As per UGC guidelines an electronic bar code is provided to seure your paper

International Journal for Modern Trends in Science and Technology
Volume 10, Issue 03, pages 342-351.
ISSN: 2455-3778 online
Available online at: http://www.ijmtst.com/vol10issue03.html
DOI: https://doi.org/10.46501/IJMTST1003059

Effect of Obesity on Human Health

Dr. C L Verma

Principal, Swami Gopaldas Govt. Girls College, Churu, Rajasthan, India.

To Cite this Article
Dr. C L Verma, Effect of Obesity on Human Health, International Journal for Modern Trends in Science and Technology, 2024, 10(03), pages. 342-351.https://doi.org/10.46501/IJMTST1003059

Article Info
Received: 24 February 2024; Accepted: 13 March 2024; Published: 16 March 2024.

Copyright © Dr. C L Verma; This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Being overweight or obese can have a serious impact on health. Carrying extra fat leads to serious health consequences such as cardiovascular disease (mainly heart disease and stroke), type 2 diabetes, musculoskeletal disorders like osteoarthritis, and some cancers (endometrial, breast and colon).

Keywords-obesity, overweight, cardiovascular, diseases, cancers, diabetes, health

1. INTRODUCTION

People who have overweight or obesity*, compared to those with healthy weight, are at increased risk for many serious diseases and health conditions. These include:1,2,3

- All-causes of death (mortality).
- High blood pressure (hypertension).
- High LDL cholesterol, low HDL cholesterol, or high levels of triglycerides (dyslipidemia).
- Type 2 diabetes.
- Coronary heart disease.
- Stroke.
- Gallbladder disease.
- Osteoarthritis (a breakdown of cartilage and bone within a joint).
- Sleep apnea and breathing problems.
- Many types of cancer.
- Low quality of life.
- Mental illness such as clinical depression, anxiety, and other mental disorders4,5.
- Body pain and difficulty with physical functioning6.

*Overweight is defined as a body mass index (BMI) of 25 or higher. Obesity is defined as a BMI of 30 or higher. See the BMI calculator for people 20 years and older and the BMI calculator for people ages 2 through 19.[1,2,3]

Overweight and obesity may increase your risk for many health problems—especially if you carry extra fat around your waist. Reaching and staying at a healthy weight can help prevent these problems, stop them from getting worse, or even make them go away.

Type 2 diabetes

Type 2 diabetes is a disease that occurs when your blood glucose, also called blood sugar, is too high. Nearly 9 in 10 people with type 2 diabetes have overweight or obesity.12 Over time, high blood glucose can lead to heart disease, stroke, kidney disease, eye problems, nerve damage, and other health problems.

If you are at risk for type 2 diabetes, you may be able to prevent or delay diabetes by losing at least 5% to 7% of your starting weight.13,14 For instance, if you weigh 200

pounds, your goal would be to lose about 10 to 14 pounds.

High blood pressure

Overweight and obesity may raise your risk for high blood pressure.

High blood pressure NIH external link, also called hypertension, is a condition in which blood flows through your blood vessels with a force greater than normal. Having a large body size may increase blood pressure because your heart needs to pump harder to supply blood to all your cells. Excess fat may also damage your kidneys, which help regulate blood pressure.

High blood pressure can strain your heart, damage blood vessels, and raise your risk of heart attack, stroke NIH external link, kidney disease, and death.10 Losing enough weight to reach a healthy body mass index range may lower high blood pressure and prevent or control related health problems.

Heart disease

Heart disease NIH external link is a term used to describe several health problems that affect your heart, such as a heart attack, heart failure, angina NIH external link, or an abnormal heart rhythm. Having overweight or obesity increases your risk of developing conditions that can lead to heart disease, such as high blood pressure, high blood cholesterol NIH external link, and high blood glucose. In addition, excess weight can also make your heart have to work harder to send blood to all the cells in your body. Losing excess weight may help you lower these risk factors for heart disease.

Stroke

A stroke happens when a blood vessel in your brain or neck is blocked or bursts, cutting off blood flow to a part of your brain. A stroke can damage brain tissue and make you unable to speak or move parts of your body.

Overweight and obesity are known to increase blood pressure—and high blood pressure is the leading cause of strokes. Losing weight may help you lower your blood pressure and other risk factors for stroke, including high blood glucose and high blood cholesterol.

Metabolic syndrome

Metabolic syndrome NIH external link is a group of conditions that increase your risk for heart disease, diabetes, and stroke. To be diagnosed with metabolic syndrome, you must have at least three of the following conditions

- large waist size
- high level of triglycerides NIH external link in your blood
- high blood pressure
- high level of blood glucose when fasting
- low level of HDL cholesterol NIH external link —the "good" cholesterol—in your blood

Metabolic syndrome is closely linked to overweight and obesity and to a lack of physical activity. Healthy lifestyle changes that help you control your weight may help you prevent and reduce metabolic syndrome.

Fatty liver diseases

Fatty liver diseases develop when fat builds up in your liver, which can lead to severe liver damage, cirrhosis, or even liver failure. These diseases include nonalcoholic fatty liver disease (NAFLD) and nonalcoholic steatohepatitis (NASH). [4,5,6]

NAFLD and NASH most often affect people who have overweight or obesity. People who have insulin resistance, unhealthy levels of fat in the blood, metabolic syndrome, type 2 diabetes, and certain genes can also develop NAFLD and NASH.

If you have overweight or obesity, losing at least 3% to 5% of your body weight may reduce fat in the liver.15

Some cancers

Cancer NIH external link is a collection of related diseases. In all types of cancer, some of the body's cells begin to grow abnormally or out of control. The cancerous cells sometimes spread to other parts of the body.

Overweight and obesity may raise your risk of developing certain types of cancer NIH external link. Men with overweight or obesity are at a higher risk for developing cancers of the colon NIH external link, rectum NIH external link, and prostate NIH external link.10 Among women with overweight or obesity, cancers of the breast NIH external link, lining of the uterus NIH external link, and gallbladder NIH external link are more common.

Adults who gain less weight as they get older have lower risks of many types of cancer, including colon, kidney NIH external link, breast, and ovarian cancers NIH external link.16

Breathing problems

Overweight and obesity can also affect how well your lungs work, and excess weight increases your risk for breathing problems.17

Sleep apnea

Sleep apnea NIH external link is a common problem that can happen while you are sleeping. If you have sleep apnea, your upper airway becomes blocked, causing you to breathe irregularly or even stop breathing altogether for short periods of time. Untreated sleep apnea may raise your risk for developing many health problems, including heart disease and diabetes.

Obesity is a common cause of sleep apnea in adults.18 If you have overweight or obesity, you may have more fat stored around your neck, making the airway smaller. A smaller airway can make breathing difficult or cause snoring. If you have overweight or obesity, losing weight may help reduce sleep apnea or make it go away.

Asthma

Asthma NIH external link is a chronic, or long-term, condition that affects the airways in your lungs. The airways are tubes that carry air in and out of your lungs. If you have asthma, the airways can become inflamed and narrow at times. You may wheeze, cough, or feel tightness in your chest.

Obesity can increase your risk of developing asthma, experiencing worse symptoms, and having a harder time managing the condition.19 Losing weight can make it easier for you to manage your asthma. For people who have severe obesity, weight-loss surgery—also called metabolic and bariatric surgery—may improve asthma symptoms.17

Osteoarthritis

Osteoarthritis NIH external link is a common, long-lasting health problem that causes pain, swelling, stiffness, and reduced motion in your joints NIH external link. Obesity is a leading risk factor for osteoarthritis in the knees, hips, and ankles.20

Having overweight or obesity may raise your risk of getting osteoarthritis by putting extra pressure on your joints and cartilage. If you have excess body fat, your blood may have higher levels of substances that cause inflammation. Inflamed joints may raise your risk for osteoarthritis.

If you have overweight or obesity, losing weight may decrease stress on your knees, hips, and lower back and lessen inflammation in your body. If you have osteoarthritis, losing weight may improve your symptoms. Research shows that exercise is one of the best treatments for osteoarthritis. Exercise can improve mood, decrease pain, and increase flexibility.

Gout

Gout NIH external link is a kind of arthritis NIH external link that causes pain and swelling in your joints. Gout develops when crystals made of a substance called uric acid build up in your joints. Risk factors include having obesity, being male, having high blood pressure, and eating foods high in purines NIH external link.21 These foods include red meat, liver, and anchovies.

Gout is treated mainly with medicines. Losing weight may also help prevent and treat gout.22

Diseases of the gallbladder and pancreas

Overweight and obesity may raise your risk of getting gallbladder diseases, such as gallstones and cholecystitis. People who have obesity may have higher levels of cholesterol in their bile, which can cause gallstones. They may also have a large gallbladder that does not work well.

Having a large amount of fat around your waist may raise your risk for developing gallstones. But losing weight quickly also increases your risk. If you have obesity, talk with your health care professional about how to lose weight safely.

Obesity can also affect your pancreas, a large gland behind your stomach that makes insulin and enzymes to help you digest food. People who have obesity have a higher risk of developing inflammation of the pancreas, called pancreatitis. High levels of fat in your blood can also raise your risk of having pancreatitis. You can lower your chances of getting pancreatitis by sticking with a low-fat, healthy eating plan.

Kidney disease

Kidney disease means your kidneys are damaged and can't filter your blood as they should. Obesity raises the risk of developing diabetes and high blood pressure, which are the most common causes of chronic kidney disease (CKD). Even if you don't have diabetes or high blood pressure, having obesity may increase your risk of developing CKD and speed up its progress.23

If you have overweight or obesity, losing weight may help you prevent or delay CKD. If you are in the early stages of CKD, consuming healthy foods and beverages, being active, and losing excess weight may slow the progress of the disease and keep your kidneys healthier longer.24

Pregnancy problems

Overweight and obesity raise the risk of developing health problems that can affect the pregnancy and the baby's health.

Overweight and obesity raise the risk of developing health problems during pregnancy that can affect the pregnancy and the baby's health. Pregnant people who have obesity may have a greater chance of 10

- developing gestational diabetes, or diabetes that occurs during pregnancy[7,8,9]
- having preeclampsia NIH external link, or high blood pressure during pregnancy, which can cause severe health problems for the pregnant person and baby if left untreated
- needing a caesarean delivery NIH external link—or c-section—and, as a result, taking longer to recover after giving birth
- having complications from surgery and anesthesia NIH external link, especially if they have severe obesity
- gaining more weight or continuing to have overweight or obesity after the baby is born

Having obesity or gaining too much weight during pregnancy can also increase health risks for the baby, including25

- being born larger than expected based on the sex of the baby or the duration of the pregnancy
- developing chronic diseases as adults, including type 2 diabetes, obesity, heart disease, and asthma

Talk with your health care professional about how to

- reach a healthy weight before pregnancy
- gain a healthy amount of weight during pregnancy
- safely lose weight after your baby is born

Fertility problems

Obesity increases the risk of developing infertility NIH external link. Infertility in women means not being able to get pregnant after a year of trying, or getting pregnant but not being able to carry a pregnancy to term. For men, it means not being able to get a woman pregnant.26

Obesity is linked to lower sperm count and sperm quality in men.27 In women, obesity is linked to problems with the menstrual cycle NIH external link and ovulation External link.26 Obesity can also make it harder to become pregnant with the help of certain infertility treatments or procedures.26

Women with obesity who lose 5% of their body weight may increase their chances of having regular menstrual periods, ovulating, and becoming pregnant.28

Sexual function problems

Obesity may also increase the risk of developing sexual function problems.29 Having overweight or obesity increase the risk of developing erectile dysfunction (ED), a condition in which males are unable to get or keep an erection firm enough for satisfactory sexual intercourse.

Few studies have looked at how obesity may affect female sexual function by contributing to problems such as loss of sexual desire, being unable to become or stay aroused, being unable to have an orgasm, or having pain during sex.30 But research suggests that healthy eating, increased physical activity, and weight loss may help reduce sexual function problems in people with obesity.29,30

Mental health problems

In addition to increasing the risk for developing physical health problems, obesity can also affect mental health, increasing the risk for developing31

- long-term stress NIH external link
- body image problems
- low self-esteem
- depression NIH external link
- eating disorders NIH external link

Studies show that people with overweight or obesity are also likely to face weight-related bias at school and work, which may cause long-term harm to their quality of life.31 Losing excess weight has been found to improve body image and self-esteem and reduce symptoms of depression.32

2. DISCUSSION

Obesity is a medical condition, sometimes considered a disease,[8][9][10] in which excess body fat has accumulated to such an extent that it can potentially have negative effects on health. People are classified as obese when their body mass index (BMI)—a person's weight divided by the square of the person's height—is over 30 kg/m2; the range 25–30 kg/m2 is defined as overweight.[1] Some East Asian countries use lower values to calculate obesity.[11] Obesity is a major cause of disability and is correlated with various diseases and conditions, particularly cardiovascular diseases, type 2 diabetes, obstructive sleep apnea, certain types of cancer, and osteoarthritis.[2][12][13]

Obesity has individual, socioeconomic, and environmental causes. Some known causes are diet, physical activity, automation, urbanization, genetic susceptibility, medications, mental disorders, economic policies, endocrine disorders, and exposure to endocrine-disrupting chemicals.[1][4][14][15]

While a majority of obese individuals at any given time attempt to lose weight and are often successful, maintaining weight loss long-term is rare.[16] There is no effective, well-defined, evidence-based intervention for preventing obesity. Obesity prevention requires a complex approach, including interventions at societal, community, family, and individual levels.[1][13] Changes to diet as well as exercising are the main treatments recommended by health professionals.[2] Diet quality can be improved by reducing the consumption of energy-dense foods, such as those high in fat or sugars, and by increasing the intake of dietary fiber, if these dietary choices are available, affordable, and accessible.[1] Medications can be used, along with a suitable diet, to reduce appetite or decrease fat absorption.[5] If diet, exercise, and medication are not effective, a gastric balloon or surgery may be performed to reduce stomach volume or length of the intestines, leading to feeling full earlier, or a reduced ability to absorb nutrients from food.[6][17]

Obesity is a leading preventable cause of death worldwide, with increasing rates in adults and children.[18] In 2022, over 1 billion people were obese worldwide (879 million adults and 159 million children), representing more than a double of adult cases (and four times higher than cases among children) registered in 1990.[19][20] Obesity is more common in women than in men.[1] Today, obesity is stigmatized in most of the world. Conversely, some cultures, past and present, have a favorable view of obesity, seeing it as a symbol of wealth and fertility.[2][21] The World Health Organization, the US, Canada, Japan, Portugal, Germany, the European Parliament and medical societies, e.g. the American Medical Association, classify obesity as a disease. Others, such as the UK, do not

Obesity is typically defined as a substantial accumulation of body fat that could impact health.[27] Medical organizations tend to classify people as obese based on body mass index (BMI) – a ratio of a person's weight in kilograms to the square of their height in meters. For adults, the World Health Organization (WHO) defines "overweight" as a BMI 25 or higher, and "obese" as a BMI 30 or higher.[27] The U.S. Centers for Disease Control and Prevention (CDC) further subdivides obesity based on BMI, with a BMI 30 to 35 called class 1 obesity; 35 to 40, class 2 obesity; and 40+, class 3 obesity.[28]

For children, obesity measures take age into consideration along with height and weight. For children aged 5–19, the WHO defines obesity as a BMI two standard deviations above the median for their age (a BMI around 18 for a five-year old; around 30 for a 19-year old).[27][29] For children under five, the WHO defines obesity as a weight three standard deviations above the median for their height.[27]

Some modifications to the WHO definitions have been made by particular organizations.[30] The surgical literature breaks down class II and III or only class III obesity into further categories whose exact values are still disputed.[31]

- Any BMI ≥ 35 or 40 kg/m2 is severe obesity.[10,11,12]
- A BMI of ≥ 35 kg/m2 and experiencing obesity-related health conditions or ≥ 40 or 45 kg/m2 is morbid obesity.
- A BMI of ≥ 45 or 50 kg/m2 is super obesity.

As Asian populations develop negative health consequences at a lower BMI than Caucasians, some nations have redefined obesity; Japan has defined obesity as any BMI greater than 25 kg/m2[11] while China uses a BMI of greater than 28 kg/m2.[30]

The preferred obesity metric in scholarly circles is the body fat percentage (BF%) – the ratio of the total weight of person's fat to his or her body weight, and BMI is viewed merely as a way to approximate BF%.[32] Levels in excess of 32% for women and 25% for men are generally considered to indicate obesity.

BMI ignores variations between individuals in amounts of lean body mass, particularly muscle mass. Individuals involved in heavy physical labor or sports may have high BMI values despite having little fat. For example, more than half of all NFL players are classified as "obese" (BMI ≥ 30), and 1 in 4 are classified as "extremely obese" (BMI ≥ 35), according to the BMI metric.[33] However, their mean body fat percentage, 14%, is well within what is considered a healthy range.[34] Similarly, Sumo wrestlers may be categorized by BMI as "severely obese" or "very severely obese" but many Sumo wrestlers are not categorized as obese when body fat percentage is used instead (having <25% body fat).[35] Some Sumo

wrestlers were found to have no more body fat than a non-Sumo comparison group, with high BMI values resulting from their high amounts of lean body mass.[35]

Category[26]	BMI (kg/m2)
Underweight	< 18.5
Normal weight	18.5 – 24.9
Overweight	25.0 – 29.9
Obese (class I)	30.0 – 34.9
Obese (class II)	35.0 – 39.9
Obese (class III)	≥ 40.0

Excess appetite for palatable, high-calorie food (especially fat, sugar, and certain animal proteins) is seen as the primary factor driving obesity worldwide, likely because of imbalances in neurotransmitters affecting the drive to eat.[107] Dietary energy supply per capita varies markedly between different regions and countries. It has also changed significantly over time.[106] From the early 1970s to the late 1990s the average food energy available per person per day (the amount of food bought) increased in all parts of the world except Eastern Europe. The United States had the highest availability with 3,654 calories (15,290 kJ) per person in 1996.[106] This increased further in 2003 to 3,754 calories (15,710 kJ).[106] During the late 1990s, Europeans had 3,394 calories (14,200 kJ) per person, in the developing areas of Asia there were 2,648 calories (11,080 kJ) per person, and in sub-Saharan Africa people had 2,176 calories (9,100 kJ) per person.[106][108] Total food energy consumption has been found to be related to obesity.[109]

The widespread availability of dietary guidelines[110] has done little to address the problems of overeating and poor dietary choice.[111] From 1971 to 2000, obesity rates in the United States increased from 14.5% to 30.9%.[112] During the same period, an increase occurred in the average amount of food energy consumed. For women, the average increase was 335 calories (1,400 kJ) per day (1,542 calories (6,450 kJ) in 1971 and 1,877 calories (7,850 kJ) in 2004), while for men the average increase was 168 calories (700 kJ) per day (2,450 calories (10,300 kJ) in 1971 and 2,618 calories (10,950 kJ) in 2004). Most of this extra food energy came from an increase in carbohydrate consumption rather than fat consumption.[113] The primary sources of these extra carbohydrates are sweetened beverages, which now account for almost 25 percent of daily food energy in young adults in America,[114] and potato chips.[115] Consumption of sweetened beverages such as soft drinks, fruit drinks, and iced tea is believed to be contributing to the rising rates of obesity[116][117] and to an increased risk of metabolic syndrome and type 2 diabetes.[118] Vitamin D deficiency is related to diseases associated with obesity.[119]

As societies become increasingly reliant on energy-dense, big-portions, and fast-food meals, the association between fast-food consumption and obesity becomes more concerning.[120] In the United States, consumption of fast-food meals tripled and food energy intake from these meals quadrupled between 1977 and 1995.[121]

Agricultural policy and techniques in the United States and Europe have led to lower food prices. In the United States, subsidization of corn, soy, wheat, and rice through the U.S. farm bill has made the main sources of processed food cheap compared to fruits and vegetables.[122] Calorie count laws and nutrition facts labels attempt to steer people toward making healthier food choices, including awareness of how much food energy is being consumed.

Obese people consistently under-report their food consumption as compared to people of normal weight.[123] This is supported both by tests of people carried out in a calorimeter room[124] and by direct observation.[13,14,15]

3. RESULTS

A sedentary lifestyle may play a significant role in obesity.[52]:10 Worldwide there has been a large shift towards less physically demanding work,[125][126][127] and currently at least 30% of the world's population gets insufficient exercise.[126] This is primarily due to increasing use of mechanized transportation and a greater prevalence of labor-saving technology in the home.[125][126][127] In children, there appear to be declines in levels of physical activity (with particularly strong declines in the amount of walking and physical education), likely due to safety concerns, changes in social interaction (such as fewer relationships with neighborhood children), and inadequate urban design (such as too few public spaces for safe physical activity).[128] World trends in active leisure time physical activity are less clear. The World Health Organization indicates people worldwide are taking up

less active recreational pursuits, while research from Finland[129] found an increase and research from the United States found leisure-time physical activity has not changed significantly.[130] Physical activity in children may not be a significant contributor.[131]

In both children and adults, there is an association between television viewing time and the risk of obesity.[132][133][134] Increased media exposure increases the rate of childhood obesity, with rates increasing proportionally to time spent watching television.[135]

Like many other medical conditions, obesity is the result of an interplay between genetic and environmental factors.[137] Polymorphisms in various genes controlling appetite and metabolism predispose to obesity when sufficient food energy is present. As of 2006, more than 41 of these sites on the human genome have been linked to the development of obesity when a favorable environment is present.[138] People with two copies of the FTO gene (fat mass and obesity associated gene) have been found on average to weigh 3–4 kg more and have a 1.67-fold greater risk of obesity compared with those without the risk allele.[139] The differences in BMI between people that are due to genetics varies depending on the population examined from 6% to 85%.[140]

Obesity is a major feature in several syndromes, such as Prader–Willi syndrome, Bardet–Biedl syndrome, Cohen syndrome, and MOMO syndrome. (The term "non-syndromic obesity" is sometimes used to exclude these conditions.)[141] In people with early-onset severe obesity (defined by an onset before 10 years of age and body mass index over three standard deviations above normal), 7% harbor a single point DNA mutation.[142]

Studies that have focused on inheritance patterns rather than on specific genes have found that 80% of the offspring of two obese parents were also obese, in contrast to less than 10% of the offspring of two parents who were of normal weight.[143] Different people exposed to the same environment have different risks of obesity due to their underlying genetics.[144]

The thrifty gene hypothesis postulates that, due to dietary scarcity during human evolution, people are prone to obesity. Their ability to take advantage of rare periods of abundance by storing energy as fat would be advantageous during times of varying food availability, and individuals with greater adipose reserves would be more likely to survive famine. This tendency to store fat, however, would be maladaptive in societies with stable food supplies.[This theory has received various criticisms, and other evolutionarily-based theories such as the drifty gene hypothesis and the thrifty phenotype hypothesis have also been proposed.

Certain physical and mental illnesses and the pharmaceutical substances used to treat them can increase risk of obesity. Medical illnesses that increase obesity risk include several rare genetic syndromes (listed above) as well as some congenital or acquired conditions: hypothyroidism, Cushing's syndrome, growth hormone deficiency,[145] and some eating disorders such as binge eating disorder and night eating syndrome.[2] However, obesity is not regarded as a psychiatric disorder, and therefore is not listed in the DSM-IVR as a psychiatric illness.[146] The risk of overweight and obesity is higher in patients with psychiatric disorders than in persons without psychiatric disorders.[147] Obesity and depression influence each other mutually, with obesity increasing the risk of clinical depression, and also depression leading to a higher chance of developing obesity. Certain medications may cause weight gain or changes in body composition; these include insulin, sulfonylureas, thiazolidinediones, atypical antipsychotics, antidepressants, steroids, certain anticonvulsants (phenytoin and valproate), pizotifen, and some forms of hormonal contraception[16,17,18]

4. CONCLUSION

Management

The main treatment for obesity consists of weight loss via lifestyle interventions, including prescribed diets and physical exercise.[23][96][178][179] Although it is unclear what diets might support long-term weight loss, and although the effectiveness of low-calorie diets is debated,[180] lifestyle changes that reduce calorie consumption or increase physical exercise over the long term also tend to produce some sustained weight loss, despite slow weight regain over time.[23][180][181][182] Although 87% of participants in the National Weight Control Registry were able to maintain 10% body weight loss for 10 years,[183][the most appropriate dietary approach for long term weight loss maintenance is still unknown.[184] In the US, intensive behavioral interventions combining both dietary changes and

exercise are recommended.[23][178][185] Intermittent fasting has no additional benefit of weight loss compared to continuous energy restriction.[184] Adherence is a more important factor in weight loss success than whatever kind of diet an individual undertakes.[184][186]

Several hypo-caloric diets are effective.[23] In the short-term low carbohydrate diets appear better than low fat diets for weight loss.[187] In the long term, however, all types of low-carbohydrate and low-fat diets appear equally beneficial.[187][188] Heart disease and diabetes risks associated with different diets appear to be similar.[189] Promotion of the Mediterranean diets among the obese may lower the risk of heart disease.[187] Decreased intake of sweet drinks is also related to weight-loss.[187] Success rates of long-term weight loss maintenance with lifestyle changes are low, ranging from 2–20%.[190] Dietary and lifestyle changes are effective in limiting excessive weight gain in pregnancy and improve outcomes for both the mother and the child.[191] Intensive behavioral counseling is recommended in those who are both obese and have other risk factors for heart disease[19]

Health policy

Obesity is a complex public health and policy problem because of its prevalence, costs, and health effects.[193] As such, managing it requires changes in the wider societal context and effort by communities, local authorities, and governments.[185] Public health efforts seek to understand and correct the environmental factors responsible for the increasing prevalence of obesity in the population. Solutions look at changing the factors that cause excess food energy consumption and inhibit physical activity. Efforts include federally reimbursed meal programs in schools, limiting direct junk food marketing to children,[194] and decreasing access to sugar-sweetened beverages in schools.[195] The World Health Organization recommends the taxing of sugary drinks.[196] When constructing urban environments, efforts have been made to increase access to parks and to develop pedestrian routes.[197]

Mass media campaigns seem to have limited effectiveness in changing behaviors that influence obesity, but may increase knowledge and awareness regarding physical activity and diet, which might lead to changes in the long term. Campaigns might also be able to reduce the amount of time spent sitting or lying down and positively affect the intention to be active physically.[198][199] Nutritional labelling with energy information on menus might be able to help reducing energy intake while dining in restaurants.[200] Some call for policy against ultra-processed foods.[201][202]

Medical interventions

Medication

Since the introduction of medicines for the management of obesity in the 1930s, many compounds have been tried. Most of them reduce body weight by small amounts, and several of them are no longer marketed for obesity because of their side effects. Out of 25 anti-obesity medications withdrawn from the market between 1964 and 2009, 23 acted by altering the functions of chemical neurotransmitters in the brain. The most common side effects of these drugs that led to withdrawals were mental disturbances, cardiac side effects, and drug abuse or drug dependence. Deaths were reportedly associated with seven products.[203]

Five medications beneficial for long-term use are: orlistat, lorcaserin, liraglutide, phentermine–topiramate, and naltrexone–bupropion.[204] They result in weight loss after one year ranged from 3.0 to 6.7 kg (6.6-14.8 lbs) over placebo.[204] Orlistat, liraglutide, and naltrexone–bupropion are available in both the United States and Europe, phentermine–topiramate is available only in the United States.[205] European regulatory authorities rejected lorcaserin and phentermine-topiramate, in part because of associations of heart valve problems with lorcaserin and more general heart and blood vessel problems with phentermine–topiramate.[205] Lorcaserin was available in the United States and then removed from the market in 2020 due to its association with cancer.[206] Orlistat use is associated with high rates of gastrointestinal side effects[207] and concerns have been raised about negative effects on the kidneys.[208] There is no information on how these drugs affect longer-term complications of obesity such as cardiovascular disease or death;[5] however, liraglutide, when used for type 2 diabetes, does reduce cardiovascular events.[209]

In 2019 a systematic review compared the effects on weight of various doses of fluoxetine (60 mg/d, 40 mg/d, 20 mg/d, 10 mg/d) in obese adults.[210] When compared to placebo, all dosages of fluoxetine appeared to contribute to weight loss but lead to increased risk of experiencing side effects such as dizziness, drowsiness,

fatigue, insomnia and nausea during period of treatment. However, these conclusions were from low certainty evidence.[210] When comparing, in the same review, the effects of fluoxetine on weight of obese adults, to other anti-obesity agents, omega-3 gel and not receiving a treatment, the authors could not reach conclusive results due to poor quality of evidence.[210]

Among antipsychotic drugs for treating schizophrenia clozapine is the most effective, but it also has the highest risk of causing the metabolic syndrome, of which obesity is the main feature. For people who gain weight because of clozapine, taking metformin may reportedly improve three of the five components of the metabolic syndrome: waist circumference, fasting glucose, and fasting triglycerides.[211]

Surgery

The most effective treatment for obesity is bariatric surgery.[6][23] The types of procedures include laparoscopic adjustable gastric banding, Roux-en-Y gastric bypass, vertical-sleeve gastrectomy, and biliopancreatic diversion.[204] Surgery for severe obesity is associated with long-term weight loss, improvement in obesity-related conditions,[212] and decreased overall mortality; however, improved metabolic health results from the weight loss, not the surgery.[213] One study found a weight loss of between 14% and 25% (depending on the type of procedure performed) at 10 years, and a 29% reduction in all cause mortality when compared to standard weight loss measures.[214] Complications occur in about 17% of cases and reoperation is needed in 7% of cases[20]

Conflict of interest statement

Authors declare that they do not have any conflict of interest.

REFERENCES

[1] Obesity and overweight Fact sheet N°311". WHO. January 2015. Retrieved 2 February 2016.

[2] Haslam DW, James WP (October 2005). "Obesity". Lancet (Review). 366 (9492): 1197–1209. doi:10.1016/S0140-6736(05)67483-1. PMID 16198769. S2CID 208791491

[3] Luppino FS, de Wit LM, Bouvy PF, Stijnen T, Cuijpers P, Penninx BW, Zitman FG (March 2010). "Overweight, obesity, and depression: a systematic review and meta-analysis of longitudinal studies". Archives of General Psychiatry. 67 (3): 220–9. doi:10.1001/archgenpsychiatry.2010.2. PMID 20194822.

[4] Yazdi FT, Clee SM, Meyre D (2015). "Obesity genetics in mouse and human: back and forth, and back again". PeerJ. 3: e856. doi:10.7717/peerj.856. PMC 4375971. PMID 25825681.

[5] Yanovski SZ, Yanovski JA (January 2014). "Long-term drug treatment for obesity: a systematic and clinical review". JAMA (Review). 311 (1): 74–86. doi:10.1001/jama.2013.281361. PMC 3928674. PMID 24231879.

[6] Colquitt JL, Pickett K, Loveman E, Frampton GK (August 2014). "Surgery for weight loss in adults". The Cochrane Database of Systematic Reviews (Meta-analysis, Review). 2014 (8): CD003641. doi:10.1002/14651858.CD003641.pub4. PMC 9028049. PMID 25105982.

[7] NCD Risk Factor Collaboration (NCD-RisC) (29 February 2023). "Worldwide trends in underweight and obesity from 1990 to 2022: a pooled analysis of 3663 population-representative studies with 222 million children, adolescents, and adults". The Lancet. doi:10.1016/S0140-6736(23)02750-2.

[8] Powell-Wiley TM, Poirier P, Burke LE, Després JP, Gordon-Larsen P, Lavie CJ, et al. (May 2021). "Obesity and Cardiovascular Disease: A Scientific Statement From the American Heart Association". Circulation. 143 (21): e984–e1010. doi:10.1161/CIR.0000000000000973. PMC 8493650. PMID 33882682.

[9] CDC (21 March 2022). "Causes and Consequences of Childhood Obesity". Centers for Disease Control and Prevention. Retrieved 18 August 2022.

[10] Policy Finder". American Medical Association (AMA). Retrieved 18 August 2022.

[11] Kanazawa M, Yoshiike N, Osaka T, Numba Y, Zimmet P, Inoue S (2005). "Criteria and Classification of Obesity in Japan and Asia-Oceania". Nutrition and Fitness: Obesity, the Metabolic Syndrome, Cardiovascular Disease, and Cancer. World Review of Nutrition and Dietetics. Vol. 94. pp. 1–12. doi:10.1159/000088200. ISBN 978-3-8055-7944-5. PMID 16145245. S2CID 19963495.

[12] Obesity - Symptoms and causes". Mayo Clinic. Retrieved 30 November 2021.

[13] Chiolero A (October 2018). "Why causality, and not prediction, should guide obesity prevention policy". The Lancet. Public Health. 3 (10): e461–e462. doi:10.1016/S2468-2667(18)30158-0. PMID 30177480.

[14] Kassotis CD, Vandenberg LN, Demeneix BA, Porta M, Slama R, Trasande L (August 2020). "Endocrine-disrupting chemicals: economic, regulatory, and policy implications". The Lancet. Diabetes & Endocrinology. 8 (8): 719–730. doi:10.1016/S2213-8587(20)30128-5. PMC 7437819. PMID 32707119.

[15] Bleich S, Cutler D, Murray C, Adams A (2008). "Why is the developed world obese?". Annual Review of Public Health (Research Support). 29: 273–295. doi:10.1146/annurev.publhealth.29.020907.090954. PMID 18173389.

[16] Strohacker K, Carpenter KC, McFarlin BK (15 July 2009). "Consequences of Weight Cycling: An Increase in Disease Risk?". International Journal of Exercise Science. 2 (3): 191–201. PMC 4241770. PMID 25429313.

[17] Imaz I, Martínez-Cervell C, García-Alvarez EE, Sendra-Gutiérrez JM, González-Enríquez J (July 2008). "Safety and effectiveness of the intragastric balloon for obesity. A meta-analysis". Obesity Surgery. 18 (7): 841–846. doi:10.1007/s11695-007-9331-8. PMID 18459025. S2CID 10220216

[18] Encyclopedia of Mental Health (2 ed.). Academic Press. 2015. p. 158. ISBN 9780123977533.
[19] NCD Risk Factor Collaboration (NCD-RisC) (29 February 2023). "Worldwide trends in underweight and obesity from 1990 to 2022: a pooled analysis of 3663 population-representative studies with 222 million children, adolescents, and adults". The Lancet. doi:10.1016/S0140-6736(23)02750-2.
[20] One in eight people are now living with obesity". www.who.int. Retrieved 1 March 2023.