# NATIONAL GUIDELINE ON
# OBESITY MANAGEMENT
# 2025-2026

# NATIONAL GUIDELINE ON OBESITY MANAGEMENT 2025 - 2026

Draft

**Developed by**
**Sri Lanka Medical Nutrition Association (SLMNA)**
**Sri Lanka College of Nutrition Physicians (SLCNP)**

**Collaborative societies**
**Sri Lanka College of Endocrinologists**
**Sri Lanka Sports Medicine Association**
**Sri Lanka College of Surgeons**
**Sri Lanka Society of Gastroenterology**
**Sri Lanka College of Psychiatrists**
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## Abbreviations

| | |
|---|---|
| AST | Aspartate Transaminase |
| ALT | Alanine Transaminase |
| BIA | Bioelectrical Impedance Analysis |
| BMI | Body Mass Index |
| CHD | Coronary Heart Disease |
| CRP | C-reactive protein |
| CVD | Cardiovascular disease |
| DXA | Dual Energy X-ray Absorptiometry |
| DNA | Deoxyribonucleic acid |
| GIP | Glucose-dependent insulinotropic polypeptide |
| GLP - 1 | Glucagon-like peptide-1 |
| HDL | High Density Lipoprotein |
| LDL | Low Density Lipoprotein |
| MASLD | Metabolic Dysfunction Associated Steatotic Liver Disease |
| MNT | Medical Nutrition Therapy |
| NCDs | Non-Communicable Diseases |
| SC | Subcutaneous |
| SR | Slow releasing |
| TC | Total Cholesterol |
| TG | Triglycerides |

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# Overview

This guideline covers identifying, assessing and managing obesity in adults.

**Key Points**

1. Obesity is a neurohormonal metabolic disease that is chronic and heterogenous. The unifying phenotypic feature of obesity is excess or abnormally distributed adipose tissue with the potential to impair health.
2. Body Mass Index (BMI), measures of body size as waist circumference, waist to height ratio, and indirect body fat measurements such as Dual Energy X-ray Absorptiometry (DXA) and Bioelectrical Impedance Analysis (BIA), are used to assess excess body fat and cardiometabolic risk.
3. Lifestyle interventions (Medical Nutrition Therapy, physical activity, behavioural therapy) are the cornerstone in prevention and management of overweight/obesity with other add-on treatment modalities as pharmacotherapy and bariatric surgery, depending on severity and complications.

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# 1 BACKGROUND

Obesity was defined as accumulation of excess body fat associated with adverse health outcomes (1). In 2012, American Association of Clinical Endocrinology (AACE) declared obesity as a disease and redefined the terminology as Adiposity Based Chronic Disease (ABCD) in 2017 , based on pathophysiological effects of excess weight (2). The 2025 AACE Consensus Statement for the Evaluation and Treatment of Adults with Obesity/Adiposity-Based Chronic Disease states obesity as a neurohormonal metabolic disease that is chronic and heterogeneous with the unifying phenotypic feature being excess or abnormally distributed adipose tissue with the potential to impair health. (3)

According to the STEPS survey in Sri Lanka 2021; 39.4% adults aged 18 - 69 years are overweight and 11% are obese which highlights the magnitude of the problem.(4) Causes of obesity are multipronged and interrelated. It is worth noting that most of these are modifiable (e.g.: excessive caloric intake, physical inactivity),(5) highlighting the importance of lifestyle interventions as the foundation of managing overweight and obesity.

**General principles of care**

- Obesity should be treated as a disease, and people with obesity should be treated with respect without judgmental opinions.
- Components of the planned weight management program should be tailored to the person's preference, initial fitness, health status and lifestyle.
- The choice of intervention should be discussed and agreed with the person.
- Creation of an environment conducive to the prevention of obesity should be a priority of government policies.

**Objectives of the guideline**

1. To provide evidence-based recommendations for identifying and diagnosing overweight, obesity, and central adiposity using BMI, waist circumference, waist–height ratio, and body composition assessments.
2. To standardize the assessment of adults with overweight or obesity**,** including evaluation of aetiology, complications, comorbidities, and obesity-related risk factors.
3. To guide clinicians in appropriate investigations for metabolic, endocrine, and obesity-related complications and to identify secondary causes of obesity.
4. To classify the severity of obesity using staging systems (e.g., Edmonton Obesity Staging System) to support clinical decision-making and individualized treatment planning.
5. To outline an evidence-based, tiered approach to obesity management, integrating lifestyle modification, pharmacotherapy, and Bariatric/metabolic surgery.

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# 2 SCOPE

## 2.1 Population covered

This guideline applies to adults aged 18 years and older, encompassing individuals across diverse body types and ethnic backgrounds. It is intended to promote consistent, safe, and patient-centred management of obesity across all clinical care settings.

## 2.2 Setting

This guideline is designed for use across all levels of the Sri Lankan healthcare system, encompassing primary, secondary, and tertiary care services. It is applicable to multiple clinical settings, including outpatient departments, NCD clinics, Medical Nutrition Units, Endocrinology clinics, Bariatric clinics, and ward settings.

## 2.3 Interventions and outcome considered

- The guideline evaluates lifestyle modification, comprising structured energy restriction, prescribed physical activity, and behavioural strategies.
- Nutritional interventions, including reduced-energy, low-energy, and very-low- energy diets, as well as portion-controlled meal planning, are assessed for their efficacy in achieving sustained caloric deficits and promoting weight reduction.
- Pharmacological therapies, such as lipase inhibitors, GLP-1 receptor agonists, dual GIP/GLP-1 agonists, and combination agents, are considered for individuals with higher BMI categories or obesity-related metabolic derangements who exhibit insufficient response to lifestyle intervention alone.
- Metabolic and bariatric surgical procedures, including sleeve gastrectomy and Roux-en-Y gastric bypass, are evaluated for patients meeting established BMI thresholds
- The guideline considers clinical outcomes, including reductions in body weight, BMI, waist circumference, and central adiposity, along with improvements in glycaemic indices, lipid parameters, blood pressure, hepatic steatosis, reproductive function, sleep-disordered breathing, and musculoskeletal symptoms, with enhancement in the quality of life, functional capacity, and psychological well-being.

## 2.4 Populations excluded from this guideline

- Children and adolescents (<18 years)
- Pregnant women
- Individuals with eating disorders
- Patients with acute or unstable medical conditions.
- Individuals requiring specialized genetic/metabolic evaluation
- People undergoing active cancer treatment or severe cachexia

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# 3 IDENTIFYING AND ASSESSING OVERWEIGHT, OBESITY AND CENTRAL ADIPOSITY

## 3.1 Identification of Overweight, Obesity and Central Adiposity in Adults

- Use BMI as a practical measure of overweight and obesity.
- Interpret with caution because it is not a direct measure of central adiposity.
- In adults with BMI below 35 kg/m$^2$ (in Sri Lankan context 32.5kg/m$^2$ is considered), measure and use their waist circumference and waist-to-height ratio, as well as their BMI, as a practical estimate of central adiposity and use these measurements to help assess and predict health risks (for example, type 2 diabetes, hypertension or cardiovascular disease) (6).

### 3.1.1 BMI

$$\textbf{BMI} = \frac{\textbf{Weight (kg)}}{\textbf{Height (m)}^2}$$

- The technique of measuring weight is shown in Annexure 1
- The technique of measuring height is shown in Annexure 2

Asian cutoff values should be used to diagnose and stage the severity which is shown in Table 1

**Table 1: Classification of obesity according to the BMI - WHO criteria** (7)(19)

| | **Asian (BMI kg/m$^2$)** | **Caucasians BMI (kg/m$^2$)** |
|---|---|---|
| Underweight | < 18.5 | < 18.5 |
| Normal | 18.5 - 22.9 | 18.5 - 24.9 |
| Overweight | 23 – 27.4 | 25 – 29.9 |
| Obesity - class 1 | 27.5 – 32.4 | 30 – 34.9 |
| Obesity - class 2 | 32.5 – 37.4 | 35 – 39.5 |
| Obesity - class 3 | ≥37.5 | ≥40 |

Adapted from: WHO expert consultation. The Lancet. 2004.(7)

- BMI >50 kg/m$^2$ is considered super obese

- Use clinical judgement when interpreting the healthy weight (normal BMI) category because a person in this category may nevertheless have central adiposity (6).
- Interpret BMI with caution in adults with high muscle mass because it may be a less accurate measure of central adiposity in this group (6).
- Interpret BMI with caution in people aged 65 and over, taking into account comorbidities, conditions that may affect functional capacity and the possible protective effect of having a slightly higher BMI when older (6).

### 3.1.2 Waist Circumference

Waist circumference (Annexure 3) is helpful as an additive information to BMI in diagnosing abdominal adiposity (Table 2). Also, it can be used in identifying metabolic risk and deciding treatment options.

**Table 2: Abdominal adiposity according to the waist circumference**

| | **Male** | **Female** |
|---|---|---|
| **Sri Lankans** | ≥ 90 cm | ≥ 80 cm |
| **Caucasians** | ≥ 102 cm | ≥ 88 cm |

### 3.1.3 Waist /Height ratio

- Waist-to-height ratio is another method of measuring body size that is useful in assessing excess body fat

**How to calculate waist to height ratio:**

- Measure waist circumference and height in centimeters
- Divide waist measurement by height measurement

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**Table 3: Interpretation of waist/height ratio**

| Waist-to-height ratio | Interpretation |
|---|---|
| 0.4 - 0.49 | Healthy central adiposity; no increased health risks. Thus, patients should try to keep their waist to half their height. |
| 0.5 - 0.59 | Increased central adiposity; increased health risks |
| ≥ 0.6 | High central adiposity; further increased health risks |

Adopted from NICE guidelines in obesity management - updated 2022 (6)

These classifications can be used for people with a BMI under 35 kg/m² of both sexes and all ethnicities, including adults with high muscle mass. The health risks associated with higher levels of central adiposity include type 2 diabetes, hypertension and cardiovascular disease (6).

#### 3.1.4 Body composition estimation

Body composition estimation by DXA scanning, air or water displacement, 4 point or 2-point bio impedance analyser or skin callipers can be used to estimate body fat percentages to diagnose obesity and can be interpreted as shown in Table 4 (7,8).

**Table 4: Definition of obesity according to body fat percentage** (8)

| | Body fat percentage % | |
|---|---|---|
| | **Male** | **Female** |
| Obese | > 25% body fat | > 32% body fat |

Adopted from: n.J Clin Endocrinol Metab. 2024 May 15;dgae341.(8)

### 3.2 Assessment of overweight, obesity and central adiposity

- Make an initial assessment, then use clinical judgement to investigate comorbidities (Table 5) and other factors to an appropriate level of detail, depending on the person, the timing of the assessment, the degree of overweight or obesity, and the results of previous assessments.

- Manage comorbidities when they are identified; do not wait until the person has lost weight.

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- Offer people who are not yet ready to change the chance to return for further consultations when they are ready to discuss their weight again and willing or able to make lifestyle changes. Give them information on the benefits of losing weight, healthy eating and increased physical activity.

- Recognize that surprise, anger, denial or disbelief about their health situation may diminish people's ability or willingness to change. Stress that obesity is a clinical term/disease with specific health implications, rather than a question of how people look; this may reduce any negative feelings (6)

**Table 5: Relative risk of health problems associated with obesity** (9)

| Greatly increased (relative risk greater than 3) | Moderately increased (relative risk 2-3) | Slightly increased (relative risk 1-2) |
|---|---|---|
| • Diabetes mellitus<br>• Gallbladder disease<br>• Dyslipidaemia<br>• Breathlessness<br>• Sleep apnoea | • Coronary Heart Disease<br>• Hypertension<br>• Osteoarthritis (weight bearing joints)<br>• Hyperuricemia and gout | • Cancer (Breast cancer in postmenopausal women, Endometrial cancer, colon cancer)<br>• Polycystic ovary syndrome and abnormalities related to reproductive hormones.<br>• Gastro-oesophageal reflux disease<br>• Low back pain<br>• Increased risk of anaesthesia complications<br>• Foetal defects associated with maternal obesity |

Adapted from: Report of a WHO consultation. World Health Organ Tech Rep Ser. 2000;894:i–xii, 1–253.and El-Serag H. Digestive diseases and sciences. 2008 Sep;53(9):2307-12. (1) (9)

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# 4 CONSULTATION

History and examination should be targeted to identify

- Aetiology of obesity
- Complications of obesity
- The most suitable treatment modality

During the consultation;
Initially, take measurements (see Section 1) to determine the degree of overweight or obesity and discuss the implications of the person's weight on overall health.

## 4.1 History

- A weight history from birth onwards/or initiation of weight gain is very important to track down the pattern of weight gain.
- Assess possible reasons for weight gain

- Current eating habits, diet and activity levels should be assessed
  - Use food diary/ diet history
  - Food related believes and myths
  - Activity diary
  - Electronic mobility trackers (step counts in mobile phones)

- Triggers of eating should be assessed.
  - Emotional/ psychological stresses which lead to overeating
  - Peer pressure and workplace environment
  - Availability and affordability, obesogenic environment
  - Certain food cravings (sweet and salt addictions)

- Assess the person's view of his/her weight
- Go through previous treatment/ management strategies and their success/failures
- Drug history (e.g. antidepressants, anti-psychotics, anti-epileptics, steroids)
- Family history of obesity (may suggest genetic syndromes)
- The weights of the partner and children will give a clue on shared dietary habits and lifestyle
- Assessment of patient's motivation, readiness for change and expectations, confidence level in making changes
- Presence of obesity related complications such as cardiovascular disease, diabetes, hypertension, psychological issues and obstructive sleep apnoea
- Assess co-existent cardiovascular risk factors such as smoking, alcohol abuse and family history of diabetes.

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**Mental health and psychosocial screening in the assessment**

- History and mental state assessment
- Screening tools

| Domain | Screening Tool | Use When |
|---|---|---|
| Depression | PHQ-9 | Patients with low motivation, fatigue, sleep changes |
| Anxiety | GAD-7 | Stress eaters, autonomic symptoms |
| Eating Disorders | SCOFF | Binge/purge patterns, distorted body image |

Indications for psychiatric referral

- Persistent depression or anxiety affecting adherence
- Suicidal ideation
- Suspected bulimia/binge-eating disorder/anorexia
- Body dysmorphic features
- Psychotropic-induced weight gain requiring optimisation
- Capacity assessment to exclude psychiatric disorders

**Psychotropic-related weight gain guidance**

a. Antipsychotics (olanzapine, clozapine) → highest risk
b. SSRIs variable → paroxetine worst, fluoxetine neutral
c. Mood stabilizers → valproate increases weight

## 4.2 Examination

- Correct anthropometric measurements of weight, height and waist circumference is very important for the correct diagnosis, staging and follow-up.

When measuring weight:

- In *oedematous patients*: Subtract the weight of oedema fluid depending on the severity of oedema. (Annexure 5)
- In *amputees*: The relevant percentage of weight should be subtracted when calculating BMI. (Annexure 6)

- Features of any underlying pathological diseases and associated conditions
  - Bradycardia, dry skin and loss of hair in hypothyroidism,
  - Purple striae in Cushing syndrome,
  - Hirsutism and acne in polycystic ovarian disease,
  - Features of genetic syndromes

- Presence of complications
  - Features of insulin resistance (acanthosis nigricans, skin tags)
  - Elevated blood pressure
  - Eruptive xanthoma in hypertriglyceridemia
  - Osteoarthritis

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### 4.3 Investigations

- Investigations are directed to identify the aetiology and to diagnose complications.
- Give people and their families and/or carers information on the reasons for tests, how the tests are done, and their results and meaning. If necessary, offer another consultation to fully explore the options for treatment or discuss test results.
- Basic investigations for screening should be done to identify common metabolic complications as shown in table 6. In practice fewer measurements may be necessary other than most important basic investigations (10)

**Table 6: Basic investigations to be done in a patient with overweight or obesity**

| |
|---|
| Most important basic investigations:<br>1. Fasting blood glucose<br>2. Lipid profile (total cholesterol, HDL-cholesterol, LDL-cholesterol, triglycerides)<br>3. Liver enzymes (AST, ALT) with an ultrasound scan of the abdomen<br>4. Thyroid function (TSH)<br>5. Full blood count |
| Optional basic investigations:<br>1. Index of inflammation (CRP, ferritin)<br>2. Kidney function (creatinine)<br>3. Uric acid in blood, if gout<br>4. Cardiovascular assessment (ergometry, echocardiography), if indicated<br>5. Sleep apnoea investigation if indicated (if high risk of sleep apnoea suspected with basic screening) |

Specific investigations to detect secondary causes for obesity (Endocrine investigations for e.g.: Cushing, hypothalamic disease) should be done in clinically suspected situations, only after relevant specialist clinic referrals.

### 4.4 Assessment of Severity/ Severity Assessment Score

The *Edmonton Obesity Staging System (EOSS)* as shown in Table 7 is useful to stage the disease condition at individual level and for decision making for treatment (10)(11)

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**Table 7: Edmonton Obesity Staging System**

| Stage | Description | Level of prevention | Management |
|---|---|---|---|
| **Stage 0** | • **NO** sign of obesity-related risk factors<br>• **NO** physical symptoms<br>• **NO** psychological symptoms<br>• **NO** functional limitation | Primordial/ No prevention | Identification of risk factors for weight gain and encouraging healthy eating and physical activity |
| **Stage 1** | • Patient has obesity related **SUBCLINICAL** risk factors (borderline hypertension, impaired fasting glucose, elevated liver enzymes, etc.)<br>- OR-<br>• **MILD** physical symptoms – patient currently not requiring medical treatment for comorbidities (dyspnoea on moderate exertion, occasional aches/pains, fatigue, etc.)<br>- OR -<br>• **MILD** obesity-related psychological symptoms and/or mild impairment of well-being (quality of life not impacted) | Primordial | Identification and correction of risk factors and encouraging healthy eating and physical activity |
| **Stage 2** | • Patient has **ESTABLISHED** obesity-related comorbidities requiring medical intervention (HTN, Type 2 Diabetes, sleep apnoea, PCOS, osteoarthritis, reflux disease)<br>- OR -<br>• **MODERATE** obesity-related psychological symptoms (depression, eating disorders, anxiety disorder)<br>- OR -<br>• **MODERATE** functional limitations in daily activities (quality of life is beginning to be impacted) | Primary | Behavioural therapy with supportive medication therapy for biochemical abnormalities and comorbidities |

| Stage 3 | • Patient has **SIGNIFICANT** obesity-related end-organ damage (myocardial infarction, heart failure, diabetic complications, incapacitating osteoarthritis)<br>– OR –<br>• **SIGNIFICANT** obesity-related psychological symptoms (major depression, suicide ideation)<br>– OR –<br>• **SIGNIFICANT** functional limitations (eg: unable to work or complete routine activities, reduced mobility)<br>– OR –<br>• **SIGNIFICANT** impairment of well-being (quality of life is significantly impacted) | Secondary | Medical therapy/<br>Bariatric surgery |
|---|---|---|---|
| **Stage 4** | • **SEVERE** (potential end stage) from obesity-related comorbidities<br>– OR –<br>• **SEVERELY** disabling psychological symptoms<br>– OR –<br>• **SEVERE** functional limitations | Tertiary | Bariatric surgery |

Adopted from: Sharma AM et al. Int J Obes. 2009 Mar;33(3):289–95. (11)

Pathological causes that lead to obesity (secondary obesity) should be identified promptly (Table 8) and referred to relevant specialties for a multi-disciplinary action (12)

**Table 8: Causes and associations of obesity**

| Environmental causes | Excess calorie intake<br>Physical Inactivity | Major determinants of obesity |
|---|---|---|
| Secondary causes | Cushing syndrome | |
| | Hypothyroidism | |
| | Hypothalamic lesions | |
| | Polycystic ovarian syndrome | |
| | Medications: E.g. Steroids | |
| Genetic causes | Monogenic (rare) | Leptin deficiency/ resistance |
| | | Melanocortin 4 receptor mutation |
| | Chromosomal rearrangements (rare) | Prader-Willi Syndrome |
| | | Lawrence-Moon-Biedl Syndrome |
| | Polygenic (common) | A large number of human genes show variations in DNA sequences that might contribute to obesity. |

Adopted from: Williams Textbook of Endocrinology E-Book. Elsevier Health Sciences; 2015. 1944 p. (12)

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# 5 MANAGEMENT

The tier pathway in prevention and managing overweight and obesity should be adhered to as in Figure 1.

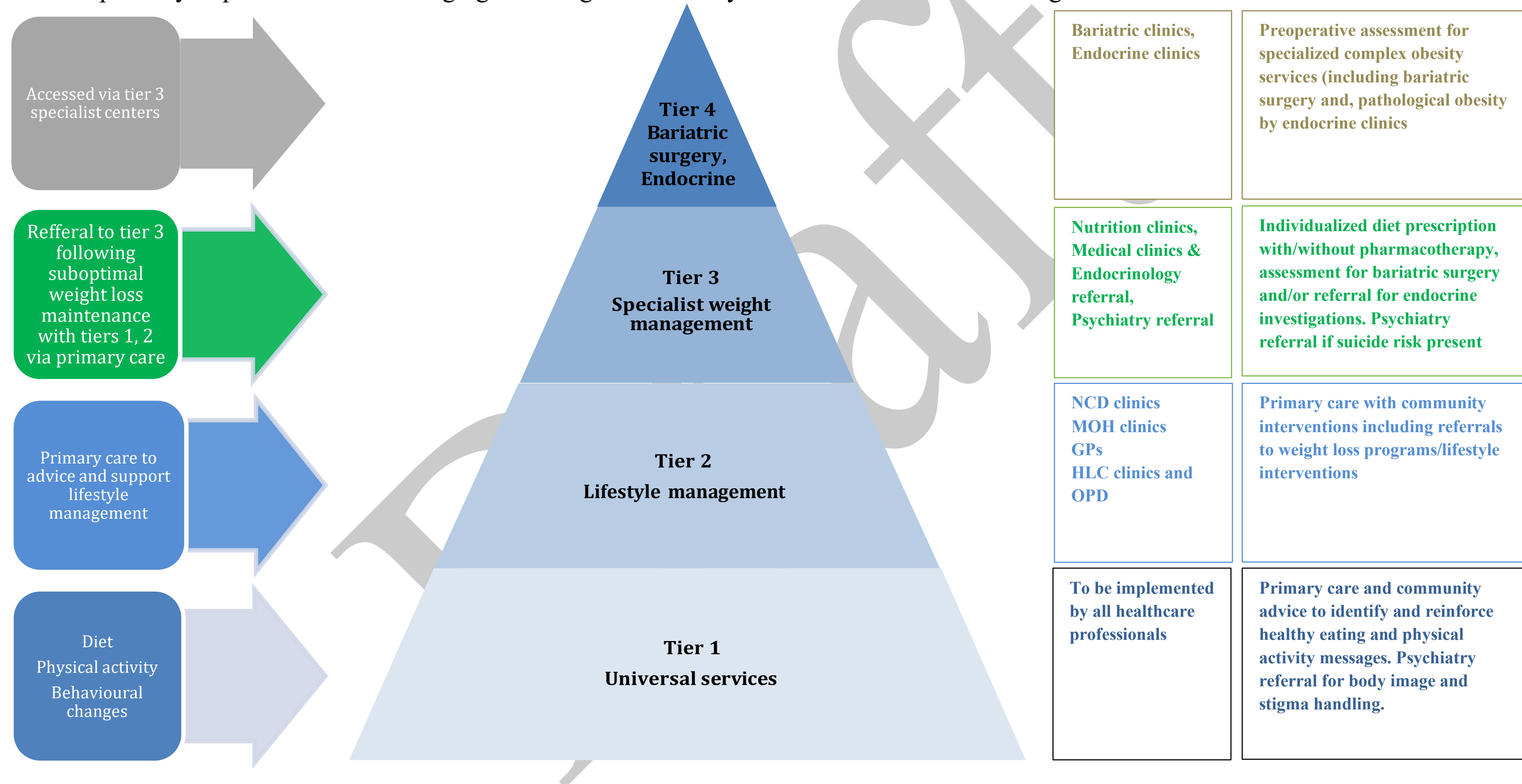


**Figure 1: The proposed tiered weight management system**

Adapted from: a Critique of NHS England Policy. Curr Obes Rep. 2020 Dec 1;9(4):530–43. (13)

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Consider referral to specialist nutrition services (from tier 2 to tier 3) if:

- The person is overweight with comorbidities and complications or obese
- The underlying causes of overweight or obesity need to be assessed

**Treatment**

Treatment targets or the expected weight loss percentages will be postulated depending on the comorbidities and complications (Table 9) and according to the degree of obesity (Table 10)

**Table 9: Treatment targets based on complications in patients with obesity**

| Diagnosis | Weight loss target (%) | Expected outcome |
|---|---|---|
| Metabolic syndrome | 10 | Prevention of type 2 diabetes |
| Type 2 diabetes | 5-15 | Reduction in glycated haemoglobin; reduction in diabetes medication; Higher percentage diabetes remission associated with 15% weight loss (especially if it is recent onset) |
| Dyslipidaemia | 5-15 | Lower total cholesterol, lower triglycerides, increase HDL, decrease LDL |
| Hypertension | 5-15 | Lower blood pressure; decrease in medication |
| MASLD (Metabolic dysfunction Associated Steatotic Liver Disease) | 7-15 | Reduction in intrahepatocellular lipids and inflammation |
| Polycystic ovary syndrome | 5-15 | Ovulation; reduction of hirsutism; decrease in androgen levels; increase insulin sensitivity |
| Sleep apnoea | 7-11 | Decrease apnoea/hypopnea index |
| Asthma | 7-8 | Improvement of forced expiratory volume at 1 s (FEV1) |
| Gastro-oesophageal reflux disease | 10 or more | Reduced symptoms |

Adapted from: Obes Facts. 2019;12(1):40–66.and American Association of Clinical Endocrinologists and American College of Endocrinology comprehensive clinical practice guidelines for medical care of patients with obesity. Endocr Pract Off J Am Coll Endocrinol Am Assoc Clin Endocrinol. 2016 Jul;22 Suppl 3:1–203. (10) (14)

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**Table 10: Obesity management interventions depend on the degree of obesity** (15)

| BMI class | Normal | Overweight | Obese 1 | Obese II | Obese III |
|---|---|---|---|---|---|
| Diet | + | + | + | + | + |
| Physical activity | + | + | + | + | + |
| Behavioural therapy | + | + | + | + | + |
| Pharmacotherapy | | | + (With presence of severe complications) | + | + |
| Surgery | | | | May be beneficial in the presence of severe complications. | + |

Adopted from : Gonzalez-Campoy JM et al. Endocr Pract. 2013 Sep;19:1–82. (15)

**Three main treatment modalities of management are:**

1) Lifestyle interventions (dietary approaches, physical activity and behavioural therapy)
2) Pharmacotherapy
3) Surgery

- In management give information about the severity of their overweight or obesity and central adiposity and the impact this has on their risk of developing other long-term conditions such as,

  type 2 diabetes, cardiovascular disease, hypertension, dyslipidaemia, certain cancers and respiratory, musculoskeletal and other metabolic conditions such as non-alcoholic fatty liver disease.

- Discuss and agree the level of intervention

## Algorithm for the management of obesity

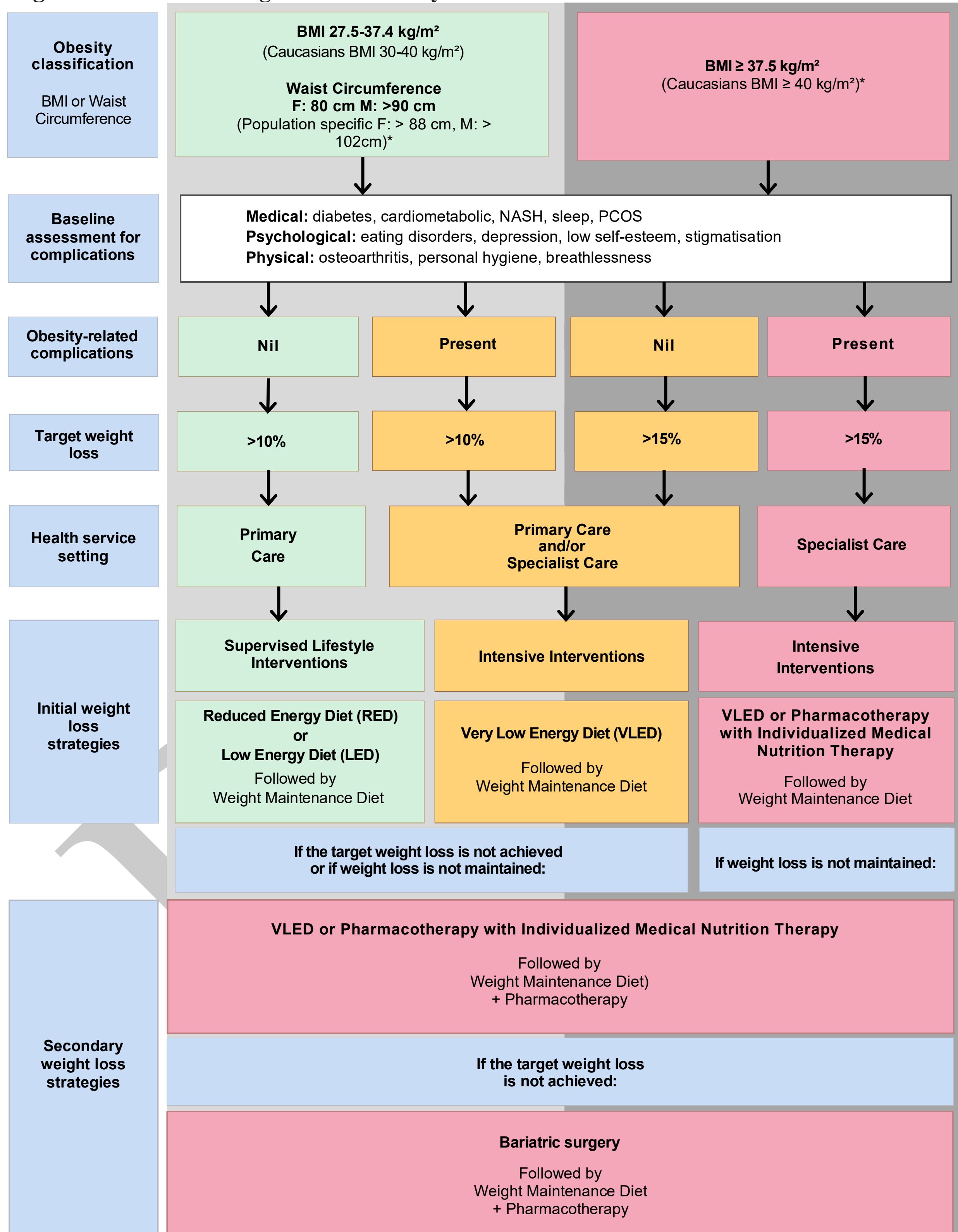


**Figure 2: Algorithm for the management of obesity**

Adapted from: The Australian Obesity Management Algorithm. Obes Res Clin Pract. 2022 Sep 1;16(5):353– 63.(16)

### 5.1 Lifestyle Interventions

Lifestyle interventions play a crucial role in management of obesity, regardless of aetiology Recruitment of other management options/ interventions depend on the severity, compliance and complications as shown in the obesity management algorithm figure 2.

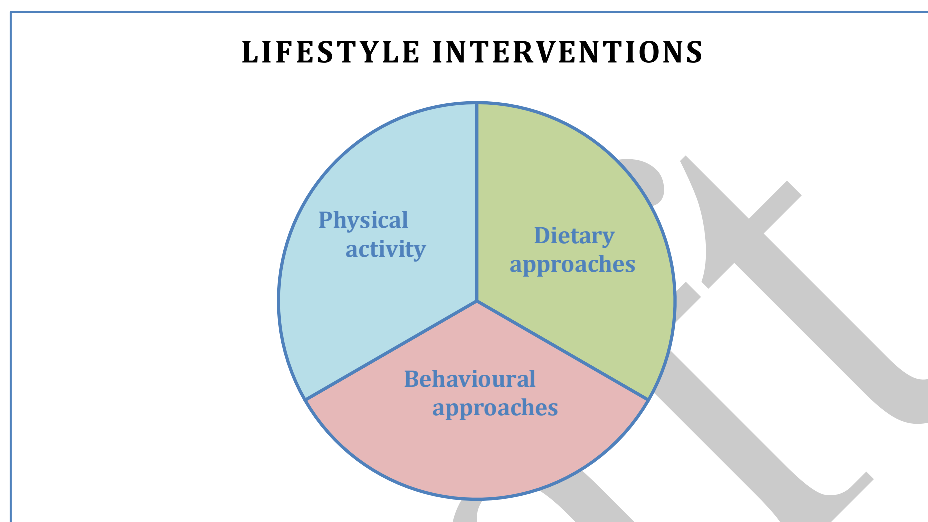


**Figure 3: Components of lifestyle interventions**

#### 5.1.1 Dietary approaches

- Tailor dietary changes to food preferences and allow for a flexible and individual approach to reducing calorie intake.
- Do not use unduly restrictive and nutritionally unbalanced diets, because they are ineffective in the long term and can be harmful.
- Encourage people to improve their diet even if they do not lose weight, because there can be other health benefits.
- The main requirement of a dietary approach to weight loss is that total energy intake should be less than energy expenditure. Diets that have a 500/600 kcal/day deficit (that is, they contain 500 - 600 kcal less than if the person needs to stay the same weight), in combination with expert support and intensive follow-up, are recommended for sustainable weight loss (6)
- Consider low-calorie diets (800 to 1600 kcal/day), but be aware these are less likely to be nutritionally complete.

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**Portion control and plate model for obesity management**

An evidenced based practical approach in weight reduction is using the plate model with portion control (17)

This consist of:

- ¼ the plate starchy food
- ¼ the plate protein sources
- ½ the plate non starchy vegetable and green leaves

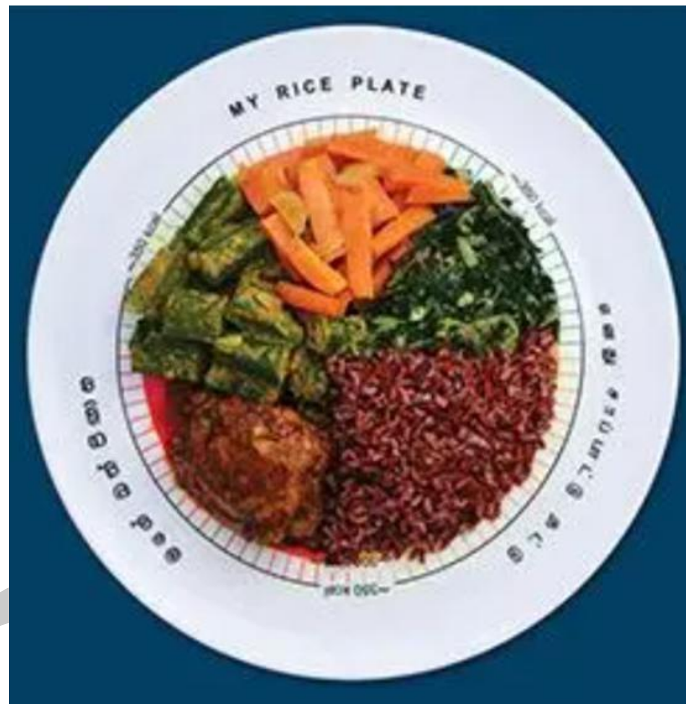


**Figure 4 - Adopted from 'My rice plate and evidenced based approach to weight reduction" by Prof Ranil Jayawardena** (18)

## 5.2 Diet types

### 5.2.1 Reduced energy diet (RED)

This aims to produce a modest energy deficit of approximate 500–1000 kcal/day. This can be achieved by encouraging the intake of vegetables, fruit, wholegrains, legumes, nuts, seeds, lean meat, poultry, fish, eggs and low-fat milk, cheese and yogurt and minimizing the intake of discretionary foods (16)

### 5.2.2 Low energy diet (LED)

A LED aims to reduce total daily energy intake to 1000–1200 kcal for which a more prescriptive diet is needed. LEDs can also be achieved by substituting one or two meals with one or two specially formulated meal replacements (16).

5.2.3 Very low energy diet (VLED) - managed at tier 3 level or above

A VLED aims to reduce energy intake to less than 800 kcal/day by substituting meals with formulated meal replacements. VLEDs can be an initial weight loss strategy when supervised lifestyle interventions have been unsuccessful in reducing weight or when rapid weight loss is required (e.g. prior to bariatric or general surgery, people who need joint replacement surgery or who are seeking fertility services), particularly in patients with super-obesity (BMI > 50 $kg/m^2$). VLEDs are low in carbohydrate, inducing mild ketosis, which has an anorexic effect, after 2–3 days.

**Do not routinely use very-low-calorie diets** (800 kcal/day or less) to manage obesity and only consider it as part of a multicomponent weight management strategy.
Ensure that:

- The diet is nutritionally complete
- The diet is followed for a maximum of 12 weeks (continuously or intermittently)
- The person following the diet is given ongoing clinical support.

Prior to commencing:

- Consider counselling and assess for eating disorders or other psychopathology to make sure the diet is appropriate for them.
- Discuss the risks and benefits with them.
- Tell them that this is not a long-term weight management strategy, and that regaining weight may happen and is not because of their own or their clinician's failure.
- Discuss the reintroduction of food following a liquid diet with them
- provide a long-term multicomponent strategy to help the person maintain their weight after the use of a very-low-calorie diet. (16)

**Low carbohydrate / low fat diets**
There has not been significant difference between these two types of diets and the mainstay is reducing the caloric intake by reducing portion sizes (19)

**Maintaining hydration**

- A daily minimum fluid intake of 1.5 – 2 L should be ensured unless fluid restricted in certain diseases conditions.
- This can be accomplished by water and non-sugar added beverages as black tea, green tea, black coffee or herbal teas.
- All use of sweetened beverages as soft drinks, sweetened milks or substitutes and fruit juices/nectars should be discouraged.

**Always encourage to eat a balanced diet which is sustainable in the long term, consistent with other healthy eating habits**

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## 5.3 Physical Activity

### General Principles

- Encourage reduction of sedentary behaviour by minimizing prolonged sitting time and screen use.
- Promote incorporation of daily physical activities such as household work, gardening, and active commuting.
- Pre-exercise evaluation is mandatory prior to initiating an exercise programme to:
    - Identify cardiovascular risk factors and comorbidities
    - Assess musculoskeletal limitations
    - Individualize exercise prescription and ensure safety

### 1. Cardiorespiratory exercise for weight reduction

#### Recommended volume

- **Moderate-intensity aerobic activity**:
    - **300 minutes per week**, spread over **≥ 5 days**

      *or*
- **Vigorous-intensity aerobic activity**:
    - **150 minutes per week**

#### Practical considerations

- Exercise may be standing or seated, depending on physical capacity.
- Begin with short bouts of activity and progressively increase duration:
    - Example: 10-minute bouts × 6 sessions/day
- For individuals with knee or lower-limb pathology, chair-based or non-weight-bearing exercises are recommended.
- Once the target volume of moderate-intensity exercise is achieved, gradually introduce higher-intensity activities, as tolerated.

#### Examples of aerobic activities

- Brisk walking
- Stationary cycling
- Swimming or water-based exercises
- Cross trainer / elliptical trainer
- Treadmill walking
- Chair aerobics

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**2. Resistance training**

**Rationale**

- Resistance training contributes to weight management by **increasing lean muscle mass**, thereby enhancing **resting metabolic rate** and improving functional capacity.

**Prescription**

| Component | Recommendation |
|---|---|
| Intensity | 60-70% of one-repetitive maximum (1RM) |
| Repetitions | 8-12 repetitions |
| Sets | 2-3 sets per exercise |
| Exercises | 6-8 exercises |
| Frequency | 3 days per week<br>Avoid consecutive-day training for the same muscle group<br>Emphasis on large muscle group |

**Equipment**

- Resistance Bands (Thera Bands)
- Improvised weights
- Barbells or resistance machines

**3. Coordination, Balance, and Flexibility Training**

**Importance**

- Improves neuromuscular coordination
- Reduces risk of falls
- Enhance movement efficiency and functional independence

**Recommendation**

- **Frequency**: 2–3 days per week
- **Duration**: 5–10 minutes per session
- Simple mobility and balancing exercises

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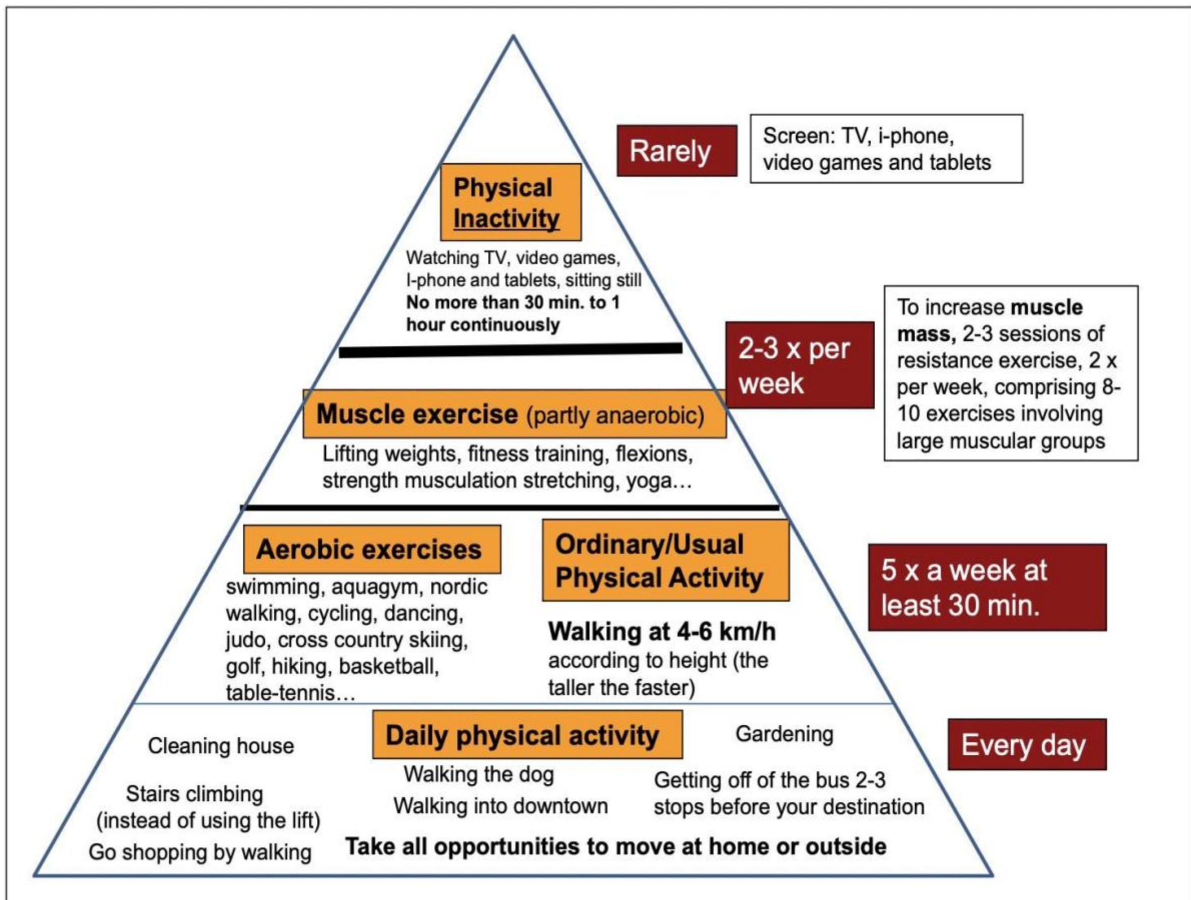


**Figure 5: Physical activity pyramid**

Adopted from: Durrer Schutz D et al . Obes Facts. 2019;12(1):40–66. (10)

The principle of the physical activity pyramid (figure 5) is that the more you climb the pyramid, the less time needs to be dedicated to physical activity. This is because the intensity of exercise becomes gradually higher. The last level (at the top) constitutes the inactivity component, which must be taken into account, since the more time spent sedentary in daily life, the less time is available for exercise.

In the weight maintenance phase, more activity than in the weight reduction phase should be included into the daily routine.

### 5.4 Behavioural Therapy

Include the following strategies in behavioural interventions as appropriate. (6)

- Setting realistic goals
- Assertiveness
- Mindful and slow eating
- Stimulus control (e.g. recognizing and avoiding triggers that prompt unplanned eating)

DH

- Cognitive restructuring (modifying unhelpful thoughts or thinking patterns)
- Problem solving
- Ensuring social support
- Reinforcement of changes
- Relapse prevention
- Self-monitoring of behaviour and progress (food diaries and activity records) Ensuring adequate sleep and stress reduction is a major component in obesity management

### 5.5 Psychotherapy options

- CBT-E for eating disorders
- Motivational interviewing depending on their stage of change

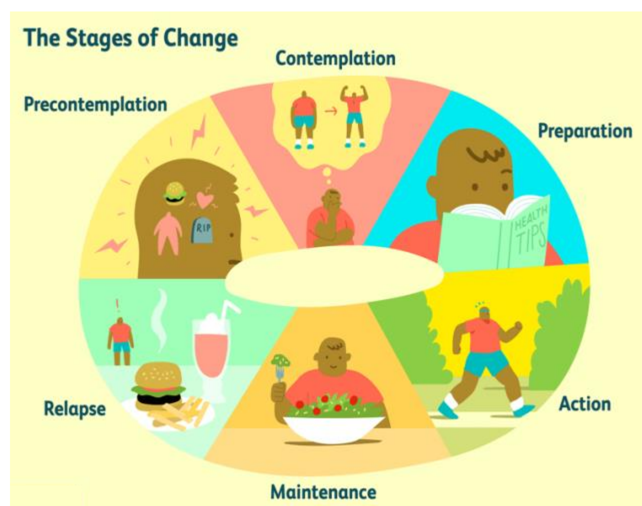


**Figure 6: Stages of change**

- Family-based intervention for Sri Lankan cultural context
- Other therapies as relevant (interpersonal therapy, behavioural therapy)

#### 5.5.1 Body image & stigma handling

Under Tier 1 Lifestyle Management

- Avoid moral language ("good/bad food")
- Reinforce health goals, not appearance

#### 5.5.2 Suicide risk

Under Tier 3

- If suicidal ideation is present → immediate psychiatric referral

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### 5.5.3 Patients going for surgery

a. To screen for untreated mental illness
   - Major depression
   - Bipolar disorder
   - Eating disorders (especially binge eating)
   - Substance misuse
   - Personality disorders

   These can:
   - Impair adherence to lifestyle changes
   - Increase postoperative complications
   - Worsen after surgery due to rapid hormonal shifts

b. To detect eating disorders
   Up to 50% of bariatric candidates have disordered eating patterns like emotional eating, binge eating, and nocturnal eating.

   If unidentified:
   - The patient loses weight initially
   - Then reverts to maladaptive eating
   - Weight regain occurs within 2–5 years

c. To assess capacity for behaviour change
   Patients must:
   - Follow lifelong dietary rules
   - Avoid alcohol misuse
   - Take micronutrient supplements
   - Attend follow-up appointments

   Patients with cognitive rigidity, impulsivity, ADHD, autism spectrum traits, or poor insight may not comply, making surgery unsafe.

d. To Identify psychotropic medication issues
   Some medications cause weight gain, and the psychiatry assessment will yield details if
   - If medication changes are needed pre-surgery
   - Whether metabolic monitoring is required

e. To prevent postoperative psychiatric complications
   After surgery:
   - Rates of alcohol misuse, impulse-control disorders, and suicidal behaviour increase
   - Relationship and identity changes destabilise some patients
   - Emotional eating has no outlet → can convert to addictions
   - Depression and anxiety predict weight regain (patients with unresolved trauma, chronic stress, social isolation

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f. Ethical and legal responsibility
  - Informed consent
  - Psychological readiness
  - Realistic expectations

## 5.6 Pharmacotherapy

- Anti-obesity medications need to be considered depending on patients BMI, availability of drug, safety, contraindications, and comorbidities as shown in figure 7.
- With the exception of data in patients with NAFLD, Lipase inhibitor - Orlistat was not investigated in patients with CVD, mental diseases and sleep apnoea. However, given its safety profile, Orlistat can be considered in these conditions. None of the drugs are approved for use during pregnancy. (20)
- Metformin is not registered as an anti-obesity medication
- The newer incretin-based anti-obesity therapies (GIP and GLP-1 receptor agonists) considerably suppress appetite and reduce energy intake, resulting in substantial weight loss. Accordingly Medical Nutrition Therapy for individuals receiving these treatments should emphasize adequate intake of nutrient-dense foods, management of gastrointestinal side effects commonly associated with these agents, and the integration of sustainable lifestyle modifications to support life-long weight maintenance and comorbidity management.

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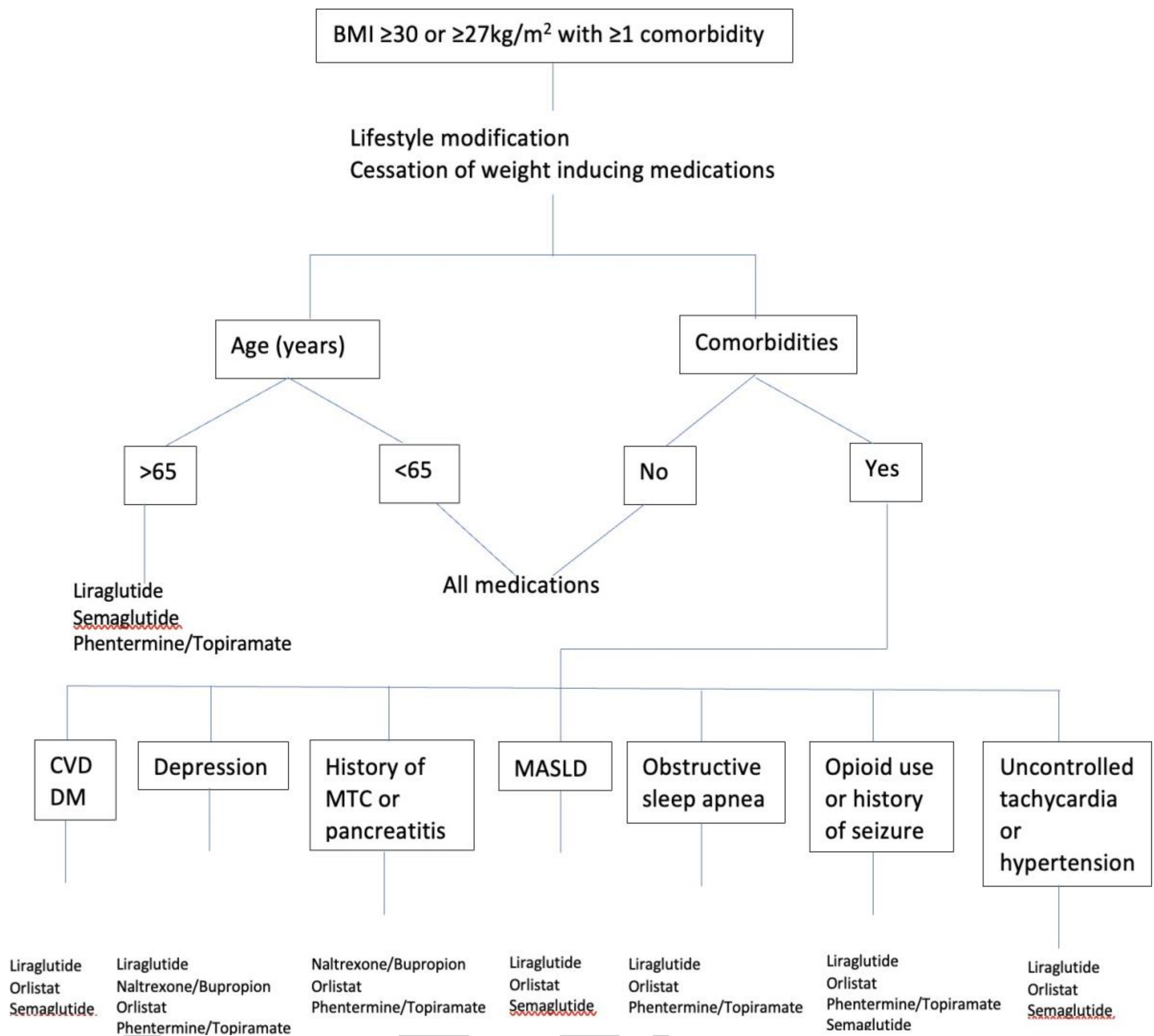


CVD: Cardiovascular disease; DM: Diabetes mellitus; HTN: Hypertension; MTC: Medullary thyroid cancer; MASLD: Metabolic dysfunction Associated Steatotic Liver Disease.

**Figure 7: Suggested algorithm for the selection of anti-obesity medications**

Adopted from : Chakhtoura M et al . eClinicalMedicine. 2023 Apr;58:101882.(20)

**Table 11: Anti-obesity medications**

| Obesity drug | Mode of action | Dosage | Effects | Expected weight loss | Common side effects | Contraindications | Special considerations |
|---|---|---|---|---|---|---|---|
| **Orlistat** | Binds to lipases in the GI tract and blocks the digestion of dietary triglycerides | 120 mg three times daily with meals | 30% of ingested fat is unabsorbed and excreted.<br><br>May improve TC, LDL, TG, HbA1c | 5%-10% of the initial body weight, over one year | Mostly GI - oily spotting, flatus, faecal urgency/ incontinence<br><br>Fat soluble vitamin malabsorption | Patients with chronic malabsorption syndrome or cholestasis, pregnancy | Low fat diet (≤ 30%) required to minimize side effects<br>Supplementation of vitamin A, D, E, K |
| **Liraglutide** | GLP-1 analogue | 0.6mg Subcutaneous injections daily.<br>Can escalate gradually up to 3 mg weekly | This is a synthetic glucagon- like peptide-1 analogue. It is agonist of the Glucagon like peptide (GLP) 1 receptor which is coupled to adenylate cyclase.<br>It stimulates the glucose dependent release of insulin, inhibits the glucose dependent release of glucagon, and slows gastric emptying. | >10% weight loss in 12 weeks | Increased heart rate, hypoglycaemia, constipation, diarrhoea, nausea, vomiting, headache | Personal or family history of medullary thyroid carcinoma or multiple endocrine neoplasia syndrome type 2, pregnancy | Can cause life threatening acute necrotising pancreatitis.<br><br>Can cause cholelithiasis or cholecystitis |

Draft

| Obesity drug | Mode of action | Dosage | Effects | Expected weight loss | Common side effects | Contraindications | Special considerations |
|---|---|---|---|---|---|---|---|
| **Semaglutide** | Glucagon-like peptide-1 (GLP- 1) receptor agonist that works by binding to and activating GLP-1 receptors. This activation improves insulin secretion, reduces glucagon release, and slows down digestion.<br>Semaglutide also interacts with GLP-1 receptors in the brain to reduce hunger and increase feelings of fullness | Starting dose is 0.25 mg once weekly with monthly increments to 1 mg weekly | Augments insulin secretion and reduces glucagon secretion. Delays gastric emptying and improves satiety. Reduce hunger. | >3.8% in 4 weeks and >15% in 12 weeks | Nausea, vomiting, diarrhoea, abdominal pain, constipation, headache | Personal or family history of Medullary Thyroid Carcinoma or in patients with multiple endocrine neoplasia syndrome type 2.<br>Known hypersensitivity to semaglutide or to any of the product components | Can cause Medullary Thyroid Carcinoma or in patients with multiple endocrine neoplasia syndrome type 2.<br>Increased risk of diabetic retinopathy complications<br>Gastric stasis can increase the risk of pulmonary aspirations.<br>Increased incidence of acute pancreatitis . |

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| Obesity drug | Mode of action | Dosage | Effects | Expected weight loss | Common side effects | Contraindications | Special considerations |
|---|---|---|---|---|---|---|---|
| **Tirzepatide** | Dual GIP and GLP-1 receptor agonist | Initial dose 2.5mg<br>subcutaneously weekly, after 4 weeks, dose is escalated to 5mg/week SC.<br>Can escalate dose by 2.5mg every 4 weeks depending on tolerance | Tirzepatide is a dual glucose-dependent insulinotropic polypeptide (GIP) and a (GLP-1) receptor agonist.<br>Stimulate first- and second-phase insulin secretion, and reduces glucagon levels.<br>Delay gastric emptying.<br>Can increase insulin sensitivity. | 20% - 25% weight loss in >12 weeks of continuous use. | Nausea, diarrhoea, decreased appetite, vomiting, constipation, dyspepsia, and abdominal pain | Personal or family history of medullary thyroid carcinoma or multiple endocrine neoplasia syndrome type 2, known serious hypersensitivity to tirzepatide or any of the excipients | May reduce the action of contraception pills.<br>May increase the incidence of thyroid -C cell tumours. |

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| Obesity drug | Mode of action | Dosage | Effects | Expected weight loss | Common side effects | Contraindications | Special considerations |
|---|---|---|---|---|---|---|---|
| **Naltrexone (SR)/ Bupropion (SR)** | Thes combinations cause β-endorphin blockage at the receptor of μ opioid would reduce the consumption of food. | Bupropion/ Naltrexone<br>90mg/8 mg orally,<br>Starting with once daily dose, increase weekly to a maximum dose of 180 mg / 16 mg BD | Improves satietyand reduce hunger | >5% weight loss within 12 weeks without dietary and lifestyle interventions | Nausea, constipation, headache, vomiting, dizziness, insomnia, dry mouth, diarrhoea, sleep disorder | Chronic opioid use, acute opioid withdrawal, uncontrolled hypertension, seizure disorder, bulimia or anorexia nervosa, abrupt discontinuation of alcohol, benzodiazepines, barbiturates, and antiseizure drugs; concomitant use of MAOIs, patient receiving linezolid or IV methylene blue, pregnancy | Can increase blood pressure and heart rate, therefore use caution in patients diagnosed with cardiovascular diseases.<br>Not indicated in eating disorders. |

Draft

| Obesity drug | Mode of action | Dosage | Effects | Expected weight loss | Common side effects | Contraindications | Special considerations |
|---|---|---|---|---|---|---|---|
| **Setmelanotide** | Melanocortin-4 (MC4) receptor agonist.<br><br>For genetically proven Leptin receptor deficiency of pro-opiomelanocortin deficiency and Bardet-Biedl syndrome (hyperphagia with severe childhood obesity) | In adults and children 12 to 17 years, the starting dose is 1 mg once daily subcutaneous injection for 2 weeks.<br><br>After 2 weeks, if Setmelanotide is well-tolerated, the dose can be increased to 2 mg once daily subcutaneous injection.<br><br>If dose escalation is not tolerated, patients may maintain administration of the 1 mg once daily dose. | Re-establish MC4 receptor pathway activity to reduce hunger and promote weight loss through decreased caloric intake and increased energy expenditure. | Around 10% of weight loss in 1 year | Injection site reactions, hyperpigmentation on, nausea, headache, diarrhoea, vomiting, abdominal pain, Spontaneous penile erections | Hypersensitivity to the drug | Benzyl alcohol may cause allergic reactions.<br>Increased risk due to accumulation of benzyl alcohol in young children (less than 3 years old).<br><br>Patients aged 2 years should be monitored for any sign of metabolic acidosis (tachycardia, rapid breathing, confusion) while under treatment.<br><br>Patients who are pregnant or breastfeeding should be advised of the potential risk from the excipient benzyl alcohol, which might accumulate over time and cause metabolic acidosis. |

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| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | For paediatric patients 6 to 12 yrs), starting dose is 0.5mg SC daily, and can increase to 1 mg/d in 2 weeks.<br><br>For 2y to 6 yrs age group, starting dose in 0.25mg/d SC, increased to 0.5mg daily SC after 2 weeks | | | | | Caution in renal and hepatic impairment. |
| **Phentermine / Topiramate** | In combination greater weight reduction than either agent alone | Low – 3.75/23 mg/d<br>Mild – 7.5/ 46 mg/d<br>High – 15/92 mg/d | May improve glycaemic control, dyslipidaemia and hypertension | 5%-11% over one year | Headache, paraesthesia, dry mouth, altered taste, dizziness | Glaucoma, Hyperthyroidism, during or within 14 days following the administration of monoamine oxidase inhibitors, Hypersensitivity to sympathomimetic amines, pregnancy | Avoid pregnancy due to increased risk of birth defects |

Adapted from: Chakhtoura M et al.eClinical Medicine. 2023 Apr;58:101882.) (20)

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## 5.7 Bariatric Surgery

**Table 12: Indications and contraindications for metabolic surgery**

| **Indications:**<br>• Metabolic and bariatric surgery (MBS) is recommended for all individuals with a body mass index (BMI) higher than 35 kg/m$^2$, regardless of the presence, absence, or severity of comorbid conditions.<br>• MBS should be considered for individuals who have metabolic disease and a BMI<br>• between 30 and 34.9 kg/m$^2$.<br>• In the Asian population, BMI thresholds should be adjusted so that a BMI exceeding<br>• 27.5 kg/m$^2$ suggests clinical obesity. MBS should be offered to Asian individuals with BMIs higher than 27.5 kg/m$^2$.<br>• MBS should be considered in obese individuals who do not achieve substantial or<br>• durable weight loss or co-morbidity improvement using nonsurgical methods. |
|---|
| **Contraindications**<br>• Absence of a period of identifiable medical management.<br>• Unable to participate in prolonged medical follow-up.<br>• Non-stabilized psychotic disorders, severe depression, personality and eating disorders, unless specifically advised by a psychiatrist experienced in obesity.<br>• Alcohol abuse and/or drug dependencies.<br>• Diseases threatening life in the short term - e.g. Pulmonary hypertension<br>• Patients who are unable to care for themselves and have no long-term family or social support that will warrant such care. |

Adopted from: Eisenberg D et al.2022 American Dec 1;18(12):1345–56. (21)

<u>Types of bariatric procedures (21)</u>

Surgical procedures can be categorized depending on the underlying mechanism;

- Restrictive procedures — Adjustable gastric banding (LAGB), gastric balloon and sleeve gastrectomy
- Malabsorptive procedures — Bilio-pancreatic diversions (BPD)
- Combined procedures — Roux-en-Y Gastric Bypass (RYGBP)

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*Sleeve Gastrectomy (SG)*

This surgery involves removing the greater portion of the fundus and body of the stomach, reducing its volume from up to 2.5 L to about 200mL This procedure provides fixed restriction and does not require adjustment like LAGB.

*Mini Gastric Bypass*

A mini gastric bypass creates a long narrow tube of the stomach along its right border (the lesser curvature). A loop of the small gut is brought up and hooked to this tube at about 180 cm from the start of the intestine. This results in restriction of food intake and modest malabsorption of nutrients.

*Laparoscopic Adjustable Gastric Banding (LAGB)*

This surgery involves placing a band around the stomach near its upper end to create a small pouch. This restricts intake of food. The band can be tightened or loosened over time to change the extent of restriction.

*Roux-En-Y Gastric Bypass (RYGB)*

This is a combination procedure in which a small stomach pouch is created to restrict food intake and the lower stomach, duodenum and first portion of the jejunum are bypassed to produce modest malabsorption of nutrients and thereby energy intake.

*Biliopancreatic Diversion (BPD)*

This is also a combination procedure that involves removing the lower part of the stomach and bypassing the duodenum and jejunum to produce significant malabsorption. This procedure is no longer recommended for Asians.

## 5.8 Discharging / Transferring Patients

Consider discharge

Once the target weight loss is achieved; follow up should be arranged

- Multidisciplinary team follow up (Nutrition, physical activity, pharmacotherapy)
- Educate patients on possibility of weight regain
- Frequent weighing during follow-up (initially at least every three months)
- Counselling for long term weight loss maintenance (realistic weight loss expectations, patient satisfaction on already achieved outcomes, health benefits of modest weight loss)

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Consider transfer (if resources not available)

- Medical nutrition unit for nutritional management
- Endocrinology opinion when indicated
- Bariatric surgical centre when indicated

### 5.9 Follow-up and Re assessment

- Patients should be re-evaluated at predetermined intervals to assess the progress in the weight loss and possible complications of interventions. (22)
- The target weight as well as rate of weight loss helps to assess the effectiveness of interventions.
- In early stages of obesity and especially young adults, with a good PA program people may not lose weight, but there will be reduction in fat mass and the waist circumference with increase bone and muscle mass.
- Patients should be assessed for possible complications of interventions as well. This can be due vigorous weight loss during a short period.
- Reasons for failure should be identified, and remedial measures should be taken at this stage after reinforcing the patient's motivation for change.

### 5.10 Patient education information

**Weight monitoring**

- A monthly weight chart can be used to monitor the weight changes during weight modification interventions. (figure 8)

- A chart to monitor the excess weight loss from baseline following weight loss interventions (figure 9) can also be used.

- **Excess weight = Actual weight (kg) – Ideal body weight (kg)**

$$\% \text{ of excess weight loss} = \frac{\text{Lost weight following weight loss intervention (kg)}}{\text{Excess weight (kg)}} \times 100\%$$

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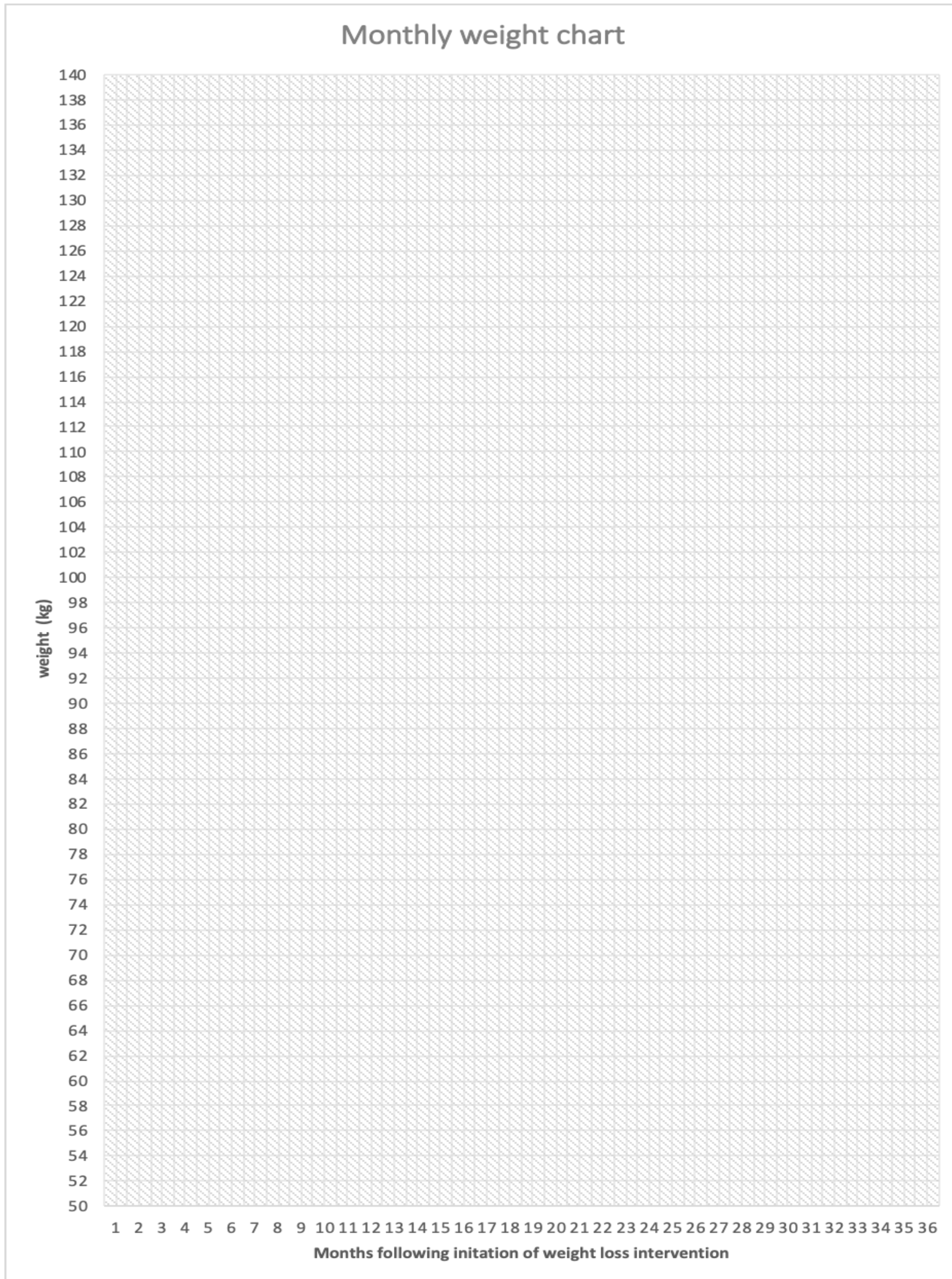


**Figure 8: Monthly weight chart**

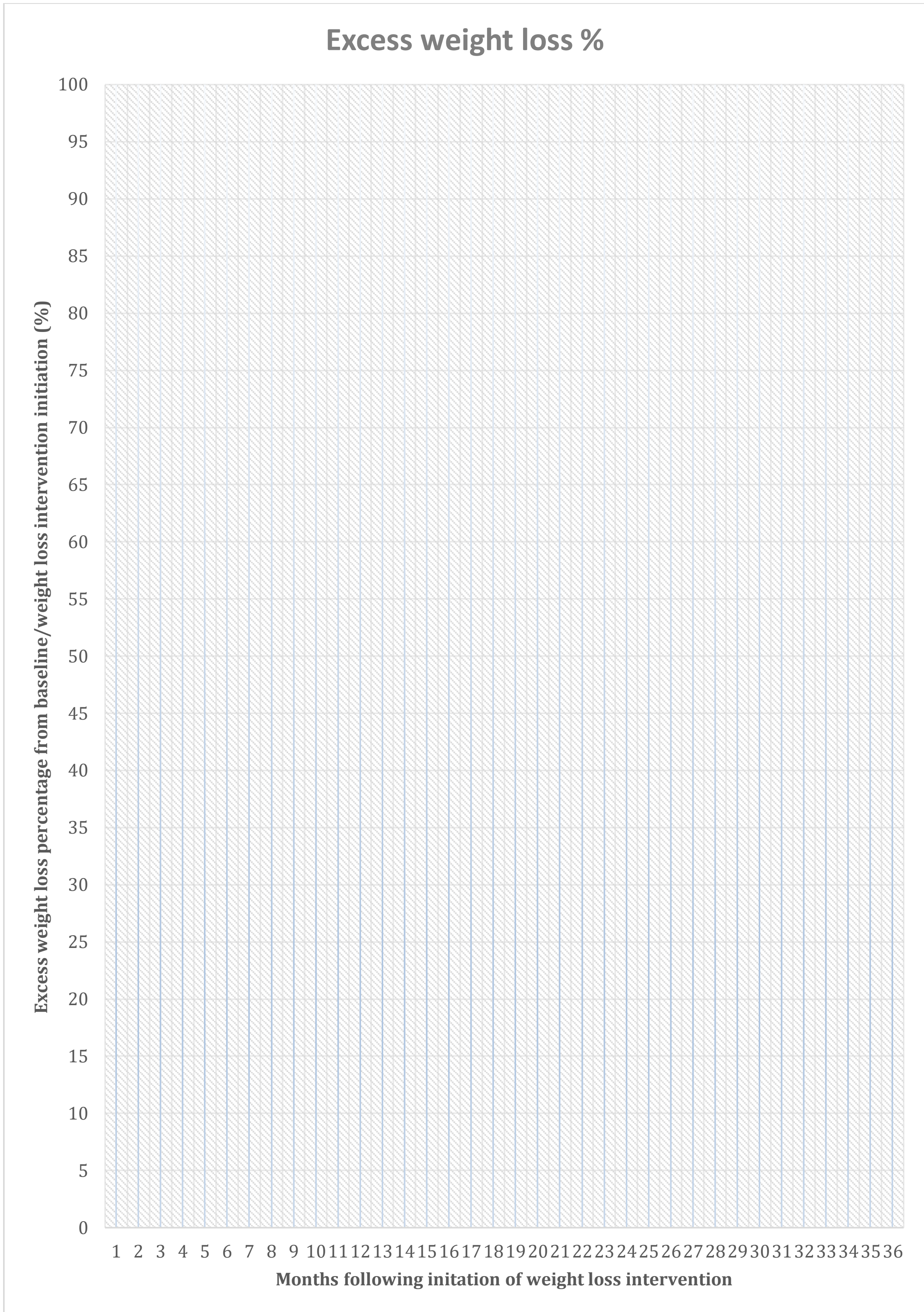


**Figure 9: Percentage of excess weight lost following weight loss interventions**

## 5.11 Additional Notes

Prevention of obesity

Four categories of obesity prevention are presented in figure 10

Doctor's side

**DISEASE**

| Patient's side: Illness | Absent | Present |
|---|---|---|
| Absent | **PRIMARY PREVENTION**<br>- Promote healthy eating, decreasing physical inactivity and increasing physical activity, managing daily stress and improving well-being and self esteem<br>- Avoid any excess weight gain during pregnancy or lose excess weight accumulated during pregnancy after delivery and lactation<br>- Control BMI in adolescents and prevent overweight and obesity. Recall that 80% of adolescents suffering from obesity will stay so in adulthood if not treated<br>- Public health measures on food habits | **SECONDARY PREVENTION**<br>- Measure abdominal circumference and calculate BMI<br>- Try to stop weight gain in overweight and persons suffering from obesity and stabilize weight before the apparition of metabolic disturbances or comorbidities<br>- Avoid any stigmatisation<br>- Evaluate eating disorders, stress level and depression<br>- Treat with behavioural modifications (nutrition, eating behaviour, physical activity and inactivity, stress and psychological issues) by patient education<br>- Increase your patient motivation by using motivational interviewing |
| Present | **QUATERNARY PREVENTION**<br>-Avoid overmedicalisation, overdiagnosis and overtreatment<br>-Focus on ethics<br>-Center on patient (illness/disease)<br>-Prevention of stigmatisation<br>-Prevention of «magical» inteventions | **TERTIARY PREVENTION**<br>- Avoid any stigmatisation<br>- Evaluate metabolic disturbances and comorbidities and treat them with lifestyle modification, by therapeutic patient education and motivational interviewing, with medication if necessary<br>- Evaluate eating disorders, stress level and depression and initiate psychotherapy if necessary<br>- Treatment should be done by a multidisciplinary team<br>- Consider bariatric surgery if the conservative treatment has failed |

**Figure 10: Primary, secondary, tertiary and quaternary preventions with their respective explanations**

Adopted from: Durrer Schutz D et al.Int J Health Policy Manag. 2015 Feb 4;4(2):61–4.(10)

# 6 ANNEXURES

## 6.1 Annexure 1: Procedure for measuring weight

Equipment's to measure weight: you will need a portable weighting scale, such as a SECA scale or the Tanita HS301 Solar Scale. Alternatively, a BMI scale measuring both height and weight (e. g. Growth Management Scale) can be used.

Set up requirements

Make sure the scales are placed on a firm, flat surface.

Do not place the scales on

- carpet
- a sloping surface
- a rough, uneven surface.

Set up scales

Follow the steps below to put the scales into operation:

1. Put the scale on a firm, flat surface.
2. Connect the adaptor to the main power line or generator, if the scale is not battery operated.
3. Turn on the scale and wait until the display shows 0.0.

Follow the steps below to measure the weight of a participant:

1. Ask the participant to remove their footwear (shoes, slippers, sandals, etc) and socks. They should also take off any heavy belts and empty out their pockets of mobiles, wallets and coins.
2. Ask the participant to step onto scale with one foot on each side of the scale.
3. Ask the participant to:
   - Stand still
   - Face forward
   - Place arms on the side wait until asked to step off
4. Record the weight in kilograms on the Android device, along with the device ID and your Technician ID.

(Adopted from: World Health Organization. Collecting Step 2 data: Physical Measurements)(23)

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## 6.2 Annexure 2: Procedure for measuring height

Equipment's to measure height: you need a portable height/length measuring board, such as from SECA. Alternatively, a BMI scale measuring both height and weight (e. g. Growth Management Scale) can be used.

Assembling the measuring board:
Follow the steps below to assemble the measuring board:

1. Separate the pieces of the board (usually 3 pieces) by unscrewing the knot at the back.
2. Assemble the pieces by attaching each one on top of the other in the correct order.
3. Lock the latches in the back.
4. Position the board on a firm surface against a wall.

Follow the steps below to measure the height of a subject:

1. Ask the subject to remove their:
   - Footwear (shoes, slippers, sandals, etc)
   - Head gear (hat, cap, hair bows, comb, ribbons, etc).
   - Any fancy or high hairdos may have to be pressed.

Note: If it would be insensitive to seek removal of a scarf or veil, the measurement may be taken over light fabric.

2. Ask the subject to stand on the board facing you.
   Ask the subject to stand with:
   - Feet together
   - Heels against the back board
   - Knees straight.

   Ask the subject to look straight ahead and not tilt their head up (figure 11)

3. Make sure eyes are the same level as the ears.
4. Move the measure arm gently down onto the head of the subject and ask to breathe in and stand tall.

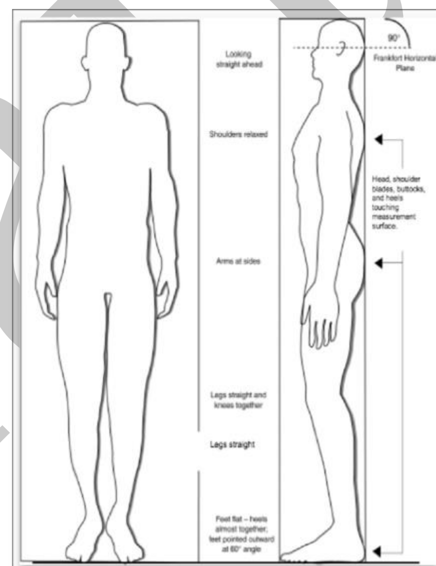


**Figure 11: Positioning for measuring standing height**
Adopted from: Malone, Susan & Zemel, Babette. (2014). The Journal of school nursing 10.1177/1059840514548801.

5. Read the height in centimetres at the exact point to the nearest mm.
6. Ask the subject to step away from the measuring board.
7. Record the height measurement in centimetres.

(Adopted from: World Health Organization. Collecting Step 2 data: Physical Measurements)(23)

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## 6.3 Annexure 3: Procedure for measuring waist circumference

- Waist circumference should be measured at the midpoint between the lower margin of the least palpable rib and the top of the iliac crest (Figure 12), using a stretch-resistant tape to reduce differences in tightness.

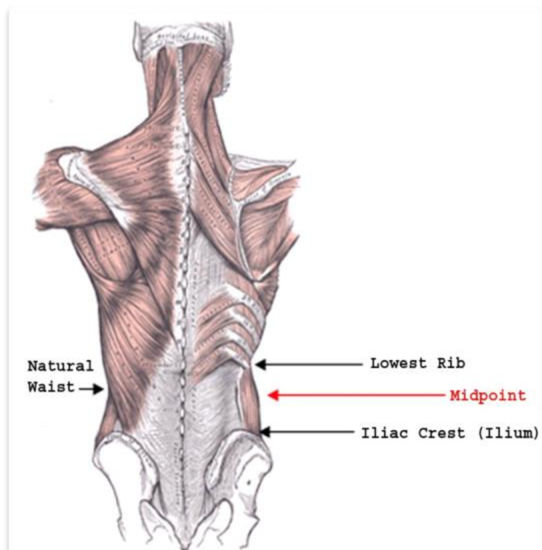


**Figure 12: Waist circumference measurement landmark**

- Tape should be parallel to the floor at the level at which the measurement is made.
- The subject should stand with feet close together, arms at the side and body weight evenly distributed, and should wear little clothing.
- The subject should be relaxed. This can be achieved by asking subject to take deep natural breaths before taking measurements.
- Measurements should be taken at the end of a normal expiration as fullness of the lungs and position of diaphragm influences the accuracy of the measurement.
- Measurement should be repeated twice; if the two measurements are within 1 cm the average should be calculated. If the difference between the two measurements exceeds 1 cm, measurements should be repeated.

(Adopted from: World Health Organization. Collecting Step 2 data: Physical Measurements)(23)

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## 6.4 Annexure 4: Procedure for measuring hip circumference

Equipment:

To take hip circumference measurements you will need a:

- constant tension tape (for example, Figure Finder or Myo Tape Body Tape Measure);
- chair or coat stand for participants to place their clothes.

Privacy

A private area is necessary for this measurement. This could be a separate room, or an area that has been screened off from other people.

Preparing the subject:

This measurement should be taken without clothing, that is, directly over the skin. If this is not possible, the measurement may be taken over light clothing. It must not be taken over thick or bulky clothing. This type of clothing must be removed.

How to take the measurement:

This measurement should be taken:

- with the arms relaxed at the sides
- at the maximum circumference over the buttocks

Follow the steps below to take hip circumference measurements.

1. Stand to the side of the subject and ask them to help wrap the tape around themselves.
2. Position the measuring tape around the maximum circumference of the buttocks.
3. Ask the subject to:
   - stand with their feet together with weight evenly distributed over both feet;
   - hold their arms relaxed at the sides.
4. Check that the tape position is horizontal all around the body and snug without constricting.
5. Measure hip circumference and read the measurement at the level of the tape to the nearest 0.1 cm.

(Adopted from: World Health Organization. Collecting Step 2 data: Physical Measurements)(23)

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### 6.5 Annexure 5: Weight adjustment in oedema

When calculating BMI in oedematous patients; oedema weight needs to be subtracted from the measured weight to get an adjusted weight for oedema. (table 13 and table 14)

**Table 13: Weight adjustment according to grading of peripheral oedema** (24)

| Grade | Symbol | Indent measurement | Rebound time | Site of oedema | Weight adjustment equation (BWef) |
|---|---|---|---|---|---|
| **Mild** | + | Barely detectable impression when finger is pressed into skin, ≤ 2 mm | Immediate rebound | Both ankles and/or feet | BWef (kg) = ABW – 1.0 |
| **Moderate** | ++ | 3–4 mm | Slight indentation, takes ≤ 15 seconds to rebound | Both feet, hands, lower arms and lower legs | BWef (kg) = ABW – 5.0 |
| **Severe** | +++ | > 4 mm | Deeper indentation, takes > 15 seconds to rebound | Generalized bilateral pitting oedema, which includes both legs, arms, feet and face | BWef (kg) = ABW – 10.0 |

ABW: Actual Body Weight
Adopted from: Lahner CR et al. South African Journal of Clinical Nutrition. 2019 Apr 3;32(2):28-31. (24)

**Table 14: Weight adjustment according to grading of ascites**

| Grade | Symbol | Definition | Weight Adjustment equation (BWef) |
|---|---|---|---|
| **Mild** | + | Ascites is only detectable by ultrasound examination | BWef (kg) = ABW – 2.2 |
| **Moderate** | ++ | Ascites causing moderate symmetrical distention of the abdomen | BWef (kg) = ABW – 6.0 |
| **Severe** | +++ | Ascites causing marked abdominal distention | BWef(kg) =ABW – 14.0 |

ABW: Actual Body Weight
Adopted from: Lahner CR.et al. South African Journal of Clinical Nutrition. 2019 Apr 3;32(2):28-31. (24)

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## 6.6 Annexure 6: Weight adjustment in amputees

When adjusting the body weight in amputees, subtract the weight of the amputated part of the body (table 15) from the original body weight before amputation.

**Table 15: Weight of individual body parts**

| Body part | % Contribution of total body weight | Weight of body part (WtBP) |
|---|---|---|
| **Hand** | 0.7 | WtBP (kg) = ((0.7 /100) x ABW) |
| **Lower arm and hand** | 2.3 | WtBP (kg) = ((2.3 /100) x ABW) |
| **Entire arm** | 5.0 | WtBP (kg) = ((5.0 /100) x ABW) |
| **Foot** | 1.5 | WtBP (kg) = ((1.5 /100) x ABW) |
| **Lower leg and foot** | 5.9 | WtBP (kg) = ((5.9 /100) x ABW) |
| **Entire leg** | 16 | WtBP (kg) = ((16 /100) x ABW) |

ABW: Actual Body Weight

Adopted from: Lahner CR et al. South African Journal of Clinical Nutrition. 2019 Apr 3;32(2):28.(24)

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# 7 REFERENCES:

1. WHO Consultation on Obesity (1999: Geneva S, Organization WH. Obesity : preventing and managing the global epidemic : report of a WHO consultation. Geneva World Heal Organ [Internet]. 2000 Dec 31 [cited 2025 Dec 4];894:i–xii, 1–253. Available from: https://iris.who.int/handle/10665/42330

2. What Is Obesity? | Obesity Medicine Association [Internet]. [cited 2025 Dec 5]. Available from: https://obesitymedicine.org/blog/what-is-obesity/

3. Nadolsky K, Garvey WT, Agarwal M, Bonnecaze A, Burguera B, Chaplin MDG, et al. American Association of Clinical Endocrinology Consensus Statement: Algorithm for the Evaluation and Treatment of Adults with Obesity/Adiposity-Based Chronic Disease – 2025 Update. Endocr Pract [Internet]. 2025 Nov 1 [cited 2025 Dec 31];31(11):1351–94. Available from: https://www.endocrinepractice.org/action/showFullText?pii=S1530891X25009772

4. STEPS Survey Sri Lanka 2021 I.

5. Masood B, Moorthy M. Causes of obesity: a review. Clin Med [Internet]. 2023 Jul 1 [cited 2025 Dec 4];23(4):284–91. Available from: https://pubmed.ncbi.nlm.nih.gov/37524429/

6. Obesity: identification, assessment and management. 2023 Jul 26 [cited 2025 Dec 5]; Available from: https://www.ncbi.nlm.nih.gov/books/NBK588750/

7. Nishida C, Barba C, Cavalli-Sforza T, Cutter J, Deurenberg P, Darnton-Hill I, et al. Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies. Lancet [Internet]. 2004 Jan 10 [cited 2025 Dec 5];363(9403):157–63. Available from: https://www.sciencedirect.com/science/article/abs/pii/S0140673603152683

8. Potter AW, Chin GC, Looney DP, Friedl KE. Defining Overweight and Obesity by Percent Body Fat Instead of Body Mass Index. J Clin Endocrinol Metab [Internet]. 2025 Apr 1 [cited 2026 Mar 9];110(4):e1103–7. Available from: https://pubmed.ncbi.nlm.nih.gov/38747476/

9. El-Serag H. The association between obesity and GERD: a review of the epidemiological evidence. Dig Dis Sci [Internet]. 2008 Sep [cited 2026 Mar 9];53(9):2307–12. Available from: https://pubmed.ncbi.nlm.nih.gov/18651221/

10. Durrer Schutz D, Busetto L, Dicker D, Farpour-Lambert N, Pryke R, Toplak H, et al. European Practical and Patient-Centred Guidelines for Adult Obesity Management in Primary Care. Obes Facts [Internet]. 2019 Mar 1 [cited 2026 Mar 9];12(1):40–66. Available from: https://pubmed.ncbi.nlm.nih.gov/30673677/

Draft

11. Sharma AM, Kushner RF. A proposed clinical staging system for obesity. Int J Obes (Lond) [Internet]. 2009 Mar [cited 2026 Mar 9];33(3):289–95. Available from: https://pubmed.ncbi.nlm.nih.gov/19188927/

12. Vargatu I. WILLIAMS TEXTBOOK OF ENDOCRINOLOGY. Acta Endocrinol [Internet]. 2016 [cited 2026 Mar 9];12(1):113. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC6586758/

13. Hazlehurst JM, Logue J, Parretti HM, Abbott S, Brown A, Pournaras DJ, et al. Developing Integrated Clinical Pathways for the Management of Clinically Severe Adult Obesity: a Critique of NHS England Policy. Curr Obes Rep [Internet]. 2020 Dec 1 [cited 2026 Mar 9];9(4):530. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC7695647/

14. Garvey WT, Mechanick JI, Brett EM, Garber AJ, Hurley DL, Jastreboff AM, et al. American association of clinical endocrinologists and American college of endocrinology comprehensive clinical practice guidelines for medical care of patients with obesity. Endocr Pract [Internet]. 2016 [cited 2026 Mar 9];22:1–203. Available from: https://pubmed.ncbi.nlm.nih.gov/27219496/

15. Gonzalez-Campoy JM, St. Jeor ST, Castorino K, Ebrahim A, Hurley D, Jovanovic L, et al. Clinical practice guidelines for healthy eating for the prevention and treatment of metabolic and endocrine diseases in adults: Cosponsored by the American association of clinical endocrinologists/the American college of endocrinology and the obesity soc…. Endocr Pract [Internet]. 2013 Sep 1 [cited 2026 Mar 9];19(SUPPL. 3):1–82. Available from: https://pubmed.ncbi.nlm.nih.gov/24129260/

16. Markovic TP, Proietto J, Dixon JB, Rigas G, Deed G, Hamdorf JM, et al. The Australian Obesity Management Algorithm: A simple tool to guide the management of obesity in primary care. Obes Res Clin Pract [Internet]. 2022 Sep 1 [cited 2026 Mar 9];16(5):353–63. Available from: https://pubmed.ncbi.nlm.nih.gov/36050266/

17. Jayawardena R, Sooriyaarachchi P, Punchihewa P, Lokunarangoda N, Pathirana AK. Effects of "plate model" as a part of dietary intervention for rehabilitation following myocardial infarction: a randomized controlled trial. Cardiovasc Diagn Ther [Internet]. 2019 Apr 1 [cited 2025 Jan 30];9(2):17988–17188. Available from: https://cdt.amegroups.org/article/view/25103/html

18. Jayawardena R. My Rice Plate an Evidence Based Approach to weight reduction| [Internet]. [cited 2026 Mar 9]. Available from: https://www.daraz.lk/products/my-rice-plate-an-evidence-based-approach-to-lose-book-i191285137.html

19. Gardner CD, Trepanowski JF, Gobbo LCD, Hauser ME, Rigdon J, Ioannidis JPA, et al. Effect of low-fat VS low-carbohydrate diet on 12-month weight loss in overweight adults and the association with genotype pattern or insulin secretion the DIETFITS randomized clinical trial. JAMA - J Am Med Assoc [Internet]. 2018 Feb 20 [cited 2025

Jan 30];319(7):667–79. Available from: https://examine.com/articles/low-fat-vs-low-carb-for-weight-loss/

20. Chakhtoura M, Haber R, Ghezzawi M, Rhayem C, Tcheroyan R, Mantzoros CS. Pharmacotherapy of obesity: an update on the available medications and drugs under investigation. eClinicalMedicine [Internet]. 2023 Apr 1 [cited 2026 Mar 9];58. Available from: https://pubmed.ncbi.nlm.nih.gov/36992862/

21. Eisenberg D, Shikora SA, Aarts E, Aminian A, Angrisani L, Cohen R V., et al. 2022 American Society for Metabolic and Bariatric Surgery (ASMBS) and International Federation for the Surgery of Obesity and Metabolic Disorders (IFSO): Indications for Metabolic and Bariatric Surgery. Surg Obes Relat Dis [Internet]. 2022 Dec 1 [cited 2026 Mar 9];18(12):1345–56. Available from: https://pubmed.ncbi.nlm.nih.gov/36280539/

22. SV M, Nitin K, Sambit D, Nishant R, Sanjay K, India) (on behalf of Endocrine Society of. ESI Clinical Practice Guidelines for the Evaluation and Management of Obesity In India. Indian J Endocrinol Metab [Internet]. 2022 Jul [cited 2026 Mar 9];26(4):295. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC9519829/

23. WHO. Section 5: Collecting Step 2 data: Physical Measurements Overview.

24. Lahner CR. Adult weight measurement: decoding the terminology used in literature. South African J Clin Nutr [Internet]. 2019 Apr 3 [cited 2026 Mar 9];32(2):28–31. Available from: https://www.tandfonline.com/doi/pdf/10.1080/16070658.2018.1426186?needAccess=true

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