

Obesity

Concept

Obesity may be defined as an abnormal growth of the adipose tissue due to an enlargement of fat cell size (hypertrophic obesity) or an increase in fat cell number (hyperplastic obesity) or a combination of both (1). Obesity is often expressed in terms of body mass index (BMI). Overweight is usually due to obesity but can arise from other causes such as abnormal muscle development or fluid retention (2).

However, obese individuals differ not only in the amount of excess fat that they store, but also in the regional distribution of the fat within the body. The distribution of fat induced by the weight gain affects the risk associated with obesity, and the kind of disease that results.

Prevalence

Obesity is perhaps the most prevalent form of malnutrition. As a chronic disease, prevalent in both developed and developing countries, and affecting children as well as adults, it is now so common that it is replacing the more traditional public health concerns including undernutrition. It is one of the most significant contributors to ill health.

Overweight and obesity are the fifth leading risk of global deaths. Worldwide, obesity has more than doubled since 1980. In 2008, more than 1.4 billion adults, 20 years and older, were overweight. Of these over 200 million men and nearly 300 million women were obese (3). In 2012, more than 40 million children under 5 years of age were overweight. Once considered a high-income country problem, overweight and obesity are now rising in low-and middle-income countries, particularly in urban settings. Close to 30 million overweight children are living in developing and 10 million in developed countries (3).

Childhood obesity is associated with a higher chance of obesity, premature death and disability in adulthood. In addition, it is associated with future risk of increased breathing difficulties, increased risk of fractures, hypertension, early markers of cardiovascular disease, insulin resistance and psychological effects. At least 3.4 million adults die each year as a result of being overweight or obese.

Overweight and obesity are linked to more deaths worldwide than underweight. In India, the non-communicable risk factor survey phase 2 was carried out in the year 2007-2008, in the states of Andhra Pradesh, Kerala, Madhya Pradesh, Maharashtra, Tamil Nadu, Uttarakhand and Mizoram. The survey shows high prevalence of overweight in all age groups except in 15-24 years group. Overweight prevalence was higher among females than males and in urban areas than in rural areas. Low prevalence was recorded among lower level of education (ill-literate and primary level), and in people whose occupation was connected with agriculture or manual work (4).

In India, 1.3 per cent males and 2.5 per cent females aged more than 20 years were obese in the year 2008 (5). As obesity is a key risk factor in natural history of other chronic and non-communicable diseases, the typical time sequence of emergence of chronic diseases following

the increased prevalence of obesity is important in public health planning. The first adverse effects of obesity to emerge in population in transition are hypertension, hyperlipidaemia and glucose intolerance, while coronary heart disease and the long-term complications of diabetes, such as renal failure begin to emerge several years (or decades) later (7).

Causes

- **AGE:** Obesity can occur at any age, and generally increases with age. Infants with excessive weight gain have an increased incidence of obesity in later life (9). About one-third of obese adults have been so since childhood (1).
- **SEX :** Women generally have higher rate of obesity than men, although men may have higher rates of overweight. It has been claimed that woman's BMI increases with successive pregnancies. The recent evidence suggested that this increase is likely to be, on an average, about 1 kg per pregnancy. On the other hand in many developing countries, consecutive pregnancies at short intervals are often associated with weight loss rather than weight gain (8).
- **GENETIC FACTORS :** There is a genetic component in the aetiology of obesity. Twin studies have shown a close correlation between the weights of identical twins even when they are reared in dissimilar environments (11). The profile of fat distribution is also characterized by a significant heritability level of the order of about 50 per cent of the total human variation.
- **PHYSICAL INACTIVITY :** There is convincing evidence that regular physical activity is protective against unhealthy weight gain. Whereas inactive lifestyle particularly sitting occupation and inactive recreation such as watching television promote it, physical activity and physical fitness are important modifiers of mortality and morbidity related to overweight and obesity (12).
- **SOCIO-ECONOMIC STATUS :** There is a clear inverse relationship between socio-economic status and obesity. Within some affluent countries, however, obesity has been found to be more prevalent in the lower socio-economic groups.
- **EATING HABITS :** Eating habits (e.g., eating in between meals, preference to sweets, refined foods and fats) are established very early in life. The composition of the diet, the periodicity with which it is eaten and the amount of energy derived from it are all relevant to the obesity. Nowadays television and print media is playing an important role in producing obesity by heavy advertisement of fast food outlets of energy-dense, micronutrient poor food and beverages (usually classified under the "eat least" category in diet guidelines) of multinational corporations, which influence the daily eating habits. The consumer demand by itself may be influenced by advertising, marketing, culture, fashion and convenience (8).
- **PSYCHOSOCIAL FACTORS :** Psychosocial factors (e.g., emotional disturbances) are deeply involved in the obesity. Overeating may be a symptom of depression, anxiety, frustration and loneliness in childhood as it is in adult life. Excessively obese individuals are usually withdrawn, self-conscious, lonely and secret eaters.

- **FAMILIAL TENDENCY** : Obesity frequently runs in families (obese parents frequently having obese children), but this is not necessarily explained solely by the influence of genes.
- **ALCOHOL** : A recent review of studies concluded that the relationship between alcohol consumption and adiposity was generally positive for men and negative for women (6).
- **SMOKING** : Reports that the use of tobacco lowers body weight began to appear more than 100 years ago, but detailed studies have been reported only during the past 10 years or so. In most populations, smokers weigh somewhat less than ex-smokers; individuals who have never smoked fall somewhat between the two.
- **DRUGS** : Use of certain drugs, e.g., cortico-steroids, contraceptives, insulin, (3-adrenergic blockers, etc. can promote weight gain (8).

Hazards of obesity

Obesity is a health hazard and a detriment to well-being which is reflected in the increased morbidity and mortality:

(a) **INCREASED MORBIDITY**: Obesity is a positive risk factor in the development of hypertension, diabetes, gall bladder disease and coronary heart disease and certain types of cancers, especially the hormonally related and large bowel cancers. There are in addition, several associated diseases, which, although not usually fatal, cause a great deal of morbidity in the community, e.g., varicose veins, abdominal hernia, osteoarthritis of the knees, hips and lumbar spine, flat feet and psychological stresses particularly during adolescence. Obese persons are exposed to increased risk from surgery. Obesity may lead to lowered fertility.

(b) **INCREASED MORTALITY**: The Framingham Heart Study in United States showed a dramatic increase in sudden death among men more than 20 per cent overweight as compared with those with normal weight. The increased mortality is brought about mainly by the increased incidence of hypertension and coronary heart disease. There is also an excess number of deaths from renal diseases. Obesity lowers life expectancy.

Prevention and control

Weight control is widely defined as approaches to maintaining weight within the 'healthy' (i.e. 'normal' or 'acceptable') range of body mass index of 18.5 to 24.9 kg/m² throughout adulthood (WHO Expert Committee, 1995). It should also include prevention of weight gain of more than 5 kg in all people. In those who are already over-weight, a reduction of 5-10 per cent of body weight is recommended as an initial goal (7). Prevention of obesity should begin in early childhood. Obesity is harder to treat in adults than it is in children. The control of obesity centres around weight reduction. This can be achieved by dietary changes, increased physical activity and a combination of both,

(a) **DIETARY CHANGES:** The following dietary principles apply both to prevention and treatment : the proportion of energy-dense foods such as simple carbohydrates and fats should be reduced; the fibre content in the diet should be increased through the consumption of common un-refined foods; adequate levels of essential nutrients in the low energy diets (most conventional diets for weight reduction are based on 1000 kcal daily model for an adult) should be ensured, and reducing diets should be as close as possible to existing nutritional patterns (16). It requires modification of the patient's behaviour and strong motivation to lose weight and maintain ideal weight.

(b) **INCREASED PHYSICAL ACTIVITY:** This is an important part of weight reducing programme. Regular physical exercise is the key to an increased energy expenditure.

(c) **OTHERS:** Appetite suppressing drugs have been tried in the control of obesity. They are generally inadequate to produce massive weight loss in severely obese patients. Surgical treatment e.g., gastric bypass, gastroplasty, jaw-wiring, to eliminate the eating of solid food have all been tried with limited success (17).

Health education has an important role to play in teaching the people how to reduce overweight and prevent obesity. A fruitful approach will be to identify those children who are at risk of becoming obese and find way of preventing it.