World Gastroenterology Organisation Global Guidelines on Obesity

Review team: Lisbeth Mathus-Vliegen, MD, PhD, (co-chair) (The Netherlands), James Toouli, MBBS, FRACS, PhD, (co-chair) (Australia), Michael Fried, MD, (Switzerland), Aamir Ghafoor Khan, MD, (Pakistan), James Garisch, MD, (South Africa), Richard Hunt, MD, (Canada), Suleiman Fedail, MD, FRCP MWGO, (Sudan), Davor Štimac, MD, (Croatia), Ton Lemair, MD, (The Netherlands), Justus Krabshuis, (France), External experts: Pedro Kaufmann, MD, (Uruguay), Eve Roberts, MD, (Canada), and Gabriele Riccardi, MD, (Italy)

CONTENTS
1 General aspects
2 Management
3 Obesity in the elderly
4 Cascades
5 Appendices

GENERAL ASPECTS

Definitions
- Body mass index (BMI): weight (kg) divided by the square of the individual’s height (m).
- The International Obesity Task Force definition of obesity (based on whites with a “western” lifestyle) sets cut-off points of 25 kg/m² for adult excess weight and 30 kg/m² for obesity. These BMI cut-off points are considered to have a more international basis than other definitions.
- The BMI index ranges for children and teenagers should take the normal differences in body fat between boys and girls and differences in body fat at various ages into account:
  - US Centers for Disease Control and Prevention definition:
    - BMI ≥ 95th percentile for age = “overweight.”
    - BMI between the 85th and 95th percentiles = “at risk of overweight.”
  - European Childhood Obesity Group classification:
    - BMI ≥ 85th percentile for age = “overweight.”
    - BMI ≥ 95th percentile for age = “obesity.”

Key Management Points
- Diet and lifestyle modification, with or without medications, are the first step; if these fail, then surgery should be considered.
- The first treatment step is the basis for every subsequent step and consists of a diet, a less sedentary lifestyle, exercise, and behavioral modification. If weight loss of 5% to 10% is not achieved within 6 months, the next step is the same basic treatment combined with medication. The last step is again a diet, a less sedentary lifestyle, exercise, and behavioral modification, but now combined with bariatric surgery.
- Obesity requires long-term care, and it is important that management should be provided in a multidisciplinary environment with support from physicians, medical specialists (internists), dieticians, surgeons, psychologists, and physiotherapists.
- Providing education and information for children may be the best and least costly way of controlling obesity in the longer term.

The Global Picture

Epidemiology
The World Health Organization (WHO) projects that by 2015, approximately 2.3 billion adults will be overweight and > 700 million will be obese.

Prevalence of Obesity in the Elderly
The prevalence of obesity is rising progressively, even among older age groups. On the basis of the National Health Examination Survey I and National Health and Nutrition Examination Study I to III, it was estimated that the prevalence of obesity (BMI ≥ 30 kg/m²) in elderly Americans aged 60 or over would increase from 23.6% in 1990 and 32.0% in 2000 to 37.4% in 2010 (ranging from...
33.6% in the best-case estimate, based on the lowest increase in prevalence of 0.1%, to 39.6% in the worst-case estimate, based on continuation of the present increase of 7%). This signifies an increase in the number of obese older adults from 9.9 million (1990) and 14.6 million (2000) to 20.9 million in 2010 (range 18.0 to 22.2 million). It is at present unclear whether these projections will be borne out. The prevalence of obesity in nursing homes is also an escalating problem. Almost 30% of US nursing homes have reported that 15% to 20% of their residents are obese. Evidence suggests that obesity and weight gain increase the relative risk of nursing home admission for community-dwelling older adults. For those aged between 65 and 74, the risk of admission increased by 31%. Those who were overweight and experienced a significant weight gain were 2.13 times more likely to be admitted to a nursing home. In Europe, the prevalence of obesity increases with age to a peak at about 60 years. Thereafter, body weights change little and begin to decline in older age groups. However, current long-term trends indicate that the prevalence of obesity will increase.

A Problem in Developing Countries?

Once considered a problem only in high-income countries, excess weight and obesity are now dramatically increasing in low-income and middle-income countries as well, particularly in urban settings, according to the WHO.

In developing countries, the prevalence of chronic or noncommunicable diseases (such as hypertension, diabetes, and cardiovascular disease) is rising much more rapidly than in the industrialized world. Although the problem of childhood malnutrition is far from having been solved, the new pandemic of obesity and its accompanying noncommunicable diseases are challenging organizations such as the WHO. Although it is now well recognized that chronic diseases are a growing problem for low-income and middle-income countries, limited data are available for these countries and the developing world has been largely ignored in health strategies.

In a recent systematic review, the highest prevalences of childhood excess weight were found in Eastern Europe and the middle east, whereas India and Sri Lanka had the lowest prevalence. Studies in developing countries showed a considerable prevalence of metabolic syndrome in adolescents. Developing countries are facing an increasing incidence of childhood obesity and new cases of metabolic syndrome among children. In the near future, this is likely to create a huge socioeconomic and public health burden for poorer nations. The WHO has warned that projected numbers of new cases of diabetes may run into the hundreds of millions within the next 2 decades.

The globalization process may exacerbate the uneven dietary development between the rich and the poor; while high-income groups in developing countries enjoy the benefits of a more dynamic marketplace, lower-income groups may experience convergence towards poor-quality diets. Many developing countries are in a “nutrition transition” phase, evident in the rapid rise in obesity and diet-related chronic diseases throughout the world. Although developing countries are still struggling with malnutrition and micronutrient deficiencies, the consumption of foods high in fats and sugars in these countries is increasing. This transition is rooted in the globalization processes that are affecting the nature of agricultural and food systems and altering the quantity, type, cost, and desirability of foods available for consumption. The integration of the global marketplace is affecting specific diet patterns, especially in middle-income countries, as a result of:

- Greater consumption of vegetable oil, made possible by agricultural production and trade policies.
- Greater consumption of highly processed foods, facilitated by policies on foreign direct investment and global food marketing.

Some of the structural causes of obesity and diet-related chronic diseases throughout the world can be addressed through global food and health policies—especially in groups with low socioeconomic status.

According to the WHO, many low-income and middle-income countries are now facing a “double burden” of disease:

- While still dealing with infectious diseases and undernutrition, they are at the same time facing a rapid upsurge in chronic disease risk factors such as obesity and excess weight.
- Undernutrition and obesity can now be found existing side by side within the same country, the same community, and even within the same household.
- This double burden is caused by inadequate nutrition in the prenatal period and in infants and young children, followed by exposure to high-fat, energy-dense, micronutrient-poor foods and a lack of physical activity.

MANAGEMENT

Management of Obesity

- Determine the obesity class—the level of excess weight:
  - Assess overall fatness and central adiposity.
  - Calculate BMI and measure waist circumference.
- Assess comorbidities and risk status.
- Decide which treatment or combination of treatments is best:
  - Which diet should be recommended?
  - Discuss a physical activity goal.
- Is the patient a candidate for surgery?
  - BMI of ≥ 40.
  - BMI of ≥ 35, with comorbidities.
  - Severe sleep apnea.
  - Obesity-related cardiomyopathy.
  - Severe diabetes mellitus.
  - Severe joint disease.
  - Failure of medical weight control. Patients should have made previous attempts to lose weight.
  - Absence of medical or psychological contraindications.
  - No risks, or acceptable risks, for surgery.
  - The patient should receive full information about the anticipated risks and results of the operation, understand the procedure and its risks, and be strongly motivated to comply with the postsurgical regimen.
- Medical and surgical care should be provided by a multispecialty team with experience in bariatric surgery and in perioperative and follow-up care.-Note. Different countries use different BMI levels as indications for surgery; in the United States, the levels are 35 and 30; in continental Europe, the figures are 40 and 35. The United Kingdom guideline
Consider Orlistat weight-loss medication:

- Consider Orlistat weight-loss medication: 2012 Lippincott Williams & Wilkins

Treatment Outcomes

**General:** A 5% to 10% reduction in weight may be sufficient for favorable modification of waist circumference, blood pressure, circulating cytokines, and (variably) fasting levels of glucose, triglycerides, and high-density lipoprotein cholesterol. This applies to individuals with a BMI of up to 40 and has been confirmed by many studies. At BMI levels >40, a 20% to 25% weight loss is recommended, although without much evidence.

- A change in the treatment regimen should be considered if weight loss is <5% in the first 6 months.
- Willingness to achieve weight reduction is important in predicting success.

**Lifestyle intervention:** Studies have shown that in comparison with standard care, lifestyle intervention:

- Significantly reduces body weight and cardiovascular risk factors.
- Has favorable effects, which are maintained for up to 3 years.
- Physical activity without a reduced calorie intake leads to limited weight-loss results.

**Treatment combinations:** Dietary and lifestyle interventions, along with pharmacologic weight-loss treatment, provide modest weight loss and may improve markers of cardiovascular risk factors, although these benefits occur mainly in patients with cardiovascular risks.

Risks of Weight Loss

Some studies have concluded that intentional weight loss reduces mortality, whereas unintentional weight loss is associated with an increased risk of mortality.

Because of an increased flux of cholesterol through the biliary system, weight loss may increase the chances of cholelithiasis developing. Diets with moderate amounts of fat that trigger gallbladder contraction may reduce this risk. Slow weight loss—for example, 0.5 to 1.0 kg/wk—has been shown to prevent the formation of gallstones in patients with higher weight-loss rates. Weight loss with adjustable gastric bands is associated with an incidence of gallstone formation that is no different from that in the normal population.

**OBESITY IN THE ELDERLY**

Health Consequences of Obesity in the Elderly

It is far from clear which parameter may best predict poor health and a poor outcome with obesity in the elderly. A slightly higher BMI value, associated with a lower relative mortality in older compared with younger adults, does not mean that obesity is not as harmful in the elderly. BMI may be a less appropriate index in the elderly. It should also be realized that although the relative risk of mortality and decreased survival appear to decline at ages above 59, the absolute mortality risk increases with increasing BMI up to age 75.

There are many confounding factors that contribute to underestimation of the health risks of obesity in the elderly. Among these are the survival effect (the presence of “resistant” survivors in whom the relation between BMI and mortality is lost), competing mortalities, relatively shortened life expectancy in old age, and the importance of age of onset and duration of obesity, as those who have become obese in old age may die before the adverse effects of obesity become apparent. Also, smoking, weight change (weight gain and weight loss may be more detrimental than a stable weight), and unintentional weight loss may confound the estimation of health risks.

Medical complications of obesity in the elderly are mainly associated with metabolic syndrome (with glucose intolerance, hypertension, dyslipidemia, and cardiovascular disease). Metabolic syndrome peaks at age 50 to 70 in males and age 60 to 80 in females, with an odds ratio (OR) of 5.8 in 65-year-old males and 4.9 in 65-year-old females in comparison with 20- to 34-year-old individuals.

Other obesity-related disorders are (osteo)arthritis (with an OR of 4.8 for males and 4.0 for females), pulmonary dysfunction including obesity hypoventilation syndrome and obstructive sleep apnea syndrome, cancer, and urinary incontinence. The obese elderly may also have to deal with functional limitations because of decreased muscle mass and strength and increased joint dysfunction, disabilities of (instrumental) activities of daily living, frailty, and an impaired quality of life.

Obesity is a major cause of frailty (OR 3.5 in 70- to 79-year-olds).

There are also beneficial effects of obesity, such as a higher bone mineral density and a lower risk of osteoporosis and hip fractures, with an extra cushioning effect of fat around the trochanter that may provide protection against hip fracture during a fall.

**Treatment Options in the Elderly**

A variety of treatment options are available. Whether they are indicated in combination or singly depends on a variety of factors including risk, patient preferences, and available resources:

- **Lifestyle interventions,** involving diet, physical activity, and behavioral modification.
- **Pharmacotherapy.**
- **Surgery.**

**Lifestyle Interventions**

Lifestyle interventions should consist of a 500 to 1000-kcal deficit diet with a sufficient amount of high-quality protein (1.0 g/kg) and adequate supplementation of calcium (1000 mg/d) and vitamin D (10 to 20 μg/d), as well as multivitamin and mineral supplements, combined with exercise and behavioral therapy. Increased physical activity and regular exercise are not essential for achieving initial weight loss, but can help in maintaining weight loss and preventing weight from being regained.

Systematic reviews of weight-loss interventions in people aged over 60 have shown significant changes, such as improved glucose tolerance and physical functioning, a reduced incidence of newly developed diabetes, and significant benefits for those with osteoarthritis, diabetes, and coronary heart disease.
Pharmacotherapy
Of the many drugs that have been developed to treat obesity, most have now been withdrawn from the market and only Orlistat is currently approved for longer periods of administration in patients with a BMI \(\geq 30\) kg/m\(^2\) and in patients with a BMI of 27 to 29.9 kg/m\(^2\) in the presence of obesity-related comorbidity.

Bariatric Surgery
Bariatric surgery is indicated for individuals with severe obesity—that is, with a BMI \(\geq 40\) kg/m\(^2\) or a BMI \(\geq 35\) kg/m\(^2\) with comorbidity. There are at present no guidelines for bariatric surgery in the elderly, but those who consider including the elderly have suggested that the values used in younger adults should be continued.

Recent research shows that older obese adults suffer from more comorbidity and require more medication before surgery than younger obese individuals. A significant loss of excess weight of 60% after 1 year and 50% after 5 years is observed after open or laparoscopic gastric bypass. This weight loss is associated with an improvement in obesity-related comorbidity and an overall reduction in medication requirements.

Nutrition Aspects
Diet-induced weight loss results in a decrease in both fat mass and fat-free mass, with approximately 75% of the weight loss being composed of fat tissue and approximately 25% of fat-free mass. Weight loss in older persons may therefore exacerbate the age-related loss of muscle mass and further impair physical function. On the basis of intensive research on sarcopenia (age-related reduction in skeletal muscle mass in the elderly) and sarcopenic obesity, dietary guidelines have been adjusted to prevent sarcopenic obesity and to guide the medical profession in supporting weight loss in the presence of sarcopenic obesity.

Treating obesity requires creating an energy deficit, and in individuals with sarcopenic obesity, or who are at risk of developing it, the energy deficit to be established is more moderate than usual (500 kcal, with a range of 200 to 750 kcal), with the emphasis on a higher intake of proteins of high biological quality. When the energy intake is restricted, protein intake has to be maintained or increased, as dietary protein and amino acids are the most effective means of slowing or preventing muscle protein catabolism.

There is no evidence that coingestion of protein and fat affects protein anabolism. Aging in itself thus does not reduce the anabolic response to adequate quantities of high-quality protein; instead, it is the presence of carbohydrates that blunts this response, explained by the effects of insulin resistance on muscle protein synthesis. A carbohydrate intake of \(<150\) g/d is therefore advised. A modest bout of physical activity such as 45 minutes of treadmill walking restores the ability of insulin to stimulate protein synthesis.

Protein intake should also be strategically timed in such a way as to overcome other consequences of aging, such as blunting of the anabolic response because of changes in digestion, gastric emptying rate, splanchnic uptake, and peripheral utilization.

In addition, in contrast to younger people, skeletal muscle in older individuals is not able to respond to low doses of protein and amino acids (7 g), although 10 to 15 g of amino acids are capable of stimulating protein synthesis to a similar extent as in the young.

Other potential strategies for enhancing protein synthesis are including leucine in the diet, from a minimum requirement of 2 g/d to an optimum of 6 to 8 g/d. Leucine-rich foods include legumes (soy beans) and animal products (fish, beef). Leucine increases protein anabolism and decreases protein breakdown. Adding leucine to a mixed nutrient meal in older individuals has been shown to result in a 56% increase in muscle protein synthesis.
CASCADeS

Stakeholders and Management Options

Which of the obesity treatment or prevention approaches (Table 1) is resource dependent? All stakeholders need to take action at global, regional, and local levels. Excess weight and obesity, as well as the related chronic diseases, are largely preventable.

### TABLE 1. Decision Scheme for Weight-loss Treatment

<table>
<thead>
<tr>
<th>Obesity Level</th>
<th>Grade 1</th>
<th>Grade 2</th>
<th>Grade 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Western Countries</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI 25.0-26.9</td>
<td>27.0-29.9</td>
<td>30.0-34.9</td>
<td>35.0-39.9</td>
</tr>
<tr>
<td>Waist (cm)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male 94-102</td>
<td>94-102</td>
<td>≥ 102</td>
<td>≥ 102</td>
</tr>
<tr>
<td>Female 80-88</td>
<td>80-88</td>
<td>≥ 88</td>
<td>≥ 88</td>
</tr>
<tr>
<td>Eastern/Asian Countries*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI 23.0-24.9</td>
<td>25.0-29.9</td>
<td>30.0-34.9</td>
<td>≥ 35</td>
</tr>
<tr>
<td>Waist (cm)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male &lt; 90</td>
<td>&lt; 90</td>
<td>≥ 90</td>
<td>≥ 90</td>
</tr>
<tr>
<td>Female &lt; 80</td>
<td>&lt; 80</td>
<td>≥ 80</td>
<td>≥ 80</td>
</tr>
<tr>
<td>Treatment Options</td>
<td>No comorbidity</td>
<td>Diet</td>
<td>Diet</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Comorbidity present</td>
<td>Diet</td>
<td>Diet</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Exercise</td>
<td>Exercise</td>
<td>Exercise</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Asians are at greater risk, and decisions are taken 1 step earlier in these patients.
†Only in patients with obesity-related disease, who are unable to achieve adequate weight loss with available conventional lifestyle modifications and have no absolute contraindications for drug therapy.
‡Only in patients with obesity-related disease who are unable to lose weight with available conventional therapy and have no absolute contraindications for surgery.
§Although there is no evidence for surgery in patients with BMI 30-35 and no complications, exceptions are possible when there is significant comorbidity.
¶There is evidence for surgery in patients with BMI 35-40 and comorbidities; the cut-off point has recently been lowered by the International Diabetes Foundation to 30 in the presence of severe diabetes.
BMI indicates body mass index.
Adapted from guidelines from the US National Heart, Lung, and Blood Institute.

**Individual level:** The patient should avoid energy-dense foods, limit the intake of alcohol, remember the non-satiating effects of foods rich in calories such as fat and alcohol (alcohol having an additional disinhibitory effect on eating), and bear in mind the better satiation and satiety effects of proteins followed by complex carbohydrates.

- Achieve energy balance and a healthy weight.
- Limit energy intake from total fats and shift fat consumption away from saturated fats to unsaturated fats.
- Increase consumption of fruit and vegetables, as well as legumes and whole grains.
- Limit the intake of sugars (particularly in beverages).
- Increase physical activity.

**Governments, international partners, civil society and nongovernmental organizations, and the private sector should:**

- Shape healthy environments.
- Make healthier diet options affordable and easily accessible.
- Facilitate and promote physical exercise.

**The food industry should:**

- Reduce the fat and sugar content of processed foods and also the portion sizes.
- Increasingly introduce innovative, healthy, and nutritious choices (low energy density, fiber-rich, functional foods).
- Review current marketing practices to accelerate health gains throughout the world.
Management options relative to available resources (Tables 2–4)

<table>
<thead>
<tr>
<th>Resources</th>
<th>Management Options by BMI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>25-30</td>
</tr>
<tr>
<td>High/affluent DEB</td>
<td>DEB</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>+/−</td>
</tr>
<tr>
<td>surgery</td>
<td>surgery</td>
</tr>
<tr>
<td>Medium/normal DEB</td>
<td>DEB</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Low/absent DEB</td>
<td>DEB</td>
</tr>
</tbody>
</table>

Whatever treatment is given, diet, exercise, and behavioral changes should always be prescribed.

“+/− surgery” is added to indicate that if the other strategies fail, then this is an option. Even in low-resource countries, surgery is an option if obesity needs to be addressed. An open gastric bypass is not an expensive operation. In the United States, there are cheap medications (phentermine, diethylpropion) and more expensive (sibutramine) ones, with Orlistat being the most expensive.

DEB indicates diet, exercise, and behavior change (must be supervised); M, medication-only effective in case of moderate increase in body mass index (must be supervised); SD, strictly supervised diets.

APPENDICES AND EVIDENCE

- Appendix 1: Nutrition and diet.
- Appendix 2: Pharmacotherapy.
- Appendix 3: Lifestyle changes.
- Appendix 4: Surgery.
- Appendix 5: Obesity and the elderly.


Prevalence of obesity in the elderly


Pathophysiology of obesity in the elderly


Health consequences of obesity in the elderly


Who should lose weight and what are the concerns?
Villareal DT, Apovian CM, Kushner RF, et al. Obesity in older adults: technical review and position statement of...