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Impact of Obesity on Cardiovascular Disease Trends in the USA

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Abstract:

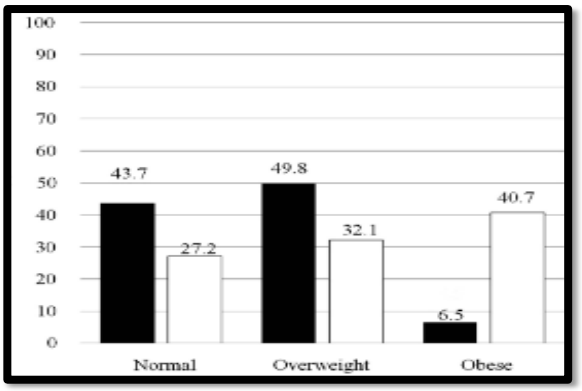
Cardiovascular disease (CVD) poses as a paramount risk factor for obesity in the US (42.4% of adults, CDC, 2018). CVD is closely linked to the increasing prevalence of obesity, as obesity contributes to risk factors such as hypertension, diabetes, and dyslipidemia.This connection increases the prevalence of heart attacks, stroke, and other cardiac events. The obesity epidemic continues to grow, placing a significant strain on public health, increasing healthcare expenditure thus reducing productivity. Beyond its economic impact, obesity also diminishes quality of life, contributes to social challenges, and increases disability rates. To reduce the associated morbidity and mortality from cardiovascular disease (CVD), it is essential to implement effective prevention strategies and policy interventions. Encouraging healthier diets, promoting physical activity, and improving access to healthcare can help lower obesity-related cardiovascular diseases, ultimately leading to better health outcomes and reduced healthcare costs.

Introduction:

Obesity, defined as excessive fat accumulation with a BMI of 30 or more, poses a serious health risk and is a major contributor to cardiovascular disease (CVD). CVD encompasses disorders affecting the heart and blood vessels, including coronary artery disease (CAD) and stroke, making it the leading cause of mortality in the U.S. Addressing obesity is a critical public health challenge, as its prevalence among adults reached 42.4% in 2017-2018 (CDC) (Engin, 2024). With CVD responsible for approximately 695,000 deaths annually (AHA, 2022), the direct link between obesity and CVD underscores the urgent need for prevention and intervention efforts. Obesity, being a modifiable risk factor yet its prevalence continues to rise due to the complex interplay of genetics, lifestyle, and environmental factors (Heianza& Qi, 2019). Contributing factors such as poor diet, physical inactivity, and socioeconomic disparities further exacerbate the issue, making CVD prevention a crucial strategy in addressing the obesity epidemic. This study aims to analyze the trends in obesity and CVD, examine how obesity contributes to CVD development, assess the economic and social burdens of obesity-related CVD, and evaluate the effectiveness of prevention strategies and policy interventions. Using epidemiological data from sources such as the CDC and AHA, the study will provide insights into the biological and socioeconomic influences on obesity-related CVD within the U.S. adult population.

Epidemiology of Obesity in USA:

Over the past few decades, obesity rates in the U.S. have risen significantly. In 1999, the CDC reported that 30.5% of U.S. adults were obese, a figure that increased to 42.4% by 2018, highlighting a persistent upward trend. Obesity is a major risk factor for CVD, diabetes, and other chronic conditions. Additionally, childhood obesity has also seen a sharp increase, rising from 13.9% in 1999 to 19.3% in 2018 (Gao et al., 2022; CDC). The early onset of obesity poses a compounding public health burden, as it significantly increases the risk of developing CVD and other related health complications later in life.

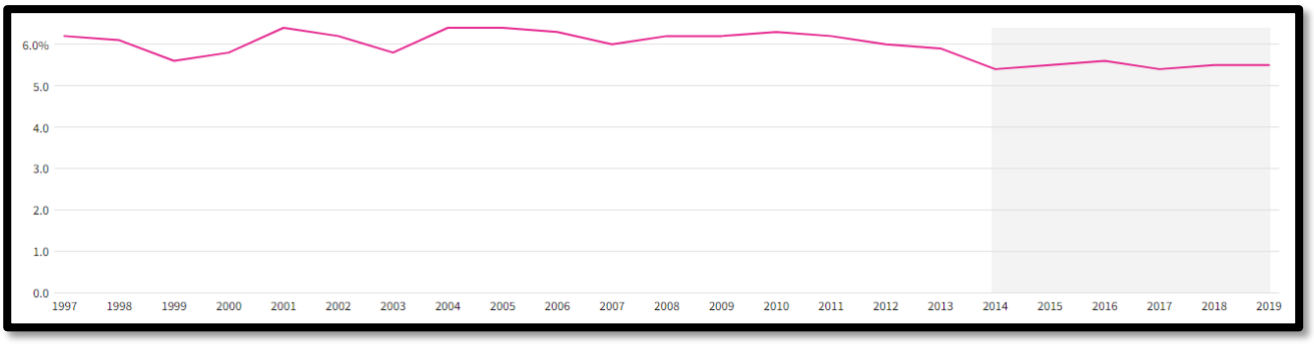


Obesity on black adults Hendley et al., (2010).

Obesity disproportionately affects certain populations, withBlack adults experiencing the highest prevalence at 49.6%, followed by Hispanics at 44.8% (Lim et al., 2020). In comparison, White adults have an obesity rate of 42.2%, while Asian adults have the lowest rate at 17.4% (Henning, 2021). Socioeconomic factors play a crucial role in these disparities, as low-income populations often face limited access to nutritious food, inadequate healthcare, and higher levels of stress, all of which contribute to obesity. Additionally, the shift toward a more sedentary lifestyle, coupled with a lack of a nutritious diet, has further fueled the obesity epidemic. The widespread availability and aggressive marketing of ultra-processed foods have led to excessive caloric intake, while poorly designed built environments—lacking walkable neighborhoods and safe spaces for physical activity—further discourage healthy behaviors. These environmental and socioeconomic factors, combined with individual choices, create a vicious cycle that continues to drive the growing obesity crisis in the U.S.

Cardiovascular diseases: Trends and Associated Risk Factors

The cardiovascular system is responsible for delivering blood, oxygen, and nutrients throughout the body to tissues, organs, and the brain. Diseases that affect this system include coronary artery disease (coronary heart disease), atherosclerosis, hypertension, and heart failure. Atherosclerosis, a condition where fatty deposits build up in the arteries, reduces blood flow and is a key underlying cause of cardiovascular disease (CVD). This narrowing of the arteries significantly increases the risk of heart attacks, strokes, and other serious health complications.



CVD deaths yearly USA Facts team.(2024, January4)

Also, CVD is the leading cause of death in the US, with about 695,000 CVD deaths yearly (Khalid et al., 2024). But CVD mortality has fallen from 2000 to 2015, with this trend turning around since then on account of the rising rates of obesity and diabetes. The risk of CVD is substantially elevated by these two conditions: hypertension, hyperlipidemia, and other metabolic disorders. These risk factors have been exacerbated due to the increase in obesity, resulting in higher morbidity and mortality rates of cardiovascular disease.

Link between obesity and CVD:

Several biological mechanisms for obesity to contribute to cardiovascular disease (CVD) are known to exist. In this way, obesity is one of the leading causes of systemic inflammation, which causes endothelial dysfunction, a factor of atherosclerosis. Also based on the studies of Piché, et al., (2020) obesity-associated insulin resistance impairs normal metabolic processes, leading to elevated blood sugar levels and the development of diabetes, which is considered a principal risk factor for CVD. Fat, mainly held deep within the abdominal cavity (visceral fat), increases the risk of hypertension and dyslipidemia, which are fundamental risk factors for cardiovascular events. Obesity raises the chance of coronary artery disease (CAD) to 64%, according to research from the Framingham Heart Study. Furthermore, as stated by Leszto et al., (2024) atrial fibrillation (AFib), caused by increased heart strain, results in irregular heartbeats and increases stroke risk, and obesity is also known to be closely tied to the development of atrial fibrillation. Clearly, these pathophysiological mechanisms describe how obesity is a significant, very, very complex relationship with CVD.

Public Health Burden of obesity-related CVD:

The American economic burden of obesity-related illnesses in the U.S. is significant, at about $173 billion per year. Direct costs of medical care for obesity-related conditions, including cardiovascular disease (CVD), diabetes and hypertension, are included. Annually, healthcare expenditures due to hospitalizations, medications, and long-term care associated with CVD alone cost more than $363 billion (Schmidt, (2022, February 22). In addition, the economy suffers from estimated workplace productivity losses and the resulting disability claims from those who are not able to work because of either CVD or obesity-related health issues. Precisely because the causality of obesity-related CVD disproportionately affects low-income and minority populations within a context of healthcare disparities like limited access to preventive care and treatment, non-economic or distal interventions to address the problem economically are unfeasible. These groups often live in food deserts having no access to physical activities, which eventually results in an increased prevalence of CVD in these populations, indirectly associated with obesity. The rising obesity rates also impose a heavy burden on the healthcare system in cardiac care and hospitalization (Wolfenden et al., 2019). With a growing number of people needing heart health care, there is a growing need for emergency services and long-term care, which only contributes to adding even more pressure on a system already stretched thin.

Epidemiological Methods and Data Source:

Key studies such as the Framingham Heart Disease Study and the National Health and Nutrition Examination Survey (NHANES) utilize cohort study designs to assess long-term cardiovascular disease (CVD) risks associated with obesity. Additionally, case-control and cross-sectional studies help measure obesity rates and their relationship with CVD. While NHANES provides direct anthropometric measurements of obesity, the Behavioral Risk Factor Surveillance System (BRFSS) relies on self-reported data on health behaviors and practices. Epidemiological techniques offer valuable insights by enabling the study of large population samples over time. However, these methods face limitations, including self-reporting bias, small sample sizes in certain studies, and underrepresentation of minority populations, which can impact the accuracy and generalizability of findings.

Prevention and intervention strategies:

Primary prevention focuses on adopting healthy lifestyle changes, such as maintaining a nutritious diet and regular physical activity. Initiatives like Michelle Obama's "Let's Move!" campaign have successfully encouraged healthier habits (Shuman, 2024). Increasing public awareness and implementing diet and exercise programs in schools and workplaces can help reduce obesity rates, ultimately lowering the risk of obesity-related cardiovascular disease (CVD).

Secondary prevention involves routine screenings for obesity using tools like BMI and waist circumference measurements, as well as early detection of conditions like hypertension and diabetes. Identifying these issues in their early stages allows for timely treatment, preventing the progression to more severe cardiovascular diseases. Policy measures have also proven effective in curbing obesity rates. For instance, research shows that implementing taxes on sugar-sweetened beverages (SSBs) can significantly reduce consumption. In Mexico, a 10% SSB tax led to a 7.6% decrease in sales (Teng et al., 2019). Additionally, school nutrition policies restricting junk food in cafeterias have contributed to reducing childhood obesity rates. These examples highlight the positive impact of policy interventions in addressing obesity and mitigating future CVD risk.

Challenges and future guidelines in public health

Challenges in Obesity Prevention and Control

Efforts to prevent and control obesity face several significant challenges. Cultural practices often reinforce unhealthy eating habits and sedentary lifestyles, making it difficult to implement behavioral changes within communities. Additionally, the political influence of the food industry plays a major role in shaping policies, often hindering the establishment of effective regulations that could promote healthier choices. Economic factors also contribute, as unhealthy, processed foods are often more affordable and accessible than nutritious options. Another critical challenge is the social stigma surrounding obesity, which can discourage individuals from seeking support, medical assistance, or early intervention. This reluctance to seek help can worsen obesity-related health conditions, leading to more severe complications over time. Addressing these challenges requires a multi-faceted approach, including policy reform, education, and increased access to healthcare and nutritious food options. Physician-led weight management programs have proven effective in helping patients adhere to treatment plans and lifestyle changes. These programs influence long-term habits by incorporating community-based initiatives, such as local fitness programs and nutrition education, which promote healthier dietary practices and physical activity. Looking ahead, future research should focus on precision medicine to develop personalized interventions for individuals with obesity-related cardiovascular disease (CVD). Additionally, further studies should evaluate the effectiveness of public health policies to guide intervention strategies and ensure the most impactful measures are implemented to combat obesity and its associated health risks.

Conclusion and public health implications:

The high obesity rates in the U.S. continue to drive the escalation of cardiovascular disease (CVD) cases, largely influenced by socioeconomic disparities, including race and income levels. Tackling this issue requires policy-driven interventions, such as expanding obesity-related taxes and tightening regulations on unhealthy food advertising and accessibility. Additionally, increased public health funding is essential for the effective implementation of obesity-related CVD prevention programs. To create a lasting impact, a comprehensive and collaborative approach is necessary, involving government agencies, the healthcare sector, and civic organizations. Immediate mass action and cooperative strategies must be adopted to address the long-term health and economic consequences of the obesity epidemic.

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