ratio compared to controls ($p < 0.05$).The levels of BMI, Waist/Hip ratio was significantly higher ($p < 0.05$) in obese compared to normal subjects.

Table.2: Biochemical profile of the participants

Biochemical profile	Normal (n=100)	Obese (n=100)	p-value
Hb (g/dl)	13.2 ± 1.2	14.7 ± 0.9	0.05
Blood glucose (mg/dl)	87.5 ± 13.3	172.6 ± 19.2	0.02
Total Cholesterol (mg/dl)	179.6 ± 22.5	213.4 ± 30.3	0.02
Triglycerides (mg/dl)	120 ± 12.5	170 ± 20.5	0.03
HDL (mg/dl)	60 ± 25.8	35 ± 15.6	0.04
LDL (mg/dl)	95 ± 33.2	145 ± 20.2	0.02

Table 2 shows increased levels of Heamoglobin in obese compared to normal. Blood glucose and lipid profile. The levels of Blood glucose and lipid profile was significantly higher ($p < 0.05$) in obese individuals compared to normal subjects.

DISCUSSION

Evidence in recent years suggests that obesity is growing rapidly across the globe. Obesity is one of the most important health related problems facing humans today. Obesity is associated with increased mortality and morbidity through its association with cardiovascular disease[14] and a variety of related conditions such as type 2 Diabetes Mellitus, musculoskeletal problems, various malignancies and polycystic ovary syndrome[15].The increasing prevalence of obesity is a global phenomenon that is showing no signs of abatin [16.]Therefore, the public health implications of obesity and its pathological sequelea are set to become even more of a priority for future governments and health-care providers.

In our study, although we observed a regular eating pattern for most of the participants, food choices were generally poor as these participants preferred high calorie foods to diet rich in fruits and vegetables. We observed that this age group often remembered and purchased foods like French fries, sweet and salty snacks, soft drinks and fast foods. In a personal communication with some participants, they revealed that they do not consume fruits and vegetables daily because they don't find them in colleges/home.

Among various indices, the BMI was selected as an indicator for total obesity. Furthermore, in this particular population the BMI is significant and highly correlated with other indices used for estimation of total body fatness[17].The WC, the waist hip ratio was selected as an indicator of obesity since WC is easy to measure and the measurement error is low due to large circumference.

In our findings we found significantly higher hemoglobin levels among obese compared to non-obese. The mechanism underlying the relationship between obesity and hemoglobin level is not well established. It has been suggested that obese individuals have higher food consumption and therefore, ingest more iron[18] .

In our study we also found that blood glucose and total cholesterol was significantly higher in obese compared to control. However, obesity is known to be more common among individuals of poor socioeconomic status of whom their diet is usually characterized by higher carbohydrate intake[19]and high saturated fat in their diet increases chances of having weight problems[20].

Several studies have confirmed that overweight and obese are at a risk of nutrient deficiencies as a consequence of inadequate dietary intake related to poor education or social factors, eating disorders, unbalanced weight- reducing diets or comorbidities[21].

CONCLUSION

Our findings show that overweight and obese individuals have inadequate dietary and physical activity behaviors. These behaviors may have resulted in the poor nutritional status observed ie. The prevalence of averagely high BMI, High percentage body fat and high levels of heamoglobin. This suggests that obesity control to be achieved, concerned efforts of stakeholders like the family, school, community, media, government and food industry is crucial to create an environment that encourages healthy eating behaviors among the obese. Innovative ways to improve consumption of fruits and vegetables and increase physical activity among obese individuals are urgently needed.

REFERENCES

1. India facing obesity epidemic: experts. http://hindu.com/2007/10/12stories/20071012 60940600. htm).
2. Lobstein T, Baur L and UauyR. Obesity in children and young people: A crisis in public health. Obes. Rev. 2004;5(1): 4-10.
3. Reilly JJ, Methven, McDowell ZC, Hacking B, Alexander D. Health consequences of obesity. Arch. Dis. Child. 2003,88: 748-52
4. Viana V, Sinde S and Saxton JC .Children's eating behavior questionnaire: Associations with BMI in Portuguese children. Brit. J. Nutr., 2008.100:445-450.
5. Freedman DS, Khan LK, Dietz WH, Srinivasan SR, Berenson GS. Relationship of childhood obesity to coronary heart disease risk factors in adulthood: The bogalusa heart study. Pediatrics, 1997; 108: 712-18.
6. Must A, Jacques PF,Dalal CE, Bajema CJ, Dietz WH. Long- termmorbidity and mortalityo f overweighta dolescentsN. Eng J Med. 1992 ;327:1350 – 55.
7. Heald F. Fast food and snack food: beneficial or deleterious. J Adol Health. I 992:l 3:380-383.
8. LytleL A, Roski J, Un healthy eat in agndo their risk- takin behavior: are they related? Annals New York Academy of Sciences. 1997 : Bl7 496.
9. Himes JH, Dietz WH. Cuidel inesfor over weight in adolescent preventive services: Recommendat ions from an expert commrttee Am J Clin Nutr. l994; 5 9 : 3 0 7 – 3.
10. Guillaume M . Def in obesity in childhood: current practice. Am J Clin Nutr. 1999;70 (l2):6l -13 0
11. Carl A.Burtis, Edward R.Ashwood, Estimation of glucose by glucose oxidase

method.Tietz., Text book of clinical chemistry.1994,chapter 24:778-780.

12. Carl A.Burtis, Edward R. Ashwood, Measurement of lipids, lipoproteins and apolipoproteins Tietz.,Text book of clinical chemistry [3rd] edition.1994,chapter 25:837-845.

13. G.K. & Pal, Pravati, Sahli's acid heamatin method.Text book of practical physiology 2nd edition.2006:13.

14. Hubert HB, Feinleib M, McNamara PM, Castelli WP. Obesity as an independent risk factor for cardiovascular disease: a 26-year follow-up of participants in the Framingham Heart Study. *Circulation* 1983, 67:968-77.

15. TM Barber, MI McCarthy, JA Wass, S Franks: Obesity and polycystic ovary syndrome. Clin Endocrinol (Oxf) 2006, 65:137-45.

16. Bessesen DH. Update on obesity. J Clin Endocrinol Metab 2008, 93:2027-34.

17. Khalid MEM, Mahmoud MSW, Elbagir MahmadK. Fat indices in high and low altitude populations in south western soudi Arabia. Ann Saudi Med 1997;17:312-15

18. Camitta BM, Nathan DG. Anemia in adolescence. Postgrand Med J 1975;57:151-155

19. Theodore B.health implications of overweight and obesity in the unitedstates. Ann intern Med 1985;103:983-88

20. Katherine M, Flegal et al. Journal of American medical association prevalence and trends in obesity among U.S adults 1999-2008; January 20,2010.

21. Allard J. Should nutritional status be routinely assessed and corrected before bariatric surgery? Nat Clin Pract Gastroenterol Hepatol. 2007;4:130–31