



## Review Article

## Obesity, its affecting factors and dietary approaches

Pooja Dubey<sup>1,\*</sup>, Ritu Singh<sup>2</sup>, Khusboo Kumari<sup>1</sup>, Jitendra Patel<sup>1</sup>, Archana Kumari<sup>1</sup><sup>1</sup>Dept. of Anatomy, Institute of Medical Sciences BHU, Varanasi, Uttar Pradesh, India<sup>2</sup>Dept. of Dietetics, Jagrani Hospital, Lucknow, Uttar Pradesh, India

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## ABSTRACT

Obesity is a globally affected lifestyle and multi factorial disorder, that is usually related to many other significant diseases like diabetes, hypertension, cardiovascular diseases, osteoarthritis and certain cancers. One in three people has been suffering from obesity all over the world (Global nutrition report 2020). The management of obesity with its comorbidities will therefore require a comprehensive range of strategies that specialize in those with existing overweight problems and also at high risk of developing obesity. Different literature reviews are considered regarding different approaches as prescribed drugs, bariatric surgery, etc., for weight loss, have their certain side-effects except for dietary approaches. Hence, in this study, prevention of obesity by nutrients intake and timing interplay with a proper dietary approach will be considered in priority, as it is a risk of persistence to all age-group populations. This article highlights various preventive aspects, factor influence and treatment procedures of obesity with special emphasis on the recent research manifolds.

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## 1. Introduction

Severe obesity is often associated with the prevalence of binge eating disorder, never relaxing or slackening, incessant hunger without sensations of satiety which leads to chronic eating disorders.<sup>1</sup> Obesity is usually defined by the estimation of the body mass index (BMI). The BMI is calculated as weight/height, the weight is in kilograms and the height in meters. While the BMI does correlate with body fat as the weight can be of different aspect in form of body water, bone weight or visceral fat, in obese, a normal BMI may conceal underlying excess accumulation of fat. It can also be estimated by assessing waist-hip circumferences, skin fold thickness in the triceps, biceps, sub scapular and supra-iliac areas. A Dual-energy X-ray absorptiometry can also be used to assess total body composition and fat mass.<sup>2</sup> Body mass index (BMI) is a standard screening tool for obesity that is calculated by using weight in kilograms divided by the square of height in meters.<sup>3,4</sup> According to

BMI range of obesity are in different categories as less than 18.5 kg/m<sup>2</sup>, 18.5 kg/m<sup>2</sup> to 24.9 kg/m<sup>2</sup> and 25 kg/m<sup>2</sup> to 29.9 kg/m<sup>2</sup> BMI range are comes within Underweight, Normal range, Overweight, and Obese range respectively. While obese subjects are further divided in three more categories, i.e.,

1. 30 kg/m<sup>2</sup> to 34.9 kg/m<sup>2</sup> as Class I obese,
2. 35 kg/m<sup>2</sup> to 39.9 kg/m<sup>2</sup> as Class II obese,
3. and more than 40 kg/m<sup>2</sup> are consider Class III Obese,

Ideally, between 0.8 or less and 0.95 or lesser the waist-to-hip ratio should be considered significant in women and men respectively.<sup>5</sup> Further evaluation studies like skin fold thickness, bioelectric impedance analysis, CT (computerized tomography), MRI (Magnetic resonance imaging), DEXA (dual-energy X-ray absorptiometry), water displacement, and air densitometry studies have been used as evidence for researchers.<sup>6,7</sup> Associated medical complications from obesity can be evaluated by different laboratory studies include complete blood picture, the basic

\* Corresponding author.

E-mail address: [Pujadubey8898@gmail.com](mailto:Pujadubey8898@gmail.com) (P. Dubey).

metabolic panel as an electrolyte and fluid balance, renal function, liver function study, lipid profile, HbA1C, TSH, vitamin D levels, urinalysis, CRP, other way like ECG, etc.<sup>8</sup>

### 1.1. Obesity; a player for health complications

If one consumes excess amounts of energy, particularly from fat and sugars rather than from protein sources and lesser expenditure of the energy either through exercise or physical activity, much of the surplus energy will be stored by the body as fat which will enhance the rate of accumulation of visceral fat.<sup>9</sup> In these conditions, losing weight is very difficult, along with this, the development of metabolic syndrome is induced<sup>10</sup>. Metabolic syndrome is a cluster of metabolic abnormalities including at least three of the following disorders, abdominal obesity, hypertension, hyperglycemia, high serum triglyceride, and low serum high-density lipoprotein (HDL), elevated fasting plasma glucose, dyslipidemia, and an enhanced inflammation.<sup>11</sup> Due to these circumstances, the probability of developing the risk of diabetes mellitus and cardiovascular disease is prominent. Medical conditions, such as a prothrombotic and proinflammatory state, fatty liver disease and obstructive sleep apnea syndrome were consecutively defined as symptoms of the metabolic abnormalities (<sup>12 13</sup>). Central obesity and metabolic syndrome are accompanied by a declined quality of life and accelerate morbidity and mortality rates.

### 1.2. Obesity and its affecting factors

Many factors can affect weight and lead to overweight or obesity. Some of these factors may make it difficult to lose weight or to get away from regaining weight that have lost. By the analysis of different studies, it is prominent to evidence that when an obese subject with metabolic syndrome, having different choices of remedies including bariatric surgery<sup>14</sup>, medication for weight loose, concomitant medication for the comorbidities accompanied with metabolic syndrome as diabetes, hyperlipidemia, and hypertension, or diet therapy, other medication and bariatric surgery have its certain side effect and risk therefore different dietary approach and nutrient interplay with timing that enhance the reduction of weight<sup>15</sup> and for the prolong maintain the enfeebled metabolic pathogenesis, should be at first sight treatment<sup>16</sup>.

### 1.3. Family History and Genetic involved in obesity

As it tends to run in families, suggesting that genes may play a role.<sup>17</sup> If one or both parents are overweight or have obesity, the chances of being overweight are greater. The Association of genetics and obesity is already well established by multiple studies. This gene might harbor multiple variants that increase the risk of obesity.<sup>18</sup>

### 1.4. Race or Ethnicity

Though obesity is most prevalent among non-Hispanic Blacks (African-Americans), individuals who lived in communities with a high concentration of non-Hispanic Blacks were no more likely to be obese than those living in other communities, regardless of their race/ethnicity. Many racial and ethnic minority groups are prone to obese. Studies show the importance of interacting individual-level strains with community-level racial/ethnic composition when one examines BMI and obesity.<sup>19</sup> In a study of Indian data, the North Indian (Delhi) subjects were found to be more obese, with the highest general obesity and relatively poor lung functions, which can be attributed to the lifestyle of the metropolitan city, categorized by a relatively faster life, irregular food habits, higher consumption of fast food, and lower physical activity. It was found that according to BMI categories, most subjects from Kerala were underweight. Subjects in Manipur were categorized by higher central adiposity despite having lesser general obesity levels and best respiratory efficiency.<sup>20</sup>

### 1.5. Age and Sex

Many people gain weight as growing. Children who have obesity are more likely to be obese as adults. Besides, adults who are having a normal BMI often start to gain weight in young adulthood and continue to gain weight until age 60 to 65.<sup>21</sup> Women are prone to build up fat in hips and buttocks while men usually build up fat in their abdomen or belly. Particularly if extra fats are around the abdomen, may put people at risk of many health problems even if they have a normal weight. Thus, sex may also affect where the body stores fat.<sup>22</sup> Women are generally more prone to make conscious efforts to have a healthy diet 'most of the time', while men are 3 times more likely to 'hardly ever' make such efforts to take a healthy diet. (<sup>23 24 25</sup>)

### 1.6. Eating behavior and physical activity habits

May raise your chances of becoming overweight and having obese if, eat and drink a lot of foods and beverages that are high in calories, sugar, and fat, drink a lot of beverages that are high in added sugars and spend a lot of time sitting or lying down and have limited physical activity,<sup>26</sup> the significance of physical activity on public health and obesity as it identified as the fourth leading risk factor for global mortality<sup>27</sup>. The need for the development of global recommendations that show the links between the frequency, duration, intensity, type and the total amount of physical activity needed for the prevention of obesity and other non-communicable diseases. Greater than 60 minutes of physical activity for adolescence and 40 to 45 minutes for early adults while for adults daily physical activities will provide additional health benefits.<sup>28</sup>

### 1.7. Place to live, work, play, and worship

These factors may affect eating and physical activity habits, and access to healthy foods and places to be active. For example, living in an area that has a high number of grocery stores can increase access to better quality, lower-calorie foods. Living in a neighborhood with a lot of green spaces and areas for safe physical activity may encourage one to be more physically active. Area of work and worship may also make it easier for you to eat unhealthy, high-calorie foods. Vending machines, cafeterias, or special events at the workplace or place of worship may not offer healthy, lower-calorie options.<sup>29</sup>

### 1.8. Not enough sleep

People may eat more calories and snacks who don't get enough sleep.<sup>30</sup> Experts recommend that adults ages 18 to 64 get 7 to 9 hours of sleep a day and that adults ages above 65 or old age should get 7 to 8 hours of sleep a day.

Other factors, that can lead to weight gain include certain medical conditions, certain medicines,<sup>4</sup> binge eating disorders,<sup>31</sup> stress.<sup>32</sup>

### 1.9. Dietary approaches and Obesity prevention

The target of different Investigations that prolonged the successful maintenance of weight loss such as the National Weight Control Registry<sup>33</sup> has recommended the dietary approach. Recent review-based studies show that the dietary approach related to the development of the metabolic syndrome presupposes the risk of diabetes and cardiovascular disease, and also has been reported a continuous reduction in risk of the metabolic syndrome arising by having a diet, rich in whole grains, legumes, nuts, high residue diet whereas the risk is being increased by a diet rich in white rice, refined flour, dehusked legume, low residue diet, preservative intake and salty or sweet snacks<sup>34</sup>. A Dietary Approaches to Stop Hypertension (DASH)<sup>35</sup> is a diet that promotes the intake of high fiber and high potassium and encourages a low sodium diet with low fat and low refined and preservative diet including vegetables, fruits, and low-fat dairy foods with moderate amounts of whole grains, fish, poultry, and nuts in the diet with foods rich in both micro and macronutrients that help lower blood pressure, such as potassium, calcium and magnesium has been shown in the different people to be associated with improved hypertension, high fasting glucose, and central obesity<sup>36</sup>.

### 1.10. Timing interplay of Diets

An appropriate number, duration and regularity of meals may affect obesity<sup>37</sup>. Missing breakfast has been associated with an increased adverse metabolic risk and there is evidence to suggest that consumption of a high-quality

breakfast with low energy density is associated with several improved markers of cardio metabolic health (serum uric acid, cholesterol, and measures on insulin resistance) in a cohort of 8–12-year-olds who were overweight or obese (7). Obesity is not only necessarily related to metabolic outcomes and major chronic comorbidities, but also it can be considered a seriously debilitating condition by itself.<sup>38</sup> Much more of body fat may be accompanied by structural as well as functional abnormalities that reduced the quality of life, as gastrointestinal re flux disease, gallbladder disease, osteoarthritis, obstructive sleep apnea/obesity hypo ventilation consequences, psychological and eating behavior disorders, stress, anxiety and depression, and physical performance.<sup>39,40</sup> . Obesity requires multiprong and lifelong treatment strategies. A minimum weight loss of only 5%-10% can optimistically improve the quality of life, health, and economic burden of an individual as well as a country or a whole. Obesity has enormous healthcare costs exceeding \$700 billion each year. To consume at least four meals daily is a well-defined good dietary strategy to reduce the prevalence of obesity or central obesity, with a breakfast containing less than 25 % of total daily calorie consumption; including a mid-morning and a mid-afternoon snack in the diet plan (that provide at least 15 % of total daily calorie intake) and should have lunch at an appropriate time (between 1-2 pm) with energy which contributes not more than 35 % of total daily calorie intake including the maximum number of foods belonging to the groups of dairy products, cereals and whole grains. (22)

## 2. Conclusion

Obesity is the world-wide new global threatening epidemic; millions of people have serious complications with associated diseases. Mainly due to the western food style and the junk food, meals high in carbohydrates & fats together with high-caloric sweets, etc. in developed countries. While in developing countries, obesity is found due to the main dependence on cheap foods which are characterized by low-protein and high- calorie content. Hence, it shows how important it is to combat obesity being with its many serious complications with many chronic diseases. A healthier lifestyle with better diet control should be encouraged to follow by the suffering people. obesity is a lifestyle disease and it should be early detected and treated, signs and symptoms of any transformation in lifestyle that leads to complications. Thus, the study concludes by establishing the association of meal frequency, nutrients interplay with time and amount and four meal patterns in obesity to identify a dietary strategy to mitigate the increasing prevalence of obesity.

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#### 4. Conflict of Interest

None.

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## Author biography

**Pooja Dubey**, Research Scholar

**Ritu Singh**, Registered Dietician

**Khusboo Kumari**, Research scholar

**Jitendra Patel**, Research scholar

**Archana Kumari**, Junior Resident

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