

Review Article**Obesity and Oral health: A review**

Kumar J, Pradhan D, Saxena A, Shavi GR, Tuteja JS, Triphati RM

**Abstract:** Obesity changes every step of our life. It affects both oral and general health. Various factors like socioeconomic factors, lifestyle factors, and dental anxiety have shown some associations with obesity. Both obesity and dental caries are multifactorial in nature and are caused due to dietary dependence. The problems and risks involved with obesity sometimes prove to be fatal. On a regular basis along with the assessment of periodontal or dental caries risk, screening regarding weight should also be done. Such a measure can further help in decreasing the risk of developing diseases like periodontitis or dental caries. Initial level of treatment and its prevention can lead to long term benefits and life expectancy of a patient. Dental professionals must try to provide excellent and efficient services including the best interventions possible so to improve the health of the surrounding people. For the prevention of dental caries and obesity preventive programs must be implemented with strict nutritional guidelines in order to reduce its prevalence. Oral health and general health must be promoted parallel so that common behaviours of risks can be targeted.

**Keywords:** Dental Caries; Periodontitis; Basal Metabolic Index; Sedentary Lifestyles; Socio Economic Factors; Health Behaviour.

**INTRODUCTION**

*“Obesity is defined as a body mass index above 30”*.<sup>1</sup> Basically, due to ill effects of obesity the expectancy of life decreases and some health problems arises. The diseases which are very likely to be associated with obesity are diabetes, heart disease, obstructive sleep apnoea and osteoarthritis. The basic causes can be due to sedentary lifestyles, intake of calorie rich food, no physical activity and genetics. Day by day the problem of obesity is increasing in developed countries especially eastern countries like China and Japan. So, it has become an urgent need to prevent obesity.<sup>1</sup>

Oral health and general health have similar mechanisms of behaviour and the self perceived oral health of a person is related to the general health.<sup>2</sup> There are numerous confounders which are there for oral health and obesity. Amongst all, socio-economic and lifestyle factors are generally associated with the oral health and body weight of a person.<sup>2</sup>

There are numerous studies which have revealed about an association of obesity with dental caries and periodontal disease. The association of dental caries and obesity is a bit complicated process due to the association of the complex conditions with numerous factors that are involved like genetics, cultural, dietary, socio-economic,

biological, lifestyle and environmental factors.

In last 50 years in India, there is a gradual rise in obesity rate. The modern data in India revealed that for men and women both the Basal Metabolic Index (BMI), boosts with age. Obesity is considered as the most preventable cause of death in the world with the highest number seen in adults. In 2013, the American Medical Association classified obesity as a disease.<sup>1</sup>

The World Health Organization (WHO)<sup>1</sup> predicts that overweight and obesity may soon replace more traditional public health concerns such as under nutrition and infectious diseases as the most significant cause of poor health.<sup>1</sup> So obesity has become an important public health concern which has reached epidemic proportions.

Therefore, this paper focuses on the role that obesity plays on the various health conditions and how it can affect an individual's oral health.

**Classification of Obesity**

The most commonly used definitions, established by the World Health Organization in 1997 and published in 2000 are as follows:

BMI	CLASSIFICATION
< 18.5	underweight
18.5–24.9	normal weight
25.0–29.9	overweight
30.0–34.9	class I obesity
35.0–39.9	class II obesity
40.0	class III obesity

Some modifications to the WHO definitions have been made by particular bodies. The surgical literature breaks down "class III" obesity into further categories whose exact values are still disputed.<sup>1</sup>

- Any BMI 35 or 40 is severe obesity
- A BMI of 35 and experiencing obesity-related health conditions or 40–44.9 is morbid obesity
- A BMI of 45 or 50 is super obesity

### Prevalence of Obesity in India

Our nation India is gaining weight. As per the statistics from the National Family Health Survey (NFHS) the percentages of women who are married and obese have risen from 11% to 15%.<sup>3</sup> In the rural areas, there is a higher amount of prevalence for undernourished people whereas; in the urban areas more than 3 times people are found to be overweight and obese. The reason behind this may be because of the lack of physical exercise and sedentary lifestyles. It is also seen that the statistics in women revealed a higher percentage than in males.<sup>3</sup>

In Punjab, around 30% women are found to be overweight or obese which is followed by Delhi (26%) and 28% in Kerala which is relatively higher from other states.<sup>3</sup> There are some socio-economic factors which are also inter linked with the prevalence of obesity. In the urban areas, the prevalence of obesity was found to be much high than the rural areas but there is a significant difference in the prevalence rates of the rural areas.

Available literature reveals that in the rural areas the living conditions have improved a lot. Education, facilities, income has drastically improved which along with ease of access to the television and city resulted in the changes of their lifestyle. Also, due to this, BMI rates have also been increased.

Data from NFHS reveals that people, who were overweight, basically belonged from urban areas and a higher socio economic status and especially women but the prevalence rates of rural areas have risen significantly. The overall prevalence for obesity was 6.8% and overweight was 33.5% but now it has increased up to 7.8% and 36.9% respectively.<sup>3</sup> Therefore, overweight, sedentary lifestyles and behaviors have become a major public health problem for India.

### Effects on Health

Obesity has many adverse effects which affects systemically which are as follows:<sup>4</sup>

1. Cardiovascular system: Effects such as pulmonary embolism, angina, myocardial infarction, congestive heart failure, ischemic heart disease, and rise in blood pressure, abnormal rise and fall of the cholesterol levels are seen. These may prove to be very harmful to our body if obesity is not prevented.
2. Neurovascular system: Effects such as migraine, dementia, carpal tunnel syndrome and multiple sclerosis can occur which can prove to be fatal also.
3. Reproductive system: Effects include menstrual disorders, polycystic ovarian syndrome and infertility can be seen.
4. Gastrointestinal system: Fatty liver disease and cholelithiasis (gall stones) can affect the system.
5. Urinary system: There may be erectile dysfunction, buried penis, chronic renal failure and urinary incontinence.
6. Endocrinal: The most important effect is diabetes mellitus, cushing's syndrome and hyperthyroidism.
7. Obesity also affects the skin so sometimes stretch marks or cellulitis occurs.
8. In some cases back pain, gout and osteoarthritis is also encountered.

### Etiology

The possible causes of obesity are discussed below:

1. Sedentary Lifestyle: It plays an important role in obesity. Majority of the people gets insufficient exercise. This happens because of the improvised

transportation and our latest fine technology which really saves time and labours both. It is generally seen in the youths because of lack of physical activity and becoming more tech savvy. Children these days instead of playing outdoor sports are watching more television and in between they are snacking or munching which is really unhealthy as they are taking most of the junk food inside them. This lifestyle is also making them weaker as there is no physical or laborious activity done by them. So sedentary lifestyle is one of the major concerns which are leading to obesity.<sup>5</sup>

2. Genes: As other diseases, obesity has a major play between the environment and the genetics. In Prader-Willi syndrome, Bardet-Biedl syndrome, Cohen syndrome, and MOMO syndrome obesity is the most important feature. In severe cases there is a single point of DNA mutation. It is also seen that genes are always more dominant as when parents are overweight the children also have an habit of taking high calorie rich foods in their diet. So genes also play a very important role.<sup>5</sup>

3. Emotional: People tend to eat more when they are stressed, angry or bored. Overeating done leads to obesity.<sup>5</sup>

4. Smoking: Generally people who quit smoking tends to eat more as after doing so the food often tastes nice.<sup>5</sup>

5. Pregnancy: After delivery mothers are unable to reduce weight but they eat a lot so it may lead to obesity.<sup>5</sup>

6. Medicines: Patients on certain medicines like anti-depressants or corticosteroids become obese as they lose the tendency of burning calories because after taking these medicines the ability of burning the calorie decreases a lot.<sup>5</sup>

7. Lack of Sleep: This is generally seen in children as they don't sleep and they eat at that time so it can lead to obesity.<sup>5</sup>

### **Obesity and Oral Health**

Various studies were reviewed and it was revealed that children who had normal weight had significantly lesser number of carious teeth in their primary dentition as compared to the permanent dentition. Further it was also seen that tooth loss can be a major factor associated with obesity.

The teeth which were restored had an effect on individual, as the person had a lesser chance of being obese. Hence, there is a correlation between obesity and oral health.<sup>6</sup> Obesity is also related with periodontitis. Periodontitis is actually caused due to the destruction of tissues of the periodontium, periodontal ligament, loss of connective tissue of the gingiva and the resorption of the alveolar bone.

Periodontitis is actually a chronic disease which included gingivitis also. Gingivitis is reversible and it leads to periodontitis which is irreversible and it further leads to the progression of the disease. There are some systematic factors which are associated with the periodontal disease and its risk factors like diabetes, osteoporosis, smoking, age and stress. Obesity is also one of the risk factor for periodontitis and the studies also showed that individuals who were obese had a higher prevalence of periodontitis. Patients who are obese and at a higher risk of developing periodontitis, they develop the disease at a later stage.<sup>6</sup>

Taking into consideration the basal metabolic index (BMI), it was found in studies that around 35% to 75% children who were having normal weight had healthy teeth while 26% to 45% children who were overweight and obese were having less healthy teeth.<sup>6, 7, 8</sup> Increase in the BMI rate is also associated with the gingival bleeding which is an another symptom of the periodontal disease. Therefore, studies reveal that weight gain is associated with periodontitis. Also, upper body obesity is associated with deeper probing depths, which is a sign of destruction associated with the periodontal disease.<sup>6, 7 & 8</sup>

### **Management**

A successful management involves changing of lifestyle and setting some goals firstly. A positive approach is also a factor that is needed for the management of obesity.

1. Setting of Goals: Reducing weight should be the first factor which should be taken into consideration.

2. Goals for Adults: To minimise the risk of coronary heart disease one should lose some weight in at least 6 months but slowly like 1 to 2 pounds a week.

3. **Goals for Children and teens:** Parents play a very important role in their child's lives. When they know that their child is obese or is prone to obesity they should control their eating habits and inculcate them towards eating healthy and nutritious food. Also children should do physical activity regularly so that they stay fit and healthy.

4. **Changes in The Lifestyle:** A change in daily lifestyle can only be improvised when one has a positive approach. To achieve long term weight loss programme successful a proper healthy dietary plan should be made and followed so that it becomes a daily routine.<sup>9</sup>

5. **Healthy Dietary Plan:** An efficient dietary plan should be nutritious with essential amount of nutrients, vitamins, minerals, proteins, carbohydrates and sugar. The plan should be made such that it should be low calories, fat free, low cholesterol, low sugar and salt. Nutritious and healthy food includes low fat dairy products like cheese, yogurt and milk. Protein food includes meat, beans and peas. Whole grain food includes bread like oatmeal or brown bread and cereals. Fresh fruits and vegetables should also be consumed to stay healthy. Olive oil is the best cooking medium as it is quiet healthy for the heart.<sup>10</sup> Food which is higher in calories or high in trans fat or saturated fat or which raises the cholesterol level and blood pressure should be restricted. Saturated fat includes food like sausages, bacon, beef, and poultry in skin, whole milk, cream, butter and coconut which is generally found in processed foods. Similarly, trans fat food includes hydrogenated oils, baked food, snack products and food which is fried in hydrogenated shortening like French fries. Cholesterol is generally found in egg yolk, shrimp, whole milk, butter and cheese. Drinks containing high fructose content should be avoided and drinks like alcohol are rich in calories which should be reduced.<sup>11</sup>

6. **Physical Activity:** It plays an important role as it minimises the risk of heart attack, diabetes, ischemic heart disease and cancer. Physical activity strengthens the heart, lung activities and

keeps our joints and muscles in a healthier condition. By doing so we may be more happy, more relaxed and able to enjoy more. It can be done in form of muscle strengthening or stretching exercises, brisk walk for about 30-45 minutes daily. In case of a heart disease or chronic diseases like diabetes one must consult a doctor that what type of physical activity should be done so to stay fit.<sup>12</sup>

7. **Behavioural Changes:** Changes related to behaviour regarding food or doing exercise can play a vital role in reducing weight. One should make changes in their food habits likewise stop overeating.<sup>13</sup>

8. **Weight Loss Surgery:** It is encountered when other treatments fail in life threatening conditions like cardiomyopathy or severe sleep apnoea or when the BMI rises to a level of 40 or more.<sup>12</sup>

### **Modifications to Reduce Obesity**

Basic Layout Followed By Individuals to Manage Obesity

- Reduction of fat intake day to day
- Skip meals
- Reduce consumption of sparkling drinks<sup>14</sup>
- Increase consumption of food with low energy like fruits and green veggies.
- Eating in small helpings instead of large helpings.
- Munch while sitting.
- Gaining fitness through gym.<sup>15, 16</sup>

Compulsory Measures Which Should Be Incorporated

- Brisk walking
- Reduction in carbohydrate and fat consumption
- Regular fitness exercises
- Eating in small increments
- School based fitness plans especially for girls
- Less calorie diet lunch to be served in schools with same allure.<sup>17</sup>

Measures defined above will only succeed if individuals follow the modifications related

to health, diet and fitness regularly. Nevertheless, the available literature suggest that due to potential for higher body weight in younger age groups and the increasingly sedentary lifestyle so preventive strategies are recommended to minimize obesity and its related complications Casazza et al. states that the common notion that “*regularly eating breakfast is protective against obesity*” because people who skip breakfast may overeat later in the day is currently nothing more than a presumption.<sup>13, 18, 19, 20</sup>

**CONCLUSION:** One of the major health concerns in developed and developing nations is obesity. It has been proved that obesity is a significant risk factor for conditions like cardiovascular diseases, stroke, hypertension and diabetes. Obesity has been to be one of the major confounders in the associations between the periodontal disease and dental caries. A severe periodontal destruction may be there due to obesity. Dental professionals must counsel obese patients and especially ensure them regarding the possible oral complications associated with obesity so that to diminish the morbidity for such patients.

### Recommendations

- A further research is indicated to find some association between obesity, dental caries and periodontal disease along with confounding factors like socioeconomic factors, lifestyle factors and dental anxiety.
- Implementation of obesity related preventive programs with strict adherence to the dietary guidelines.

**Author affiliations:** 1. Dr. Jayant Kumar, PG student, 2. Dr. Devina Pradhan, PG student, 3. Dr. Antima Saxena, PG student, 4. Dr. Girish Ramachandrapa. Shavi, MDS, Professor & Head, 5. Dr. Jaspreet Singh Tuteja, MDS, Senior Lecturer, Department of Public Health Dentistry, Rama Dental College Hospital and Research Centre, Kanpur, U.P. 6. Dr. Ranjan Mani Triphati, MDS, Senior Lecturer, Department of Public Health Dentistry, Career post graduate institute of Dental sciences & Hospital, Sitapur-Hardoi bypass road, Lucknow, U.P.

### REFERENCES

1. James W. WHO Recognition of the global obesity epidemic. *International journal of obesity* 2008; 32: s120-126.
2. Ostberg AL, Bengtsson C, Lissner L, Hakeberg M. Oral health and Obesity indicators. *BMC Oral health* 2012; 12(50): 1-5.
3. Kalra S, Unnikrishnan. Obesity in India: weight of the nation. *J Med Nutr Nutraceut* 2012; 1: 37-41.
4. Sattar N, Lean ME. *ABC of Obesity*. Oxford: Blackwell; 2007.
5. Gard M. *The obesity epidemic: science, morality and ideology*. London: Routledge; 2005.
6. Willershausen B, Haas G, Krummenauer F, Hohenfellner K. Relationship between high weight and caries frequency in German elementary school children. *Eur J Med Res*. 2004; 9:400-404.
7. Mathur L, Manohar B, Shankarpillai R, Pandya D. Obesity and periodontitis: a clinical study. *J Indian Soc Periodontol*. 2011; 15(3): 240-244.
8. Hong L, Ahmed A, McCunniff M, Overman P, Mathew M. Obesity and Dental Caries in Children Aged 2-6 Years in the United States: National Health and Nutrition Examination Survey 1999-2002. *Journal of Public Health Dentistry*. 2008; 68(4):227-233.
9. Rockville MD. *The Surgeon General's Call to Action to Prevent and Decrease Overweight and Obesity*. Washington DC: U.S. Government printing office; 2001. <http://www.surgeongeneral.gov/library> (accessed 12 December 2015).
10. Evans J. *Education disordered eating and obesity discourse: fat fabrications*. London: Routledge; 2009.
11. Gibney MJ. *Public health nutrition*. Oxford: Blackwell science; 2004.
12. Loscalzo J et al. *Harrison's principles of internal medicine*, 18th ed. United States of America: McGraw-Hill Companies; 2008.
13. Thiralaway K, Upton D. *The psychology of lifestyle: promoting healthy behaviour*. London: Routledge; 2009. <http://www.imd.inder.cu/adjuntos/article/619/The%20Psychology%20of%20Lifestyle%20Promoting%20Healthy%20Behaviour.pdf> (accessed 10 December 2015).
14. Ashwell M. *The nature and risk of obesity*. London: Oxford; 1992.
15. Casazza KR. Developmental origins of obesity: A critical period perspective. *The open obesity journal* 2011;31:1-3.
16. Haslam DW, Haslam F. *Fat, gluttony and sloth: obesity in medicine, art and*

literature. Liverpool: Liverpool university press; 2009.

17. Pi-Sunyer FX. Obesity. London: Williams and Wilkins; 1999.
18. Webb GP. Nutrition: A health promotion approach. London: Hodder Arnold; 2008.
19. Hubber J, Haslay L, Reeves. Myths, Presumptions, and Facts about Obesity. The new England journal of medicine 2013;446-454
20. Whitney EN, Rofles SR. Understanding nutrition. United Kingdom: Cengage learning; 2012.

**Corresponding Author:**

Dr Devina Pradhan  
PG Student  
Department of Public Health Dentistry  
3/99, Vishnupuri, Kanpur- 208002  
Contact no:8173914009  
Email id: meetdrdevina@gmail.com

**How to cite this article:** Kumar J, Pradhan D, Saxena A, Shavi GR, Tuteja JS, Triphati RM. Obesity and Oral health: A review. Rama Univ J Dent Sci 2015 Dec;2(4):11-16.

**Sources of support:** Nil

**Conflict of Interest:** None declared