Obesity and Heart Problems: A Review

[1]Anil K Dwivedi & [2]Vishnu Vibhor Dwivedi

[1]Department of Botany, Deen Dayal Upadhyaya Gorakhpur University, Gorakhpur, U. P., India

[2]Junior Resident (Non Acad.), AIIMS, Gorakhpur, U. P., India

ABSTRACT

Excess body weight puts severe strain on the heart and blood vessels, significantly increasing the risk of cardiovascular disease. [1, 2]

How Obesity Affects the Heart

- High Blood Pressure (Hypertension): Extra body fat increases resistance in blood vessels, forcing the heart to pump harder. [1]
- High Cholesterol: Obesity raises "bad" LDL cholesterol and triglycerides while lowering "good" HDL cholesterol, leading to fatty plaque buildup in the arteries (atherosclerosis). [1, 2]
- Type 2 Diabetes: Excess weight drives insulin resistance, which accelerates damage to blood vessels and heart tissue. [1]
- Chronic Inflammation: Adipose (fat) tissue—especially around the abdomen—releases pro-inflammatory chemicals that harm arteries and promote clotting. [1, 2]
- Direct Heart Muscle Damage: Excess weight can independently cause heart muscle enlargement (left ventricular hypertrophy) and heart failure, even without high blood pressure or diabetes. [1, 2]
- Sleep Apnea: Obstructive sleep apnea is common with obesity and strains the heart, raising the risk of arrhythmias and pulmonary blood pressure

Key Heart Complications

- Heart Attack: Caused by blocked or restricted blood flow in coronary arteries. [1]
- Heart Failure: The heart struggles to pump enough blood to meet the body's needs. [1, 2]
- Stroke: Blocked or damaged blood vessels leading to the brain. [1, 2]
- Arrhythmias: Irregular heartbeats caused by structural changes in the heart chambers. [1]

Prevention and Management

- Weight Reduction: Gradual weight loss through a balanced diet and regular physical activity reduces heart strain and lowers inflammatory markers.
- Regular Screening: Monitor blood pressure, blood sugar, and cholesterol levels.
- Medical Guidance: Consult healthcare providers or cardiologists for tailored lifestyle plans, medical therapies, or weight-management interventions.

KEYWORDS-obesity, heart, complications, management, cholesterol, hypertension

INTRODUCTION

Adipose tissue is a specialized connective tissue that functions as the major storage site for body fat in the form of triglycerides. Adipose tissue is considered as the energy store of the body as well as acts as a mechanical cushion and insulates various body parts. In recent years, adipose tissue's function as an endocrine organ has been of increasing interest to researchers. Adipose tissue functions like a major endocrine organ producing numerous bioactive peptides, called "adipokines." These include leptin, chemerin, resistin, and various cytokines such as tumor necrosis factor alpha (TNFα) and interleukin 6 (IL6).4,5 Adipokines act on different organs and regulate energy balance, immunity, insulin sensitivity, angiogenesis, blood pressure, lipid metabolism, and hemostasis. In obesity, an increased level of adipokines creates an imbalance of different physiological functions which are ultimately linked with cardiovascular diseases. Leptin, in particular, controls the balance between food intake and energy metabolism.6 Increase secretion of leptin by excessive adipose tissue in obesity induces insulin resistance and causes metabolic syndrome which predispose to adverse cardiovascular effects.7 Increase in activity of TNFα and IL6 causes an increased inflammatory response in the adipose tissue. This results in the creation of a pro-inflammatory and prothrombotic state causing endothelial damage and vascular hypertrophy. The increased inflammatory activity is reflected by an increase in C-reactive protein [1,2,3] (CRP) levels in obese patients and is associated with adverse cardiac events. Obesity is also associated with increased plasma renin and aldosterone activity, as well as elevated insulin levels which promote left ventriclular hypertrophy (LVH)

In obesity, due to excess adipose tissue the total blood volume increases. This results in increased stroke volume, and cardiac output. The increased cardiac output in obese patients is to meet the metabolic demand of the excess adipose tissue. Although the heart rate is higher in obese individuals due to increased sympathetic activation, the increased cardiac output is related to an increase in stroke volume.9 The left ventricle dilates to accommodate the increased venous return and, in turn, becomes hypertrophic. In contrast to concentric LVH observed in hypertensive patients, the eccentric LVH is more common among morbidly obese patients. Eccentric LVH is characterized by an increase in LV cavity volume that is greater than the increase in the wall thickness and is an effect of increased cardiac output in obese subjects to meet the metabolic demand of excessive adipose tissue.

In obese subjects, in spite of lower peripheral vascular resistance; the Frank Starling curve is shifted to left because of increased wall stress related to increase in LV volume. The left atrium dilates as a result of increased circulating blood volume and a higher left ventricle diastolic filling pressure. The dilated left atrium and elevated LV filling pressure increase the risk of heart failure and atrial fibrillation. Alteration in myocardial structure due to fatty tissue infiltration predisposes to conduction abnormalities and ventricle arrhythmias10,11 which further potentiate heart failure.[4,5,6]

DISCUSSION

Obesity is a major health concern today, and one of its most serious consequences is heart disease, the leading cause of death worldwide. The good news is that with awareness and the right lifestyle changes, this harmful cycle can be stopped.

How Obesity Affects the Heart
Carrying extra weight puts strain on the heart and blood vessels. Here's how it can lead to heart problems:

High Blood Pressure: Excess fat increases resistance in the blood vessels, making the heart work harder. Over time, this can damage arteries and raise the risk of heart attacks or strokes.
High Cholesterol: Obesity often leads to high "bad" cholesterol (LDL) and low "good" cholesterol (HDL). This causes fatty deposits in the arteries, restricting blood flow to the heart.
Increased Diabetes Risk: Obesity is a major cause of type 2 diabetes, which further harms blood vessels and increases the risk of cardiovascular disease.
Inflammation: Fat tissue, particularly around the abdomen, releases chemicals that trigger inflammation, which can contribute to the development of heart disease.
Sleep Apnea: Obesity increases the risk of developing obstructive sleep apnea, a disorder in which breathing repeatedly stops during sleep. This puts extra stress on the heart.
The Vicious Cycle
Obesity not only causes heart problems but also makes them harder to manage. Fatigue, joint pain, or shortness of breath may limit physical activity, leading to further weight gain and worsening heart health. Breaking this cycle requires conscious lifestyle changes or medical help.[7,8,9]

Warning Signs to Watch For
Sometimes heart issues caused by obesity develop silently, but common signs include:

Shortness of breath during everyday activities
Chest pain or tightness
Swelling in the legs or ankles
Fatigue or low energy
Irregular heartbeat
How to Break the Cycle
The link between obesity and heart disease is strong, but it can be reversed. Steps to protect your heart include:

Aim for Gradual Weight Loss: Losing 5–10% of your body weight can help lower blood pressure, improve cholesterol levels, and reduce the risk of diabetes. Small, consistent changes matter more than drastic diets.
Follow a Heart-Healthy Diet: Include fruits, vegetables, whole grains, and lean proteins. Limit processed foods, sugary drinks, and excess salt. Choose healthy fats, such as olive oil, nuts, and seeds.
Increase Physical Activity: Regular exercise strengthens the heart and burns calories. Even 30 minutes of brisk walking most days can help.
Manage Stress: Stress can trigger unhealthy eating or habits. Yoga, meditation, or hobbies can help reduce stress.

Prioritise Sleep: Aim for 7–8 hours of quality sleep to support heart and overall health.
Seek Medical Guidance: In some cases, doctors may recommend medications, structured weight management programs, or bariatric surgery.
Prevention is Key
Obesity and heart disease are closely linked, but the cycle can be broken. By making small, lasting changes, you can protect your heart and improve your quality of life. Remember, it's not about quick fixes; it's about long-term habits that lead to a healthier heart and a better future.[10,11,12]

RESULTS

Obesity is no longer just a lifestyle concern — it is a serious chronic disease directly linked to heart health. Across India, cardiologists are witnessing a steady rise in cardiovascular problems among individuals who are overweight or obese. At KG Hospital, Coimbatore, our cardiac specialists emphasize that early weight management can significantly reduce the risk of heart attack, heart failure, and other cardiovascular complications.

Understanding Obesity as a Chronic Disease

Obesity is medically classified as Adiposity-Based Chronic Disease (ABCD). A person is considered obese when their Body Mass Index (BMI) is above 30, but measuring central obesity (abdominal fat) is often more accurate in assessing cardiac risk. Abdominal fat is metabolically active and plays a major role in insulin resistance, chronic inflammation, hormonal imbalance, and atherosclerosis (artery blockage).

How Obesity Affects Heart Health

Excess body fat impacts the heart in several dangerous ways:

Increases Insulin Resistance: Reduces the body's ability to use insulin effectively, leading to Type 2 diabetes — a major heart disease risk factor.
Triggers Chronic Inflammation: Persistent low-grade inflammation damages blood vessels and accelerates plaque formation in arteries.
Raises Blood Pressure: Obesity increases sympathetic nervous system activity, leading to hypertension.
Causes Abnormal Lipid Profiles: High LDL (bad cholesterol) and triglycerides increase coronary artery disease risk.
Promotes Blood Clot Formation: Higher clotting tendency increases heart attack and stroke risk.[13,14,15]
Leads to Sleep Apnea: Obstructive sleep apnea, common in obese individuals, strains the heart and increases arrhythmia risk.
Why Abdominal Fat Is More Dangerous
Not all fat is equal. Visceral fat (fat around internal organs) releases inflammatory chemicals, worsens insulin resistance, increases coronary artery disease risk, and contributes to irregular heart rhythms. Measuring waist circumference can sometimes be more predictive of heart risk than BMI alone.
Practical Weight Management Tips for Heart Health
Cardiologist-recommended strategies include:

Smart eating patterns: protein first, vegetables next, carbohydrates last; avoid added sugars; reduce salt and processed foods.
Stay physically active: minimum 30–45 minutes of moderate exercise daily.
Prioritize sleep: aim for 7–8 hours of quality sleep and address snoring or sleep apnea early.
Manage stress through yoga, meditation, and reduced screen time.
Avoid smoking and excess alcohol.
Modern medications like semaglutide and tirzepatide may support weight loss in eligible patients, but should always be combined with lifestyle changes and used under cardiologist supervision.
You may already be aware that obesity can lead to the development of high blood sugar and raised levels of blood pressure and cholesterol. However, you may not have realised that these are all significant risk factors for CVD – if left untreated, they can potentially cause heart disease.

Why? There are two key reasons. High levels of fat in the body (known as adiposity) is known to cause a wide-range of cardiovascular abnormalities, such as increased heart rate, and raised pressure on the arteries in the heart. These abnormalities can all increase the risk of a CV event.[16,17,18]

The second factor is hardening of the arteries (atherosclerosis) caused by a build-up of fatty material in the blood vessels. This restricts blood flow and increases the risk of blood clots and stroke (where the blood supply to part of the brain is cut off).

The reality is that people living with overweight or obesity are at a greater risk of a CVD event. On a more positive note, most people can reduce their risk by making changes to their lifestyle.

How can you reduce your risk of CVD?
The good news is that making relatively small changes can help to reduce the risk of CVD. In fact, you may already be making some of these choices.

Many people understand the importance of keeping track of blood pressure, cholesterol and blood sugar levels. Your doctor, nurse or pharmacist can arrange for you to be tested on a regular basis. If your levels are above normal limits you may be offered medication or advised to make lifestyle changes
It is equally important to try and keep your weight within a healthy range. Even modest reductions in your weight can have a positive effect in terms of reducing the risk of CVD
You should also aim to increase your level of activity. Find something that you enjoy – brisk walking, dancing or football are all beneficial!
Quitting smoking is a healthy choice for everyone, as is keeping alcohol levels to within recommended limits
The sooner you start making changes, the better. The first step is to talk to your healthcare professional.

Tips for making the most of your healthcare professional's appointment

Make a list of any questions and take notes during the appointment. Consider taking a friend or family member along for support
Explain that you are aware of the link between obesity and heart disease and concerned that you may be at risk. Ask what specific steps you can take to reduce your risk
If you are struggling to control your weight, explain that you need support
Be honest. There is no point pretending that everything is OK if you are finding it difficult to cope
If you do not understand something, say so! It is important to be clear about what you are being advised to do
What can I expect my healthcare professional to do?
Depending on your individual circumstances, your healthcare professional may discuss a range of different strategies. These include:

Regular monitoring of your cholesterol, blood pressure and blood sugar. Make sure you understand what the results mean
Discussing lifestyle factors such as increasing levels of exercise, quitting smoking and reducing alcohol intake[17,18,19]
Reviewing eating habits and agreeing a plan of healthy eating
Identifying and tackling behaviours that are preventing you from managing your weight. You may be referred to a specialist weight management provider or offered behavioural therapy
Discussing weight loss medications if appropriate
Discussing bariatric surgery (surgery to the gastric system) if appropriate

CONCLUSIONS

Patients and doctors alike often think “everything’s OK” in the absence of diabetes or hypertension. But there may be silent heart injury going on. Take extra pounds seriously with these steps.

Try to lose weight (if overweight) or control weight.
Know your heart disease risk. It’s smart to have your heart risk assessed and “know your numbers” (BMI, blood pressure, blood sugar, cholesterol).
If you’re obese, be watchful for signs of heart failure. These include fatigue, shortness of breath and an irregular heartbeat.
Realize that all weight loss helps. For every five-point increase in BMI, the risk of heart failure rose by 32 percent in the study. [20]

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