



An Overview On Obesity: A Review

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ABSTRACT

Obesity is a worldwide issue; it depends on the number of conditions in which excess body fat of individual can lead to various complications. In India, the occurrence of obesity is growing continuously. It is defined as excessive deposition of fat in adipose tissue and can be easily diagnosed by checking Body Mass Index (BMI) of individual. Body Mass Index is independent of all age and same for both the gender. Obesity is a risk factor for most of the metabolic syndrome like Hypertension, Certain types of cancer (endometrial, breast, prostate, and colon), Type II Diabetes Mellitus, Dyslipidemia, Heart disease, Stroke, Gallbladder disease, respiratory problems, Sleep Apnea, Osteoarthritis (joint pain) and lack of fertility, even individual experience inequity, injustice and stigma which affect their psychological and physical health. There are several drugs which can be used to treat other morbidities and can cause weight gain as their adverse effects. Medication inducing weight gain can be depressing to the patients; in such a situation alternative therapy is suggested. It's a severe and neglected situation by the population. In spite of the significant effect of obesity, losing weight can result in considerable decrease in the complication for most of these co-morbid situations. Some fundamental management for overweight and obese patients involve behavioral change, regular physical activity, diet and nutrition, counseling about the safe and effective weight loss with a prominence on long duration weight management rather than short duration extreme or sudden weight decrease. In general, this review concentrates on complications related to obesity, its diagnosis and management for overweight and obesity.

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INTRODUCTION

Obesity is non-communicable diseases, called "New World Syndrome" and it's a global problem (Kalra

and Unnikrishnan, 2012; Consulation, 2000). Obesity is defined as an excessive deposition of fat in adipose tissue, which can damaged the health of individual. The circulation of fat in the body affect the weight and risks related with obesity. It touches all age groups (Consulation, 2000).

It's not normal to be heavier than average and can lead to various complications to the body. 'complex obesity' is defined as a BMI more than 35 kg/m² with at least one obesity related co-morbidity (Nield and Kelly, 2016). The country had already started witnessing the overweight and obesity problem in metropolitan cities (Neves *et al.*, 2017; Kalra *et al.*, 2012).

According to the World Health Organization (WHO),

there may be around 2.3 billion overweight at the age of 15 years and above and around 700 million obese all over the world in the year 2015. It's a 5th foremost risk for deaths resulting in approximately, deaths of 2.8 million adults annually worldwide (Pi-Sunyer, 2009). Morbid obesity has not yet become a public health priority in India but it's difficult problem in developing countries (Gouda and Prusty, 2014).

India has around 30 million obese citizens, and the counts are increasing severely (Puhl and Heuer, 2010). This is more commonly seen in women than in men (Kalra et al., 2012; Behl and Misra, 2017). In metropolitan cities of India, over 23% of women are either overweight or obese, which is higher than the occurrence amongst men (20%) (Kalra et al., 2012).

India is undergoing rapid economic evolution (Shukla, 2002). The frequency of obesity in India is growing endlessly and recent statistics shows that 13% to 50% of the metropolitan population suffers from obesity. In men, the occurrence of weight below and above normal showed similarity by comparing to their economic status, education and age but in women occurrence of overweight was more than underweight (Kalra and Unnikrishnan, 2012). Adoption of sedentary lifestyle and use of energy dense foods results in obesity. The distribution of body mass index (BMI) broadly represents urban Indian population in relation to the tobacco use, age and literacy (Shukla, 2002).

COMPLICATION

The rise in obesity has led to increase in relation with the co-morbidities like, Hypertension, Certain types of cancer (endometrial, breast, prostate, colon), Type II diabetes mellitus, Dyslipidemia, Heart disease, Stroke, Gallbladder disease, respiratory problems, Sleep apnoea, Osteoarthritis (joint pain) and lack of fertility (Neves et al., 2017; Lyznicki et al., 2001). Raise in stigma, Emotional distress and social discrimination towards obese patients may results in serious risks to their physical health and psychological behavior (Puhl and Heuer, 2010; Behl and Misra, 2017; Lyznicki et al., 2001).

The relation of obesity with type 2 diabetes mellitus has been documented from last 10 years. Insulin resistance/ sensitivity and hyperinsulinemia caused by obesity is a long-recognized phenomenon with its basic scientific and clinical consequence (Kalra and Unnikrishnan, 2012; Kahn and Flier, 2000).

India is one of the capitals of diabetes and cardiovascular diseases (Gouda and Prusty, 2014). In women with raise of 5 to 8kg weight, the relative risk for

was 1.9 and for those with an increase of 8kg to 11kg weight, the relative risk for diabetes was 2.7. In comparison, risk of diabetes can be reduced to 50% by losing 5kg weight (Neves et al., 2017). The Framingham Heart Study calculated the outcome of obesity (BMI \geq 30 kg/m²) which can increase the complication of cardiovascular disease (CVD) [stroke, myocardial infarction (MI), angina or coronary heart disease (CHD)], hypercholesterolemia, and hypertension and Type II diabetes mellitus.

Table 1: Classification of weight according to body mass index (BMI)

BMI Range	Obesity Class
Less than 18.50 kg/m ²	Under Weight
18.50- 24.99 kg/m ²	Normal Weight
25 - 29.99 kg/m ²	Pre- Obesity
30 - 34.99 kg/m ²	Obesity Class I
35 - 39.99 kg/m ²	Obesity Class II
More than 40 kg/m ²	Obesity Class III

A combination of commonly associated cardiovascular risk factors is known as metabolic syndrome (MetS). Abdominal fat combined with high systolic and diastolic pressure, increased fasting blood sugar level, triglycerides, and low high-density lipoprotein (HDL) cholesterol levels and risk of cardiovascular mortality characterize metabolic syndrome. A prospective study of 3051 aged men participants showed interconnection between physical immobility, obesity, smoking and increased amount of carbohydrate in diet with presence of coronary heart disease (CHD) and diabetes mellitus (DM).

Obesity is strongly related to increased risk of Osteoarthritis (OA), which has a force on patient's activity, impairment and lost productivity due to ill health in early life. Weight loss has been shown to significant improvement in obese patient. Acute pancreatitis and Non-alcoholic fatty liver (NHFLD) disease is closely related with obesity and which can further lead to confined complications, organ failure, and death.

Obstructive sleep apnoea (OSA) is sign of upper airway obstruction which occurs during sleep on repetitive basis. The common characteristics of OSA are fragmented sleep, daytime sleepiness, repetitive hypercapnia /hypoxemia, loud snoring and many other complexities. Even if the rate of recurrence of OSA in middle-aged is 2% to 3% in female and 4% to 5% in male, the occurrence between obese patients is 30% and the morbidly obese ranges from 50% to 98%. Therefore, obesity is the significant complication for expansion or growth of OSA. Major depres-

sive disorder (MDD) has also been documented with obesity, even though it's indecisive and there are some antidepressant medication which are correlated to weight gain (Neves *et al.*, 2017).

There are several other drugs which cause weight gain as there adverse effects. Drugs which are used to treat other morbidities may also cause weight gain. Drugs for diabetes like insulin and sulfonylureas, anti-psychotic drugs such as phenothiazine, clozapine and olanzapine, drugs use for depression such as tricyclic antidepressants appear to be related to higher amount of weight gain, anti-hypertensive drugs like beta-blockers, corticosteroids like prednisolone and epilepsy drug like phenothiazine (Consulation, 2000; Wharton *et al.*, 2018).

Premature menstruation, adolescent pregnancy, premenopausal and lack of schooling are also the complication for the occurrence of morbid obesity in women of reproductive period. Women who are obese are likely to undergo infertility treatment (Consulation, 2000; Pi-Sunyer, 2009). Various prospective studies on large scale have explained a convincing and active relationship between increase BMI and carcinoma. Obesity is not dependent exposure for cardiovascular diseases (CVD), defined as including myocardial infarction (MI), stroke, angina pectoris, congestive heart failure (CHF), coronary heart disease (CHD) atrial fibrillation and hypertension (Neves *et al.*, 2017; Puhl and Heuer, 2010). In general, results from different observational and prospective studies established a clear injurious effect of obesity on cardiovascular diseases (CVD). The more common clinical findings like diabetes mellitus, Hypertension and cardiovascular diseases were more common with participants having BMI more than 30 kg/m² to normal participants (Neves *et al.*, 2017).

Diagnosis

The increasing number co-morbidities causes economic burden on the individual. Hence, it is important for medical professionals in India to analyze and initiate early treatment to stop the progressive increase in body weight and development of co-morbidities (Behl and Misra, 2017).

The body fatness can be measured by using weight for height or body mass index (BMI). It's the simplest and commonly used method to determine under, normal and overweight (Puhl and Heuer, 2010).

According to World Health Organization (WHO), there is a standard classification and calculation based on BMI. The classification of weight according to body mass index is given in Table 1.

Body mass index of 25.0 kg/m² to 29.9 kg/m² is

known as overweight; a body mass index of 30.0 kg/m² or more is known as obesity. The measurements of waist should not be more than 40 inches (102 cm) in male or 35 inches (89 cm) in female as it can increase the risk of co-morbidities with obesity (Lyznicki *et al.*, 2001).

Other method to assess overweight and obesity apart from body mass index and waist circumference there are underwater weighing, waist hip ratio (WHR), isotope dilution, bioelectrical impedance, dual energy X-ray absorptiometry (DEXA), skin fold thickness computer tomography, ultrasound, magnetic resonance imaging, energy intake, computer tomography Energy expenditure are other diagnostic method (Puhl and Heuer, 2010).

Treatment

Obesity is a serious disease and it's unavoidable. It is mainly curable through change in standard of living (Kalra *et al.*, 2012). Development brings urbanization and which lead to high standard of living with reduction in physical activity, increase co-morbidity with obesity and finally bariatric surgery for severe cases of obesity. This article will focus on taking steps to avert the occurrence of obesity (Gouda and Prusty, 2014).

Medications for obesity require to be used on a daily basis and for a long period to achieve significant weight loss. In three months, Patients who do not achieve 5% of initial weight loss are too supposed to leave the treatment (Behl and Misra, 2017).

The pharmacological treatment given to the patient having BMI ≥ 27 kg/m² in existence of obesity-related complications or diseases and to the patient having BMI ≥ 30 kg/m² (Lyznicki *et al.*, 2001).

Drugs approved by US Federal Drug Administration (USFDA) for weight loss include orlistat, lorcaserin, liraglutide, bupropion-naltrexone combination and phentermine-topiramate combination. Out of these, drugs, liraglutide and orlistat are available in India. As guidelines recommended by Asian Indians patient with severe obesity that is BMI ≥ 37.5 kg/m² and with co-morbidities BMI ≥ 32.5 kg/m² should advise bariatric surgery (Behl and Misra, 2017).

Goals should be prepared to shed weight, around 0.5kg to 1kg per week for six months. Motivate for low-calorie diets and physical activity which will be helpful for overweight and obese adults. For weight loss, 500 to 1,000 kcal per day should be reduced for desired weight loss (Jacob and Isaac, 2012).

Physical activity may help out in reduction of stomach fat, weight loss and weight maintenance. It will enhance cardio respiratory fitness and immune

system. Set a long duration target and take out partially 30 minutes or more for moderate to high intensity workout. Assess patient incentive and implement the weight management plan like Self-monitoring, Stimulus control, Slower eating, marked ideal weight, proper exercise, Behavioral counseling, Social support and Education about obesity and nutritional food (Jacob and Isaac, 2012).

Lifestyle modification like increased physical activity, following certain diets and behavior management is considered a core of weight management (Wadden *et al.*, 2001).

According to Indian tradition, overweight and obesity may be tackled by going walking, yoga, meditation, maternal nutrition and the traditional Indian folk dance systems (Gouda and Prusty, 2014). Costs of beverages and calorie-dense foods have come down intensely in comparison to the costs of vegetables, fish, fresh fruits and dairy items. Providing unhealthy foods, with increased portion sizes and decreased cost have developed led to weight gain tremendously (Puhl and Heuer, 2010).

According to this article, evaluation and execution of overweight and obese patient can be followed like this: BMI of the patient is measured, if it is more than $25\text{kg}/\text{m}^2$ and waist circumference more than 89cm in female and 102 in male than assess the risk for any present co-morbidities. If the BMI is $\geq 30\text{kg}/\text{m}^2$ with increased waist circumference and presence of two or more risk factors then advise goals and treatment for weight loss and control the complication related to obesity. Check the weight from time to time and educate patient about weight management and maintenance through counseling (Lyznicki *et al.*, 2001).

LITERATURE REVIEW

In this study, weight (expressed in BMI) of women was higher than compared to men. In male patient, risk of skinniness and overweight were similar but in female patient, risk of overweight was more than compared to skinny women. 0.2 % of female had BMI more than $40\text{kg}/\text{m}^2$. In a study showed, female in Mumbai has higher number of overweight (37.5%). Another study in Delhi showed, male (23-25%) overweight, whereas female (35 -60%). Literacy rate were high in both the cities. By this trial, it was found that skinniness and overweight are prevalent in urban population and need to attend both portion and identify the interventions (Shukla, 2002).

In presence of 288 participants, they started the prospective cohort study. They assess the patient

for 12 weeks and 24 weeks for weight loss and have seen statistically significant decline ($p < 0.001$). There was absolutely weight loss from baseline. The patient who attended the appointment reduced weight. Physical activity levels, fruits and vegetable intake (FVI) and Rosenberg self esteem were all elevated from baselines of 12 and 24 weeks of study. This study shows that SCWMP (specialist community weight management program) was a successful way of encouraging weight management and developing long term benefit. They concluded with the statistics of the patient who attended there designed sessions and over 80% of the patient prevented by weight gain, regardless of their sex, age and background (Nield and Kelly, 2016).

An overall of 357 female were convinced taking part in this case-control trial; however, 137 participants were excluded. Therefore, 220 women were included, with 110 morbid obesity cases and 110 non-obese controls with adequate BMI. Physical activity was more prevalent ($P < 0.001$) among women with morbid obesity. Alcohol consumption was also more prevalent among women with morbid obesity. This data showed an association of premature menstruation, adolescent pregnancy and low education with increased weight in women aged 20 to 49. This study also confirms the strong relationship between morbid obesity and some non-communicable diseases, even during reproductive ages. Related outcome were found in a cross-sectional study of 1,273 Iranian girls that found an association of early menarche with greater adiposity and body fat. Study found that girls who had early menarche had a decreased height, elevated BMI, greater fat percentage and bulkier waist circumference compared to other girls. Girls who continue schooling are less likely to become pregnant. In addition, when pregnant, many of them end up quitting their studies and risk their own economic potential and other opportunities. A higher educational level could be related to better eating habits and a healthier lifestyle, which may contribute to maintaining the ideal weight for women (Pi-Sunyer, 2009).

CONCLUSIONS

Increase in BMI distribution is mostly observed in urban population because of unhealthy lifestyles. Reduction in weight and maintaining BMI ($18.50\text{kg}/\text{m}^2$ - $24.99\text{kg}/\text{m}^2$) will give progressive effect in improving co-morbidities related to obesity and raise quality of life. Adherence to diet and exercise by counseling to patient on physical, nutritional and behavioral therapy can help in

weight loss management. Lifestyle modification can increase the life expectancy.

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