

Causes, Risk Factors and Complications of Obesity in Family Practice

Sharifa Salem Alshehri^{1*}, Razan Ahmed Zainalden², Ahmad Naif Alharbi¹¹, Muath Yousef Al Mohammadi³, Abdulmajeed Ayed Al hashim⁴, Nawaf Mesaad Bahatheq⁵, Linda Tawfeeq Allaf⁶, Kholoud Abdulsalam Assur⁷, Sultanah Khalid Alamoudi⁸, Khaled Abdullah Alshareef⁹ and Ahlam Ahmed Alhassan¹⁰

¹Consultant Family Medicine, Primary Health Care, King Abdulaziz Medical City, Ministry of National Guard Health Affairs, Jeddah City, Saudi Arabia

²Umm Alqura University, GP at Kudai and Hijrah Health Care Center, Saudi Arabia

³Alhada Military Hospital, Saudi Arabia

⁴King Faisal Hospital, Saudi Arabia

⁵King Saud Bin Abdulaziz University for Health Sciences, Riyadh, Saudi Arabia

⁶Primary Health Care, King Abdulaziz Airport, Saudi Arabia

⁷King Abdulaziz University Hospital, Saudi Arabia

⁸Ibn Sina National College, Saudi Arabia

⁹Almadina General Hospital, Saudi Arabia

¹⁰King Fahad Hufuf Hospital, Saudi Arabia

¹¹Ohud Hospital, Saudi Arabia

***Corresponding Author:** Sharifa Salem Alshehri, Consultant Family Medicine, Primary Health Care, King Abdulaziz Medical City, Ministry of National Guard Health Affairs, Jeddah City, Saudi Arabia.

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Abstract

Background: Obesity is one of the most important preventable diseases in developed countries, and is rapidly emerging in the developing world. Obesity is associated with multiple medical conditions and can cause serious complications in chronic conditions. Obesity needs multipronged treatment strategies and may require lifelong treatment.

Aim: In this review, we will look into the causes, risk factors and complications of obesity.

Methodology: The review is comprehensive research of PUBMED since the year 1996 to 2019.

Conclusion: Obesity is predicted to rise over the coming years (4–6). Interventions to reduce the burden of obesity partly depend on recognizing and understanding the complications of obesity. Clinicians are reminded to look for these complications in obese patients and institute interventions emphasizing the benefits of weight loss in obese patients.

Keywords: Obesity; Obesity Complications; Causes of Obesity

Introduction

Obesity is one of the most important preventable diseases in developed countries, and is rapidly emerging in the developing world [1]. Obesity is the excessive or abnormal accumulation of fat or adipose tissue in the body that may impair health. Obesity has become

an epidemic which has worsened for the last 50 years [2]. As a result of Western culture adoption, the prevalence of obesity is growing in both industrialized nations and those experiencing changes in diet and activity pattern. There is clear evidence that obesity rates are increasing in much of the rest of the world [3].

Obesity is the consequence of an imbalance in daily energy consumption and excessive weight gain resulting in energy expenditure. Obesity is caused by multiple factors which can be genetic, cultural, and societal can be considered common. Other causes of obesity include reduced physical activity, insomnia, food habits, endocrine disorders, medications, food advertisements, and energy metabolism [4].

Obesity is not only important in relation to metabolic effects and major chronic diseases, as it can by itself be considered a serious debilitating disorder. Body fat excess may be followed by systemic and functional anomalies that have impaired quality of life, such as gastrointestinal reflux disease, gallbladder disease, osteoarthritis, obstructive sleep apnea/obesity hypoventilation syndrome, psychiatric and eating disorders, anxiety and depression, and physical performance [5].

Obesity is associated with multiple medical conditions and can cause serious complications in chronic conditions. Obesity needs multipronged treatment strategies and may require lifelong treatment. A 5% to 10% weight loss can significantly improve health, quality of life, and economic burden of an individual and a country as a whole [6].

Obese people are at major risk for developing a range of comorbid conditions, including cardiovascular disease (CVD), gastrointestinal disorders, type 2 diabetes (T2D), joint and muscular disorders, respiratory problems, and psychological issues, which may significantly affect their daily lives as well as increasing mortality risks [7].

As a result of these comorbidities, the medical costs directly related to obesity are difficult to determine, but a conservative estimate would place the healthcare burden for obesity at approximately \$150 billion per year in the United States [8].

It is necessary to obtain a comprehensive history, physical examination and laboratory test related to the obesity of the individual. Treatment objectives also include the control of co-morbidities and the enhancement of the quality of life of obese patients. A comprehensive management of obesity can only be achieved through a multidisciplinary team to manage obesity [9].

Epidemiology

Obesity is one of the most important preventable diseases in developed countries, and is rapidly emerging in the developing world. The 2015 World Health Statistics Report that the overall rate of obesity among adults in the European region is 21.5% for males and 24.5% for females [10]. The worldwide obesity prevalence has increased to almost tripled since the year 1975; as a result, approximately more than 1.9 billion adults worldwide were overweight, with over 650 million being obese [11]. It was also estimated that by 2030 60% of the world's population, i.e. 3.3 billion citizens, could be overweight (2.2 billion) or obese (1.1 billion) if recent trends continue [12].

Etiology and causes

Obesity results from genetic, behavioral, environmental, physiological, social, and cultural factors resulting in energy imbalance and promoting excessive deposition of fat. The relative importance of each of these factors has been extensively studied, and although genes play an important role in body weight control, the WHO Consultation on Obesity reported that behavioral and environmental factors such as sedentary lifestyles combined with excess energy intake are primarily responsible for the increase in obesity during the past 2 decades [13].

Obesity occurrence relies on an imbalance between energy intake and energy expenditure over an extended period of time. The trigger can be regarded as excess energy consumption relative to daily energy expenditure or as low energy expenditure relative to daily energy consumption [14].

Despite increased emphasis on diet, increased awareness of food energy and fat content, and the availability of numerous low-fat, cholesterol-free and sugar-free foods and drinks, obesity continues to rise [15]. In addition, behavioral changes common during holidays contribute to seasonal weight gain during the winter months, which although less than 0.5 kg on average, is greater among individuals who are overweight or obese and is responsible for at least half of annual weight gain [16].

Adverse dietary patterns were followed by sedentary lifestyles that lead to high obesity prevalence. Engaging in physical activities, whether mild, moderate or intense, has an effect on day-to-day energy consumption and is therefore a major determinant of the energy balance. Industrialization and various technological advances have made it possible for people to transform from hunter-gatherers to increasingly sedentary people in America and other wealthy nations [17,18].

Nevertheless, the amount of energy spent in physical activity and exercise is often not enough to offset the relatively sedentary nature of the majority of our lives and the effect of excessive caloric consumption. In comparison, those who regularly engage in organized exercise represent a relatively small proportion of our general population and in many cases also include a minority of the population that is neither overweight nor obese [19].

Risk factors

- **Lifestyle:** Over the past 30 years, the rapid increase in obesity prevalence is primarily due to cultural and environmental influences. High energy density diet, increased portion size, low physical activity and adoption of a sedentary lifestyle as well as eating disorders are considered as important risk factors for the development of obesity. These behavioral and environmental factors lead to alterations in adipose tissue structure (hypertrophy and hyperplasia of adipocytes, inflammation) and secretion (e.g. adipokines) [20].
- **Social and economic issues:** Social and economic factors are linked to obesity. People should be taught healthy ways of cooking, or may not have access to healthier foods. People are more likely to develop obesity if they have friends or relatives with obesity.
- **Age:** Aging process is characterized by chronic inflammation; many factors contribute to inflammation, including polymorphism in the promoter regions of pro-inflammatory genes, chronic immune cell activation with viruses such as cytomegalovirus, changes in the gut microbiome and increased intestinal permeability [21]. According to the WHO standard, among women, the age-specific prevalence increased until age 74 for overweight but until age 64 for obesity, and then declined thereafter; among men, the age-specific prevalence peaked at 65–74 years old for overweight; age-specific prevalence of overweight were higher in men than in women of 25–54 years old, but the opposite was true for those above 55 years old; for obesity, the age-specific prevalence were higher in women than in men in all groups except for 25–34 years old [22].
- **Certain diseases and medications:** Obesity can be linked to a medical cause in some cases, such as syndrome of Prader-Willi, syndrome of Cushing, and other disorders. Medical issues, such as diabetes, can also lead to reduced exercise, which can lead to weight gain. Such drugs include certain antidepressants, anti-seizure medicines, medicines for autism, antipsychotics, steroids and beta blockers [23].
- **Family inheritance and influences:** Several genome-wide association studies (GWAS) have demonstrated that common genetic variants contribute to obesity. The genes inherited from your parents will influence the quantity of body fat store and the distribution of that fat. Genetics can also play a role in how effectively the body converts food into energy, how the body regulates appetite, and how calories are burned during exercise. Obesity runs in families, that's not just because of the genes they share but family members also tend to share similar eating [24].

- **Other factors:** Weight gain during pregnancy is normal. Most women find it hard to lose this weight after the baby is born. This increase in weight will lead to women's obesity [25].
- Not getting enough sleep or sleeping too much can trigger hormone changes that increase appetite. It can also lead to high-calorie and carbohydrate craving foods that can contribute to weight gain.
- Previous weight loss attempts followed by rapid weight recovery will lead to further weight gain. This phenomenon will slow your metabolism, also called yo-yo diet [26].

Complications

Some of the co-morbidities related to overweight and obesity include cancers (cancers of breast, endometrial, ovarian, colorectal, esophageal, kidney, pancreatic, prostate), Type 2 diabetes, hypertension, stroke, Coronary Artery Disease, Congestive Heart Failure, asthma, chronic back pain, osteoarthritis, pulmonary embolism, gallbladder disease, and also an increased risk of disability [27].

Studies have confirmed that obesity is a major public health concern, leading to lower life expectancy, especially in younger age groups. Statistics further show that overweight and obesity are a major problem for the minority population compared to the white population, for the poor compared to the wealthy and for women compared to men [28].

Cardiovascular disease

Obesity is an independent risk factor for CVD, defined as including CHD, myocardial infarction (MI), angina pectoris, congestive heart failure (CHF), stroke, hypertension, and atrial fibrillation. Overall, results from large prospective and observational studies confirm the marked adverse effects of obesity on CVD [29].

There is a close relationship between hypertension and obesity, with obesity being a frequent cause of hypertension. Over half of hypertensive patients are obese and vice versa [30].

Obesity has a strange association with heart failure. It can contribute to systolic and diastolic dysfunction, while obese heart failure patients have improved clinical outcomes compared to normal BMI people. Obesity has also higher risk for atrial fibrillation incidence, recurrence, and poor prognosis [31,32].

Diabetes

Elevated BMI and WC were significantly associated with incidence of type II diabetes in men and women. Obesity, showed the strong association with incidences of type II diabetes. The pooled relative risks (95% confidence interval) across categories of BMI were 6.75 (5.55–8.19) in men and 12.41 (9.03–17.06) in women [33]. Type 2 diabetes mellitus (T2DM) comprises up to 90% of all diagnosed diabetic cases in adults and is typically associated with presence of various degrees of obesity. Depending on ethnicity, age and gender, 50-90% of T2DM patients exhibit a BMI over 25 kg/m², while patients with BMI over 35 kg/m² are almost 20 times more likely to develop T2DM compared to individuals with BMI in the normal range (18.5-24.9 kg/m² for Caucasians) [34].

Gastrointestinal diseases

Gastroesophageal reflux disease, erosive esophagitis, Barrett's esophagus, esophageal adenocarcinoma, erosive gastritis, gastric cancer, diarrhea, colonic diverticular disease, polyps, cancer, liver disease including nonalcoholic fatty liver disease, cirrhosis, hepatocellular carcinoma, gallstones, acute pancreatitis, and pancreatic cancer are associated with obesity [35].

The prevalence of GERD has increased significantly in the past 20 years in parallel with the increased prevalence of obesity. Several meta-analyses have shown a positive association between body weight (BMI) and GERD [36].

Obesity also is associated with symptoms that may arise in the stomach, such as upper abdominal pain, nausea, vomiting, retching, and gastritis [37].

Obesity, insulin resistance, hyperinsulinemia and metabolic syndrome are associated with various diseases of the gallbladder, including gallbladder stones, cholecystitis, gallbladder polyps and gallbladder cancers [38]. Subjects with obesity have a higher incidence of cholelithiasis, cholecystitis, and cholesterolosis when compared with lean controls [39].

- **Central Nervous System:** BMI was a risk factor in men and women for total and ischemic stroke; however, abdominal adiposity was a risk factor in men for total or ischemic stroke only [40]. An abundance of literature has shown that obesity is associated with mild cognitive impairment and altered hippocampal structure and function, and there is a robust correlation between obesity and Alzheimer's type dementia. Similarly, many reports show that both the autonomic and somatic components of the peripheral nervous system are impacted by obesity [41].
- **Reproductive Disease:** Polycystic ovary syndrome (PCOS), characterized by anovulation, hyperandrogenism and a polycystic ovary, is associated with obesity as well as insulin resistance. In men, abdominal obesity has been associated with impotence and infertility. There are other reproductive complications of obesity that occur in pregnancy and labour. These include gestational diabetes, macrosomia, dystocia and increased rates of caesarean sections [42,43].
- **Dyslipidemia:** Obesity has a strong association with atherogenic dyslipidemia, with high triglycerides and low cholesterol lipoprotein (HDL) [44]. The underlying mechanism is largely due to insulin resistance. Very low density lipoprotein (VLDL) clearance in plasma is dependent on the rate of hepatic synthesis and catabolism by lipoprotein lipase, an enzyme which is also involved in formation of HDL. In obesity, insulin resistance is associated with increased hepatic synthesis of VLDL and impaired lipoprotein lipase [25].
- **Psychosocial Problems:** Obesity in the affluent society has been associated with several untoward outcomes in terms of psychosocial or socioeconomic wellbeing [45]. Obesity contributes to a variety of psychological disorders. These include depression, eating disorders, attempted suicides, anxiety, somatization, obsessive-compulsive disorder, etc. [46].
- **Cancer:** There is considerable evidence of an association between obesity and some cancers [47]. However the underlying mechanism linking cancers to obesity is not clear. For uterus and breast cancers, it is thought to be due to higher estrogen levels synthesized from fat tissue in obese women [48].

Conclusion

Obesity is predicted to rise over the coming years (4–6). Interventions to reduce the burden of obesity partly depend on recognizing and understanding the complications of obesity. Clinicians are reminded to look for these complications in obese patients and institute interventions emphasizing the benefits of weight loss in obese patients.

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