

ORIGINAL RESEARCH

## STUDY OF CLINICO-SOCIAL & PROFILE OF YOUNG OBESE INDIVIDUALS AT A TERTIARY HOSPITAL

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### ABSTRACT

**Background:** Obesity can alter lipid and carbohydrate metabolism. There is an epidemic rise in obesity in the country. Dyslipidemia (DLP), type 2 diabetes mellitus (DM) and impaired fasting glucose (IFG) has been recognized as a common complication of obesity. Present study was aimed to study clinico-social profile of young obese individuals at a tertiary hospital.

**Material and Methods:** Present study was single-center, descriptive, observational study, conducted in young individuals (18-40 years age group), with BMI  $\geq 25\text{kg/m}^2$ .

**Results:** Among 150 young obese individuals, common age group was between 36 -40 years of age (53.3 %) and the mean age was  $34.43 \pm 3.76$  years. Majority were male (62 %) as compared to female (38 %). Majority cases were in the BMI group of 25-30  $\text{kg/m}^2$  (74%) as compared to  $> 30 \text{kg/m}^2$  (26%). High risk factors such as alcohol consumption (38 %), smoking (43.3 %) & family history of obesity (25.3 %) were also noted. The most common associated comorbidity was dyslipidemia found in 12.7% of cases followed by obstructive sleep apnea (OSA) in 8.7% and then impaired fasting glucose in 8% of cases. 69.3% of cases had no history of comorbidities It was found that impaired fasting glucose was seen in 53.3% of cases where as only 11.3% were having type 2 diabetes mellitus. In this study, it was found that dyslipidemia was seen among 82% of the cases. High TC, LDL and TC/HDL-C ratio was found in 3.3%, 22% and 62.7% of subjects, respectively. Percentage of hypertriglyceridemia was 36.7% among the cases. Low HDL was found in 33.3% of subjects.

**Conclusion:** Young obese individuals are prone for altered fasting blood sugar (impaired fasting glucose &/and type 2 diabetes mellitus) & dyslipidemia (hypertriglyceridemia and high TC/HDL-C).

**Keywords:** Obesity, Impaired fasting glucose, Type 2 diabetes mellitus, Dyslipidemia.

## INTRODUCTION

Obesity is a state of excess adipose tissue mass in the body. The word obesity derived from Latin word “obesitas” points to the most common behavioral condition leading to obesity, ie “overeating”.<sup>[1]</sup> In India, 1.3 per cent males and 2.5 per cent females aged more than 20 years were obese in the year 2008.<sup>[2]</sup> This can be due to increased accessibility to processed food. This, combined with rising middle class incomes, is increasing the average caloric intake per individual among the middle class and above households.<sup>[3]</sup>

Three simple measures of obesity are widely used in clinical practice; BMI, WC and WHR. The most widely used method to define thinness and fatness is BMI, a ratio of weight in kilograms divided by height in meters square (kg/m<sup>2</sup>). It has been correlated to morbidity and mortality risk in various populations.<sup>[4]</sup> A disease practically unheard a few years back is now considered to affect even the younger age group. Obesity can alter lipid and carbohydrate metabolism. There is an epidemic rise in obesity in the country. Dyslipidemia (DLP), type 2 diabetes mellitus (DM) and impaired fasting glucose (IFG) has been recognized as a common complication of obesity.<sup>[5]</sup> Obesity and its complications can lead to various cardiovascular disease making early detection and prevention important. Present study was aimed to study clinico-social profile of young obese individuals at a tertiary hospital.

## MATERIALS & METHODS

Present study was single-center, descriptive, observational study, conducted in department of general, at XXX medical college & hospital, XXX, India. Study duration was of 2 years (September 2014 to April 2016). Study was approved by institutional ethical committee.

### Inclusion criteria:

- Young individuals (18-40 years age group), with BMI  $\geq 25\text{kg/m}^2$  attending outpatient and inpatient services

### Exclusion criteria:

- Subjects suffering from diseases like cirrhosis, congestive cardiac failure, tuberculosis, and renal diseases.
- History of drug intake like steroids, anti-epileptics, antipsychotics, oral contraceptive pills.
- Subjects who is on treatment for obesity, diabetes mellitus and dyslipidemia.
- Pregnant or lactating women.
- Proven cases of Cushing’s disease, hypothyroidism, acromegaly, polycystic ovarian disease and hypogonadism.

A detailed questionnaire was administered to all study subjects to collect information regarding demographic, socioeconomic, behavioral, and health status. Fasting blood sugar (FBS) of all subjects was estimated to diagnose diabetes mellitus and impaired fasting glucose. Fasting lipid profile (FLP) of all the subjects was done to note lipid profile abnormalities.

Data was collected and compiled using Microsoft Excel, analysed using SPSS 23.0 version. Statistical analysis was done using descriptive statistics.

**RESULTS****Table 1: Age & gender distribution**

| Characteristics          | Number of subjects | Percentage |
|--------------------------|--------------------|------------|
| Age group (years)        |                    |            |
| 18 – 25                  | 4                  | 2.7        |
| 26 – 30                  | 30                 | 20.0       |
| 31 – 35                  | 36                 | 24.0       |
| 36 – 40                  | 80                 | 53.3       |
| Gender                   |                    |            |
| Female                   | 57                 | 38.0       |
| Male                     | 93                 | 62.0       |
| BMI (kg/m <sup>2</sup> ) |                    |            |
| 25-30                    | 111                | 74         |
| >30                      | 39                 | 26         |

In present study, 96.7% of subjects consumed both veg and non-veg diet. Family history of obesity was seen in 25.3% of cases. High risk factors such as alcohol consumption (38 %), smoking (43.3 %) & family history of obesity (25.3 %) were also noted. The most common associated comorbidity was dyslipidemia found in 12.7% of cases followed by obstructive sleep apnea (OSA) in 8.7% and then impaired fasting glucose in 8% of cases. 69.3% of cases had no history of comorbidities.

**Table-2: Lifestyle related parameters**

| Parameters                       | Number of subjects | Percentage |
|----------------------------------|--------------------|------------|
| Type of diet                     |                    |            |
| • Veg and non-veg                | 145                | 96.7%      |
| • Veg                            | 5                  | 3.3%       |
| Alcohol consumption              | 57                 | 38.0%      |
| Smoking                          | 65                 | 43.3%      |
| Family history of obesity        | 38                 | 25.3%      |
| Regular exercise                 | 7                  | 4.7%       |
| Comorbidities                    |                    |            |
| • Dyslipidemia                   | 19                 | 12.70%     |
| • Obstructive sleep apnea        | 13                 | 8.70%      |
| • Impaired Fasting Glucose       | 12                 | 8.00%      |
| • Type 2 Diabetes mellitus       | 10                 | 6.70%      |
| • Gallstones                     | 10                 | 6.70%      |
| • Genitourinary disease in women | 8                  | 5.30%      |
| • Hypertension                   | 4                  | 2.70%      |
| • Impotence                      | 1                  | 0.70%      |
| • Osteoarthritis                 | 1                  | 0.70%      |
| • Liver disease                  | 1                  | 0.70%      |

The most common cutaneous manifestation of obesity in the study group was acanthosis nigricans which was present in 16.6% cases followed by hirsutism and skin folds in 12.6% and 9.33% cases, respectively.

**Table 3: Frequency of cutaneous manifestations**

| Cutaneous manifestations | Number of subjects | Percentage |
|--------------------------|--------------------|------------|
| Acanthosis nigricans     | 25                 | 16.66      |
| Skin folds               | 14                 | 9.33       |
| Hirsutism                | 19                 | 12.66      |

In our study, it was found that impaired fasting glucose was seen in 53.3% of cases where as only 11.3% was having type 2 diabetes mellitus. In this study, it was found that dyslipidemia was seen among 82% of the cases. High TC, LDL and TC/HDL-C ratio was found in 3.3%, 22% and 62.7% of subjects, respectively. Percentage of hypertriglyceridemia was 36.7% among the cases. Low HDL was found in 33.3% of subjects.

**Table 4: Fasting sugar & lipid profile**

| Fasting sugar & lipid profile |                          | Frequency | %      |
|-------------------------------|--------------------------|-----------|--------|
| Fasting Blood sugar           | Normal                   | 53        | 33.4 % |
|                               | Impaired fasting glucose | 80        | 53.3%  |
|                               | Diabetes mellitus        | 17        | 11.3%  |
| TC                            | Normal                   | 104       | 69.3%  |
|                               | Borderline               | 41        | 27.3%  |
|                               | High                     | 5         | 3.3%   |
| TG                            | Normal                   | 95        | 63.3%  |
|                               | High                     | 55        | 36.7%  |
| LDL                           | Normal                   | 29        | 19.3%  |
|                               | Near optimal             | 42        | 28.0%  |
|                               | Borderline               | 46        | 30.7%  |
|                               | High                     | 33        | 22.0%  |
| HDL                           | Low                      | 50        | 33.3%  |
|                               | Normal                   | 97        | 64.7%  |
|                               | High                     | 3         | 2.0%   |
| TC:HDL                        | Normal                   | 56        | 37.3%  |
|                               | High                     | 94        | 62.7%  |
| VLDL                          | Normal                   | 130       | 86.7%  |
|                               | High                     | 20        | 13.3%  |

In the study most cases were in the BMI group of 25-30 kg/m<sup>2</sup> with occurrence of 74%. Out of which 48.6% were in the age group of 36-40 years. In this study, it was found that 82.8% of males and 59.6% females were in the BMI range of 25-30 kg/m<sup>2</sup>. In this study most cases were having abdominal obesity with occurrence of 92%. Out of which 54.3% were in the age

group of 36-40 years. In our study it was found that 98.9% of males and 80.7% of females were having associated abnormal waist hip ratio (WHR). 52.9% of DM cases were in the BMI group of 25-30 kg/m<sup>2</sup> and 47.1% of DM cases were seen among BMI of >30 kg/m<sup>2</sup>. In this study, 69.9% of cases with dyslipidemia were in the BMI range of 25-30 kg/m<sup>2</sup>. 93.5% of cases with DLP were having abnormal WHR.

## DISCUSSION

Obesity is a leading cause for increasing mortality and morbidity worldwide. As per data released by WHO, in 2008 there were about 1.4 billion overweight persons aged 20 years and above, with at least 500 million adults being obese.<sup>[1]</sup> In young individuals, problem of obesity/overweight is on rise and its association with rapid urbanization, unhealthy eating patterns and reduced physical activity.<sup>[7]</sup>

Depending on the degree and duration of weight gain, obesity can progressively cause and/or exacerbate a wide spectrum of co-morbidities, including type 2 diabetes mellitus, hypertension, dyslipidemia, cardiovascular disease, liver dysfunction, respiratory and musculoskeletal disorders, infertility, psychosocial problems and certain types of cancer.<sup>[8]</sup>

These chronic diseases have been shown to hold strong correlations with BMI and closely follow the prevalence patterns of excessive body weight in all studied populations.<sup>[9]</sup>

Studies in South Asian, Japanese and Chinese populations have demonstrated significantly higher risk for insulin resistance (IR), type 2 diabetes mellitus (DM) and cardiovascular disease (CVD) compared to matched overweight and obese Caucasians.<sup>[10]</sup>

In this study, the disease occurrence was found to be predominantly in the fourth decade with a mean age of 34.43 years. Similar findings were noted by Termizy HM et al,<sup>[11]</sup> where mean age was found to be 39.5 years. The disease burden was mainly found to be distributed among adults who comprise the predominant working class of the population. Among the total 150 subjects, the disease incidence was mainly distributed among male population (62%). Chehrei A et al,<sup>[12]</sup> noted that female population (55.1%) was slightly more than males (44.9%).

In the present study the most common associated comorbidity was dyslipidemia (12.7%) followed by obstructive sleep apnea (8.7%) and then impaired fasting glucose (8%). A study conducted by Khurram et al,<sup>[13]</sup> showed that dyslipidemia (76%) was the most common associated comorbidity followed by hypertension (71%), type 2 diabetes mellitus (65%), gallstones (57%), coronary artery disease (49%), obstructive sleep apnea (35%) and stroke (14%). Incidence of associated comorbidities in present study was much lower than Khurram M et al, This could be possible because the above study included study subjects between the age group of 50 to 59 years. Hence, it warns the young obese group for higher risk of disease burden as age advances. In a study conducted by Patil VC et al, showed that high BMI among both sex groups had strong correlation between obesity/overweight and various coronary risk factors.<sup>[14]</sup>

Acanthosis nigricans is also an indicator of insulin resistance and is a common occurrence in obese individuals. Divyashree R A et al,<sup>[15]</sup> which showed that incidence of acanthosis nigricans was higher (67.6%) followed by skin folds (45%). The most cutaneous manifestation of obesity in present study was acanthosis nigricans (16.6 %), followed by hirsutism and skin folds in 12.6% and 9.33% cases, respectively. There is an important and

well established clinical association between obesity with dyslipidemia, impaired fasting glucose and type 2 diabetes mellitus. In a study done by Nichols GA et al,<sup>[16]</sup> showed that there is progression of patients with impaired fasting glucose into type 2 diabetes mellitus in less than three years. In our study 53.3% of cases were having IFG and hence at a high risk of progression to type 2 diabetes mellitus. There is a well-documented association between obesity and type 2 diabetes mellitus. In a study done by Dunsten DW et al,<sup>[17]</sup> concluded that prevalence of diabetes is rising drastically and they have attributed its close association with obesity. Dyslipidemia are disorders of lipoprotein metabolism, including lipoprotein overproduction and deficiency which is associated with obesity regardless of ethnic group. They may be marked as one or more of the following: elevated TC, LDL Cholesterol, and TG levels or as decreased HDL Cholesterol level with promotion of insulin resistance causing metabolic syndrome in obesity.<sup>[18]</sup>

Obesity has been found to be associated with increase in plasma triglycerides. The characteristic pattern observed consists of elevated serum LDL cholesterol and TG's and lowered HDL cholesterol levels. In our study subjects, lipid profile was typical of an atherogenic dyslipidemia with its significant association with obesity (82%). High total cholesterol, LDL cholesterol and TC/HDL-C ratio was found in 3.3%, 22% and 62.7% of subjects, respectively. Percentage of hypertriglyceridemia was 36.7% among the cases. Low HDL was found in 33.3% of subjects.

In a study conducted by Gupta et al,<sup>[19]</sup> showed that there was significant correlation between dyslipidemia and obesity in the form of increase in mean total cholesterol, TC/HDL-C ratio, and triglycerides and decline in HDL cholesterol levels. In another study, there was high prevalence of dyslipidemia among obese individuals in the form of reduced high density lipoprotein and high triglyceride.<sup>[11]</sup>

Since the prevalence of impaired fasting glucose was high in our study there is still a high risk for progression of these patients into type 2 diabetes mellitus. Hence a strong health education including life style modification as a part of primary prevention is mandatory.

## CONCLUSION

Young obese individuals are prone for altered fasting blood sugar (impaired fasting glucose &/and type 2 diabetes mellitus) & dyslipidemia (hypertriglyceridemia and high TC/HDL-C). Also, a direct proportional relationship exists between dyslipidemia and impaired fasting glucose with the degree of obesity.

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