

NATIONAL CLINICAL GUIDELINES

THE MANAGEMENT OF OBESITY IN CHILDREN

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المبادئ الإرشادية السريرية لدولة قطر
NATIONAL CLINICAL GUIDELINES FOR QATAR



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Abbreviations

The abbreviations used in this guideline are as follows:

ALT	Alanine Aminotransferase
AST	Aspartate Aminotransferase
BMI	Body Mass Index
DASH	Dietary Approaches to Stop Hypertension
FT₄	Free Levothyroxine
HBA_{1c}	Glycated Haemoglobin
HOMA-IR	Homeostasis model assessment-estimated insulin resistance
MDT	Multidisciplinary Team
MOPH	Ministry of Public Health
NASH	Non-alcoholic steatohepatitis
NCG	National Clinical Guideline
PCOS	Polycystic Ovarian Syndrome
PHCC	Primary Health Care Corporation
T2DM	Type 2 Diabetes Mellitus
TSH	Thyroid Stimulating Hormone
WHO	World Health Organization

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1 Information about this Guideline

1.1 Objective and Purpose of the Guideline

The purpose of this guideline is to define the appropriate prevention, diagnosis and management of obesity in children. The objective is to guide the appropriate prevention, investigation, treatment and referral of patients presenting to provider organisations in Qatar. It is intended that the guideline will be used primarily by healthcare professionals in primary, secondary and tertiary levels of care.

1.2 Scope of the Guideline

This guideline covers the following aspects of care:

- The awareness, prevention, early detection of childhood obesity.
- Screening for obesity among children (<18 years).
- Diagnosis, assessment, and management of obesity in children (aged < 18 years), including:
 - Risk stratification.
 - Investigations.
 - Addressing barriers to weight loss and psychological factors.
 - The assessment of associated comorbidities.
 - Lifestyle advice and behavioural interventions.
- Referral indications to specialised obesity services.
- Pharmacological treatment options.
- Endoscopic bariatric therapies.
- Surgical treatment options.

Aspects of care not covered in this guideline are:

- Patients age \geq 18 years.
- Medical treatment of related medical conditions.

1.3 Editorial Approach

This guideline document has been developed and issued by the Ministry of Public Health of Qatar (MOPH), through a process which aligns with international best practice in guideline development and localisation. The guideline will be reviewed on a regular basis and updated to incorporate comments and feedback from stakeholders across Qatar.

The editorial methodology, used to develop this guideline, has involved the following critical steps:

- Extensive literature search for well-reputed, published evidence relating to the topic.
- Critical appraisal of the literature.
- Development of a draft summary guideline.
- Review of the summary guideline with a Guideline Development Group, comprised of practising healthcare professionals, subject matter experts and patient representatives, from across Qatar.
- Independent review of the guideline by the National Clinical Guidelines & Pathways Committee, appointed by the MOPH, from amongst stakeholder organisations across Qatar.

Whilst the MOPH has sponsored the development of the guideline, the MOPH has not influenced the specific recommendations made within it.

1.4 Sources of Evidence

The professional literature published in the English language has been systematically queried using specially developed, customised, and tested search strings. Search strategies are developed to allow efficient yet comprehensive analysis of relevant publications for a given topic and to maximise retrieval of articles with certain desired characteristics pertinent to a guideline.

For each guideline, all retrieved publications have been individually reviewed by a clinical editor and assessed in terms of quality, utility, and relevance. Preference is given to publications that:

1. Are designed with rigorous scientific methodology.
2. Are published in higher-quality journals (i.e. journals that are read and cited most often within their field).
3. Address an aspect of specific importance to the guideline in question.

Further information about the literature search and appraisal process is included in the appendix.

1.5 Evidence Grading and Recommendations

Recommendations made within this guideline are supported by evidence from the medical literature and where possible the most authoritative sources have been used in the development of this guideline. In order to provide insight into the evidence basis for each recommendation, the following evidence hierarchy has been used to grade the level of authoritativeness of the evidence used, where recommendations have been made within this guideline.

Where the recommendations of international guidelines have been adopted, the evidence grading is assigned to the underlying evidence used by the international guideline. Where more than one source has been cited, the evidence grading relates to the highest level of evidence cited:

- **Level 1 (L1):**
 - Meta-analyses.
 - Randomised controlled trials with meta-analysis.
 - Randomised controlled trials.
 - Systematic reviews.
- **Level 2 (L2):**
 - Observational studies, examples include:
 - Cohort studies with statistical adjustment for potential confounders.
 - Cohort studies without adjustment.
 - Case series with historical or literature controls.
 - Uncontrolled case series.
 - Statements in published articles or textbooks.
- **Level 3 (L3):**
 - Expert opinion.
 - Unpublished data, examples include:
 - Large database analyses.
 - Written protocols or outcomes reports from large practices.

In order to give additional insight into the reasoning underlying certain recommendations and the strength of recommendation, the following recommendation grading has been used, where recommendations are made:

- **Recommendation Grade A (RGA):** Evidence demonstrates at least moderate certainty of at least moderate net benefit.
- **Recommendation Grade B (RGB):** Evidence is insufficient, conflicting, or poor and demonstrates an incomplete assessment of net benefit vs harm; additional research is recommended.
- **Recommendation Grade C (RGC):** Evidence demonstrates potential harm that outweighs benefit; additional research is recommended.
- **Recommendation of the GDG (R-GDG):** Recommended best practice based on the clinical experience of the Guideline Development Group members.

1.6 Guideline Development Group Members

The following table lists members of the Guideline Development Group (GDG) nominated by their respective organisations and the Clinical Governance Group. The GDG members have reviewed and provided feedback on the draft guideline relating to the topic. Each member has completed a declaration of conflicts of interest, which has been reviewed and retained by the MOPH.

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1.7 National Clinical Guidelines & Pathways Committee Members

The following table lists members of the National Clinical Guidelines & Pathways Committee (NCGPC), appointed by the MOPH. The NCGPC members have reviewed and provided their feedback and approval of the guideline document. Each member has completed a declaration of conflicts of interest, which has been reviewed and retained by the MOPH.

National Clinical Guidelines & Pathways Committee (NCGPC) Members		
Name	Title	Organisation
Ms Huda Amer Al-Katheeri	Chair of the NCGPC, Director- Strategic Planning & Performance Department	Ministry of Public Health
Shk Dr Mohammed Hamad J. Al Thani	Co-Chair of NCGPC, Director of Public Health	Ministry of Public Health
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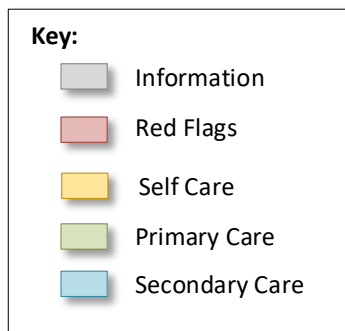
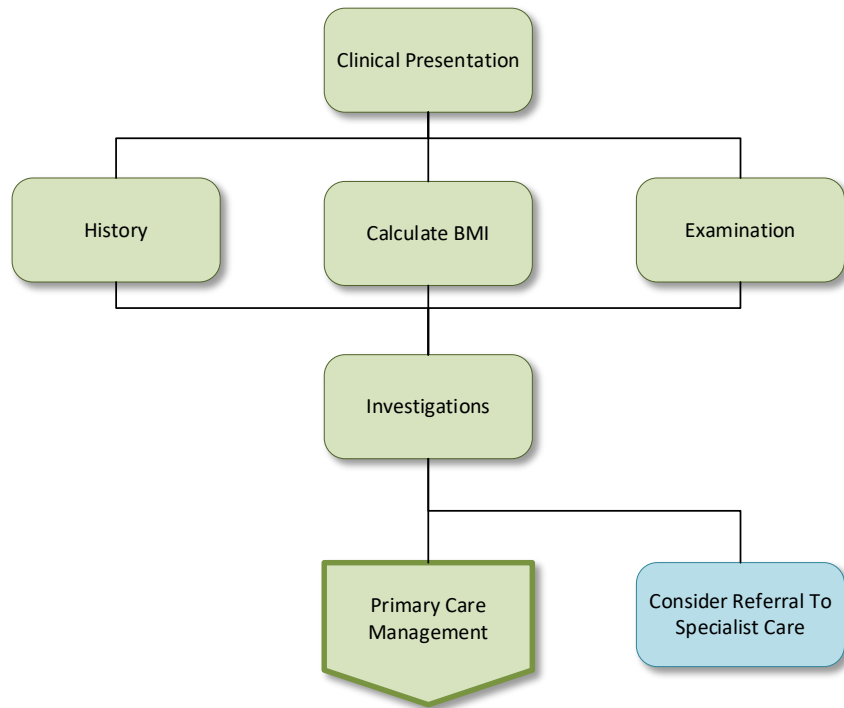
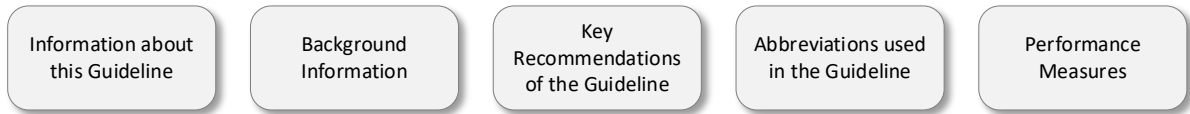
1.8 Responsibilities of Healthcare Professionals

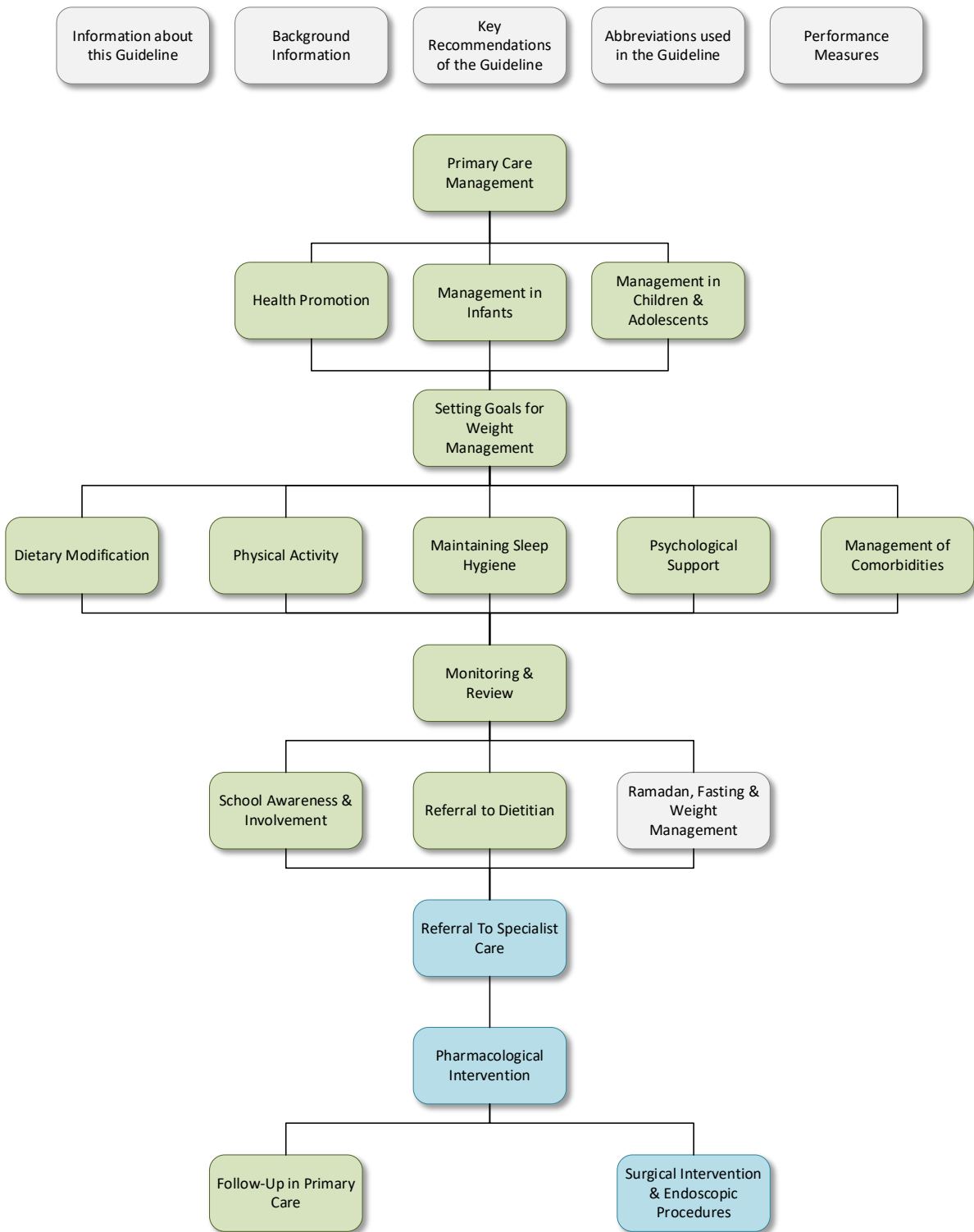
This guideline has been issued by the MOPH to define the required care and treatment pathway for children of obesity in Qatar. It is based upon a comprehensive assessment of the evidence as well as its applicability to the national context of Qatar. Healthcare professionals are expected to take this guidance into account when exercising their clinical judgement in the care of patients presenting to them.

The guidance does not override individual professional responsibility to take decisions which are appropriate to the circumstances of the patient concerned. Such decisions should be made in consultation with the patient, their guardians, or carers and should consider the individual risks and benefits of any intervention that is contemplated in the patient's care.

2 Obesity in Children Diagnosis & Management Pathway

Click on a box below to see the relevant page of the Pathway.





3 Key Recommendations of the Guideline

The key recommendations of this guideline are:

Clinical Presentation (*Section 5*):

- Refer to *Section 5* for symptoms which may be associated with childhood obesity.

Clinical Assessment (*Section 6*):

- As part of the routine assessment of patients with obesity, enquire about the following¹⁻⁶ [**L1, RGA**]:
 - Prenatal, birth and postnatal, developmental milestone and weight history.
 - Eating pattern /behaviours, physical activity levels and sleep characteristics.
 - Psychological problems, psychosocial distress, and family factors including patient and family's willingness to change their lifestyle and any financial constraints.
 - Puberty and menstruation history.
 - Medication history.
- Relevant comorbidities (See *Section 4.5* for details).
- BMI should be calculated as patient's weight in kilograms divided by the square of their height in metres^{4,7} [**L1, RGA**].

Screening (*Section 7*):

- All children should be screened for obesity and their BMI calculated at every clinic visit and on annual basis for school-aged children^{1,8}.

Investigations (*Section 8*):

- Perform the following investigations in children who are found to be obese^{1-4,8}[**L1, RGA**]:
 - Complete blood count.
 - Urea and electrolytes.
 - Fasting glucose:
 - Used in screening for diabetes in well children aged 10-18 years old with obesity and two other diabetes risk factors⁹:
 - Family history of T2DM in a first and second degree relative.
 - High risk ethnicity.
 - Signs of insulin resistance or conditions associated with insulin resistance:
 - Acanthosis nigricans.
 - Hypertension.
 - Dyslipidaemia.
 - Polycystic ovary syndrome.
 - Small-for-gestational age birth weight.
 - Maternal history of DM or GDM during child gestation.
 - Fasting lipid profile, liver and thyroid function tests.
 - HbA_{1c} should be measured in all cases.
 - Fasting lipid profile.
 - Liver function tests.
 - Thyroid function tests.
 - Vitamin D.
 - Urinary free cortisol or midnight salivary cortisol (if Cushing's syndrome is suspected).
 - Serum calcium, phosphate, and parathormone (for pseudohypoparathyroidism).

- Consider genetic testing in obese children (BMI > 3 standard deviations of Z-Scores above the WHO Child Growth Standards median).

Management in Primary Care (Section 9):

- Decisions about the clinical care of an overweight or obese child (including assessment and target goals and actions) should be made together with the child and their family².
- Comorbidities should be managed when identified. Weight loss before treatment is not mandatory².
- Provide patients, and their families and or carers, with individually tailored, relevant information on the prevention of obesity and weight management including the potential health benefits associated with maintained modest weight loss with lifestyle change^{7,10} [L1] (See Section 10.1).
- Tailored Clinical care plan including assessment and target goals should be in collaboration with school nurse to monitor progress and provide needed support [R-GDG].
- Encourage parents of children and young people who are overweight or obese to lose weight if they are also overweight or obese².

Management of Obesity and Overweight in Children and Adolescents (Sections 9.3):

- Children should receive an individualised weight maintenance or weight loss plan⁶ [RGA]. Weight loss goals should depend on the patient age and degree of overweight and obesity^{1,6}. This plan should be shared with school nurse to monitor progress and provide needed support.
- Lifestyle modification is the initial approach and the primary treatment for all children with obesity^{1,11}. [L1, RGA].
- Advise patients regarding dietary modification^{1,3,4,6,8} [L1, RGA], and decrease portion sizes when needed.
- Serving size should be measured after cooking and be appropriate for the child's age and energy needs [R-GDG]
- Advise patients and their family members of relevant points regarding physical activities and exercise^{1-4,6,8,11} [L1, RGA].
- Children with obesity and comorbid sleep disorders should be advised on proper sleep hygiene^{3,12} [L1, RGA].
- Patients with ongoing depression should be excluded from weight loss medications that may exacerbate their mental health condition. However, such patients should not be excluded from other weight management treatments [R-GDG].

School Awareness and Involvement (Section 9.6):

- School nurses, in coordination with school authorities, should provide health education to help students gain knowledge, attitudes, beliefs and skills needed to make informed decisions and practice healthy behaviours.

Referral to Specialist Care (Section 10):

- All obese children should be assessed by a dietitian, either in primary care or as part of a specialist MDT [R-GDG].
- See Section 10 for specific referral criteria to specialist care.

Pharmacological Treatment for Obesity (Section 11.3):

- Pharmacotherapy is not recommended for:
 - Children <12 years of age² [L1, RGC].
 - Children and adolescents <16 years of age who are overweight but not obese⁸ [L1, RGB].

- Orlistat (120 mg 3 times per day) is approved for weight loss in children >12 years^{1,3,11,13,14} [**L1, RGA**]:
 - May be prescribed only in case of physical comorbidities (such as orthopaedic problems or sleep apnoea) or severe psychological comorbidities².
 - Treatment should be started in a specialist paediatric setting by MDT⁶ (see *Section 9.1*).
- Metformin^{1,14}:
 - Can be used to treat obesity in children with T2DM >10 years of age.
 - Paediatric randomised, controlled trial studies have shown improvement in BMI, fasting serum glucose, fasting insulin, homeostasis model assessment-estimated insulin resistance (HOMA-IR) and lipid profile in patients on Metformin therapy for exogenous obesity associated with insulin resistance^{15,16}.
- Sibutramine Is **NOT** recommended for weight control due to the increased risk of cardiovascular events^{1,13,17} [**L1, RGC**].

Bariatric Surgery (*Section 11.4*):

- Reserved for sexually mature adolescents in Tanner 4 or 5 pubertal development and final or near-final adult height with severe obesity and moderate to severe comorbidities^{1,3,18} [**L1, RGA**].
- Consider as the last treatment option in patients resistant to all other interventions^{22,33} [**L1, RGA**].
- Not recommended for pre-pubertal adolescents.
- Surgery and endoscopic procedures for obesity should only be considered by a specialist MDT² [**L1, RGA**].

4 Background Information

4.1 Definition

Obesity is an abnormal or excessive accumulation of adipose tissue that presents a risk to health^{1,19}. The accumulation usually occurs around the viscera²⁰. It is associated with increased morbidity and mortality²¹.

Body mass index (BMI) is a simple index that is commonly used to classify overweight and obesity^{1,19,22}:

- BMI is defined as a person's weight in kilograms divided by the square of his height in meters (kg/m^2)²⁰.
- BMI should be interpreted with caution because it is not a direct measure of adiposity^{2,19,23}.
- BMI should be adjusted for age and gender as the amount of body fat changes with age and differs between boys and girls^{4,2}.
- BMI is not assessed in infants below 2 years old. Instead, the ratio of the infants' weight percentile and length percentile should be used.

Criteria for defining paediatric obesity and overweight developed by World Health Organization (WHO) are summarised below^{8,24–26}.

Children <2 years old	Children 2-5 years old	Children 5-18 years old
<i>Overweight:</i> BMI (or weight for length/height) greater 2 standard deviation of Z-scores above the WHO Growth Reference median for age and sex.	<i>Overweight</i> BMI (or weight for length/height) greater than 2 standard deviations of Z-scores above WHO Child Growth Standards median.	<i>Overweight:</i> BMI (or weight for length/height) greater 2 standard deviation of Z-scores above the WHO Growth Reference median for age and sex.
<i>Obesity:</i> BMI (or weight for length/height) greater than 3 standard deviations of Z-scores above the WHO Growth Reference median for age and sex	<i>Obesity:</i> BMI (or weight for length/height) greater than 3 standard deviations of Z-scores above the WHO Child Growth Standards median.	<i>Obesity:</i> BMI (or weight for length /height) greater than 3 standard deviations of Z-scores above the WHO Growth Reference median for age and sex.

Table 4.1: Definition of overweight and obesity in paediatric patients^{1,3,27}.

4.2 Prevalence

A surveillance study published in 2018 from data collected from 2015-2016, reported that 42.6% of children and young people aged 5-19 years were either overweight or obese. Qatari nationals had 1.4 times higher odds of obesity than non-Qataris and the prevalence of obesity was also noted to be higher in boys than in girls²⁸.

Surveillance data from PHCC records in 2019, indicates the prevalence of overweight and obesity in children aged 5-18 years is 20.4%^{28,29}. Further research is therefore recommended to determine the true prevalence of overweight and obesity in children in Qatar.

4.3 Aetiology

Obesity in children results from an imbalance between multiple factors leading to discordant energy intake and energy expenditure. The following factors contribute to obesity:

- Genetic predisposition^{1,30,31}:

- Obese parents.
- Small-for-gestational age pre-term neonates with early catch-up [R-GDG].
- Large-for-gestational age pre-term neonates
- Rapid weight gain during infancy.
- Belonging to ethnic minorities.
- Monogenic disorders:
 - Leptin deficiency.
 - Melanocortin-4 receptor mutation.
 - Proopiomelanocortin deficiency.
- Genetic syndromes:
 - Down's Syndrome.
 - Bardet-Biedl syndrome.
 - Prader-Willi syndrome.
 - Cohen syndrome.
 - Froehlich syndrome
 - Alström syndrome.
- Behavioural and cultural practices^{1,3}:
 - Poor dietary habits:
 - Energy-dense foods.
 - Large portion sizes.
 - Fast food.
 - Sugary beverages.
 - Decreased physical activity.
 - Increased sedentary behaviour.
 - Unhealthy sleeping pattern.
- Environmental influences^{1,3}:
 - Maternal gestational diabetes.
 - Poor nutrition in utero.
 - Psychological factors.
 - Poor socioeconomic status.
- Medical conditions^{1,32,33}:
 - Hypothyroidism.
 - Cushing's syndrome.
 - Partial or complete hypopituitarism.
 - Hypothalamic damage (e.g. tumour, surgery, or radiotherapy).
- Medications that are associated with weight gain^{1,4}:
 - Steroids.
 - Antiepileptics.
 - Antihistamines.
 - Antidepressants.
 - Antidiabetics.
 - Antihypertensives.
 - Antipsychotics.
 - Contraceptives and hormones.

4.4 Risk Factors

The risk factors for the development of obesity in children, include:

- Individual modifiable risk factors^{5,32,34}:
 - Unhealthy family lifestyle.
 - High intake of energy-dense food or drink (e.g. confectionary and sugar drinks).

- Sedentary lifestyle and low levels of physical activity (e.g. frequent use of television, computer games, internet, and telephone).
- Sleep deprivation.
- Psychological factors (e.g. stress, comfort-eating, depression).
- Cultural acceptance of overweight and obesity.
- Individual non-modifiable risk factors^{7,27,32,35}:
 - Genetic factors and ethnicity^{3,36}:
 - 30% chance of obesity if one parent has obesity.
 - 90% chance of obesity if both parents have obesity.
 - Family history of overweight, obesity, and comorbidities.
 - Physical disability, learning disability, or enduring mental health difficulties.
 - Exposures to toxins, nutrition, medications, antibiotics, infection, and exogenous hormones³.
- Environmental cofactors^{7,27,32}:
 - Lack of active extracurricular activities after school.
 - Limited physical activities during the school day and Improper activation of physical education classes in schools.
 - Insufficiency of suitable sporting facilities for children less than 18 years.
 - Low public health awareness.
 - Transportation (i.e. high dependence on cars).
 - Wide and easy availability of cheap processed foods.
 - Lack of nutrition labelling and awareness of this labelling.
 - Insufficient structured awareness programs targeting obesity in children.

4.5 Comorbidities

Comorbidities of obesity in children include^{2,3,37,38}:

- Cardiovascular:
 - Hypertension.
- Respiratory:
 - Obstructive sleep apnoea.
 - Asthma.
 - Breathlessness.
- Endocrine and Metabolic disorders:
 - Insulin resistance.
 - Type 2 diabetes mellitus (T2DM).
 - Hyperlipidaemia.
 - Hyperinsulinaemia.
 - Mild sub-clinical hypothyroidism.
 - Hirsutism.
 - Vitamin D deficiency.
- Gastrointestinal:
 - Non-alcoholic steatohepatitis (NASH).
 - Gastro-oesophageal reflux disease.
 - Gall bladder disease.
 - Constipation.
- Reproductive:
 - Polycystic ovarian syndrome (PCOS).
- Renal:
 - Chronic kidney disease.

- Musculoskeletal:
 - Osteoarthritis.
 - Slipped capital femoral epiphysis.
 - Blount disease.
 - Scoliosis.
- Psychological:
 - Low self-esteem.
 - Anxiety.
 - Depression.
 - Bullying.
- Central Nervous System:
 - Pseudotumor cerebri.

4.6 Prognosis

Obese children are at increased risk of becoming obese adults:

- Children who are already obese at age 8 years will tend to have more severe obesity and increased morbidity as an adult¹.
- Approximately 80% of children who are obese at age 10-15 years will remain obese in adulthood^{1,39}.
- Even with successful weight loss, children are at risk of rebounding back to or going above their previous weight.

Success rate of weight loss therapies correlates with:

- Family involvement and support².
- Motivation of patients and families²⁵
- Community support.
- Age (i.e. younger children have better outcomes)^{40,41}.

Significant improvements in insulin sensitivity, blood pressure, and lipid profiles, as well as reduction of cardiovascular risk and other obesity-associated diseases, have been shown in severely obese children with mild to moderate degree of weight loss^{1,41}.

5 Clinical Presentation

The following symptoms are often associated with obesity in children³:

- Early puberty in girls and early or delayed puberty in boys.
- Menstrual dysfunction or irregular menses.
- In-toeing.
- Interrupted Sleep and snoring.
- Breathlessness.
- Hyperglycaemic symptoms (polyuria, polydipsia, and polyphagia)
- Headache.
- Fatigue.
- Muscle aches.
- Knee or hip pain.
- Leg bowing.
- Abdominal pain and indigestion.
- Abnormal skin pigmentation.
- Nervousness.
- School avoidance.

6 Clinical Assessment

6.1 History

As part of the routine assessment of patients with obesity, enquire about the following¹⁻⁶ [**L1, RGA**]:

- Prenatal, birth and postnatal history including gestational diabetes, preterm or full term, birth weight.
- Growth and developmental milestone history.
- Weight history, including:
 - Age of starting weight gain
 - Previous and ongoing weight loss attempts.
 - Weight loss medication.
 - Weight loss surgery.
 - Seeing other weight loss professionals or organisations.
 - Use of alternative therapies.
- Presenting symptoms (See *Section 5*).
- Eating pattern and behaviours, including:
 - History of breast or bottle feeding for infants.
 - Timing of introduction of complementary foods.
 - Child's eating habits.
 - Parent feeding styles.
- Physical activity levels.
 - Time spent on internet or electronic activities per day.
 - School activities.
 - After school activities. (structured or unstructured).
 - Intensity of physical activities.
- Sleep duration and quality.
- Relevant comorbidities (see *Section 4.5*).
- Psychological problems and psychosocial distress, including:
 - Low self-esteem and body image.
 - Isolation from peers.

- Bullying.
- Anxiety and depression.
- Eating disorders (i.e. binge eating disorder, night eating disorder, and bulimia).
 - Consider using the SCOFF questionnaire to score the risk of the child having an eating disorder⁴².
 - Score: 1 point for each positive answer to the following questions⁴².
 - A total score of ≥ 2 indicates high risk of an eating disorder⁴²:
 - Do you make yourself **S**ick because you feel uncomfortably full?
 - Do you worry that you have lost **C**ontrol over how much you eat?
 - Have you recently lost more than **O**ne stone (14 lb) in a 3-month period?
 - Do you believe yourself to be **F**at when others say you are too thin?
 - Would you say that **F**ood dominates your life?
- Puberty and menstruation history.
- Medication history:
 - Management of obesity and comorbid conditions.
 - Vitamins and supplements.
- Any environmental, social, and family factors, including:
 - Family history of overweight, obesity, and comorbidities.
 - Maternal history of gestational diabetes.
 - Poor nutrition.
 - Home environment.
- The patient and family's willingness and motivation to change their lifestyle.
- Financial constraints encouraging purchase of poor quality processed and fast-foods.

6.2 Calculating BMI

BMI should be calculated as patient's weight in kilograms divided by the square of their height in metres^{4,7} [L1, RGA], i.e.:

$$\text{Weight (kg) / Height (m}^2\text{)}.$$

BMI should be interpreted with caution because the calculation alone is not a direct measure of adiposity [L1, RGC]^{2,19}. Consider additional measurements to support the diagnosis of obesity, including^{1,2,43,44} [L2, RGB]:

- Waist circumference (or waist-hip ratio) for children ≥ 2 years old.
- Skinfold thickness.
- Mid-upper arm circumference.
- Neck circumference.

6.3 Examination

Assess for the following signs^{1,3}[L1, RGA]:

- Linear growth abnormalities:
 - Accelerated growth is typical for nutritional obesity.
 - Decreased linear growth is typical for obesity with underlying endocrinopathy
- Abnormalities in blood pressure and heart rate measurements – ensure appropriate blood pressure cuff is used.
- Dysmorphic features and goitre [R-GDG].
- Acanthosis nigricans (associated with insulin resistance).

- Hyperandrogenaemia (Hirsutism, alopecia, acne and PCOS).
- Cushingoid features (associated with Cushing's disease).
- Tanner stages [**R-GDG**].
- Any comorbidities or associated conditions (see *Section 4.5*):
 - Children with obesity should be carefully examined for scoliosis as it is harder to detect due to adiposity.
- Consider genetic causes of obesity in children <5 years old with severe obesity.

7 Screening for Overweight & Obesity

Screening:

- All school-age children should be screened for overweight and obesity by having their BMI calculated on an annual basis^{1,8}.
- All children should be screened for overweight and obesity by having their BMI calculated, at every clinic visit^{1,8}.

8 Investigations

Perform the following investigations in children who are found to be obese^{1-4,8}[**L1, RGA**]:

- Complete blood count.
- Urea and electrolytes.
- Fasting glucose:
 - Used in screening for diabetes in well children aged 10-18 years old with obesity and two other diabetes risk factors⁹:
 - Family history of T2DM in a first and second degree relative.
 - High risk ethnicity.
 - Signs of insulin resistance or conditions associated with insulin resistance:
 - Acanthosis nigricans.
 - Hypertension.
 - Dyslipidaemia.
 - Polycystic ovary syndrome.
 - Small-for-gestational age birth weight.
 - Maternal history of DM or GDM during child gestation.
 - Note: Screening for diabetes in obese children, should be performed at 10 years of age or onset of puberty, whichever is earlier.
 - If results are negative, screening should be repeated at least every two years and more frequently if BMI increases^{1,2,26,45}.
- HbA_{1c} should be measured in all cases.
- Fasting lipid profile.
- Liver function tests.
- Thyroid function tests.
- Vitamin D.
- Urinary free cortisol or midnight salivary cortisol (if Cushing's syndrome is suspected).
- Serum calcium, phosphate, and parathormone (for pseudohypoparathyroidism).
- Consider genetic testing in obese children (BMI > 3 standard deviations of Z-Scores above the WHO Child Growth Standards median).

9 Management in Primary Care

The care of children and young people should be coordinated around their individual and family needs². Decisions about the clinical care of an overweight or obese child (including assessment and target goals and actions) should be made together with the child and their family².

Initial baseline biochemical investigations should be performed in a primary care setting by either a primary care physician or a paediatrician [**R-GDG**].

NB: Comorbidities should be managed when identified. Weight loss prior to treatment of comorbidities is not mandatory².

9.1 Health Promotion

Inform obese or overweight patients and their parents or carers about the following potential health benefits associated with maintained modest weight loss with lifestyle change¹⁰:

- Improved quality of life.
- Reduced blood pressure.
- A reduction in the risk of developing type 2 diabetes mellitus.
- Reduction of incidence of cardiovascular disease later in life.
- Reduced osteoarthritis-related disability later in life.
- Improved lung function in patients with asthma.

In order to determine the next steps²⁰:

- Advise and design an appropriate programme to achieve weight control.
- Assist in establishing an appropriate intervention.
- Arrange follow-up.

Provide patients, and their families and or carers, with individually tailored, relevant information on the prevention of obesity and the following aspects of weight management^{7,10} [**L1**]:

- General information on being overweight and obesity, including related health risks.
- An agreed weight loss target.
- Understanding the distinction between losing weight and maintaining weight loss, and the importance of developing skills for both.
- Realistic targets for outcomes other than weight loss, such as increased physical activity and healthier eating.
- Diagnosis and treatment options.
- Healthy eating in general.
- Medication and side effects.
- Surgical treatments.
- Self-care.
- Voluntary organisations and support groups and how to contact them.

Encourage parents of children and young people who are overweight or obese to lose weight if they are also overweight or obese².

9.2 Prevention and Management of Obesity in Infants

Obesity in infants can be managed through dietary and behavioural modifications only. Pharmacological and surgical interventions are not recommended [R-GDG].

Parents or carers should be informed that^{3,8,11}:

- Exclusive breastfeeding is the optimal feeding practice for infants up to 6 months of age.
- Appropriate home-made complementary foods should be introduced after 6 months of age.
- Watching TV or other kinds of screens is not recommended for children less than 18 months of age.
- Infants should sleep 12-18h a day.
- Infants should be allowed to be as active as possible.
- Parents should have as much direct interaction with kids as possible.
- Infants should not be given:
 - Sugar sweetened beverages, including juice and desserts.
 - Fast food (high fat foods, high salty foods, etc).

9.3 Prevention and Management of Obesity and Overweight in Children and Adolescents

9.3.1 Setting Goals for Weight Management

The aims of weight management should include^{10,32,46} [L1, RGA]:

- Improving of pre-existing obesity-related comorbidities.
- Reducing the future risk of obesity-related comorbidities.
- Improving of physical, mental, and social well-being.
- Improving of quality of life.

All overweight or obese children should receive an individualised weight maintenance or weight loss plan⁶ [L2, RGA]. Weight loss goals depend on the patient age and degree of overweight and obesity^{1,6}.

For overweight children^{1,6}:

- Without additional risk factors (see *Section 4.4*):
 - Weight velocity maintenance during the period of linear growth.
 - Weight maintenance after linear growth is complete.
- With additional risk factors:
 - Weight loss not to exceed 0.9 kg per week.

For obese children^{1,6}:

- 2-11 years old:
 - Weight maintenance; or
 - Gradual weight loss not to exceed 0.45 kg per month.
- 12-18 years old:
 - Weight loss not to exceed 0.9 kg per week.

For severely obese children¹:

- 2-5 years old:
 - Weight loss not to exceed 0.45 kg per month.
- 6-18 years old:
 - Weight loss not to exceed 0.9 kg per week.

Children growing in height should concentrate on weight maintenance rather than weight loss^{1,4,6} [L1].

To estimate energy requirements for low activity in children refer to *Table 9.3.1*.

Age	Energy (kcal/day)	Protein (g/day)	Total Fat (g/day)	Iron (mg/day)	Calcium (mg/day)	Zinc (mg/day)
1 to 3 years						
Boys	850 to 1300	13	30 to 40	7	700	3
Girls	750 to 1250	13	30 to 40	7	700	3
4 to 8 years						
Boys	1400 to 1700	19	25 to 35	10	1000	5
Girls	1300 to 1600	19	25 to 35	10	1000	5
9 to 13 years						
Boys	1800 to 2300	34	25 to 35	8	1300	8
Girls	1700 to 2000	34	25 to 35	8	1300	8
14 to 18 years						
Boys	2500 to 2800	52	25 to 35	11	1300	11
Girls	2000	46	25 to 35	15	1300	9

Table 9.3.1: Estimated energy requirements (low activity) and recommended dietary allowance of selected nutrients for children⁶.

9.3.2 Lifestyle Interventions

Lifestyle modification is the initial approach and the primary treatment for all children with obesity^{1,11}. It is important that parents and family adopt healthy lifestyle habits and have time and resources for children to participate in weight management programs^{1,4,8,47} [**L1, RGA**].

Consider behavioural interventions that are appropriate for the individual, such as^{2,3,8} [**L1, RGA**]:

- Goal setting.
- Self-monitoring of behaviour and progress.
- Rewards for reaching goals.
- Proper sleep hygiene.
- Physical activity (see *Section 9.3.4*).
- Stimulus control:
 - Where the patient is taught how to recognise and avoid triggers that prompt unplanned eating.
- Cognitive restructuring:
 - Modifying unhelpful thoughts or thinking patterns.
 - Eating slowly.
 - Problem solving.
 - Assertiveness training.
 - Reinforcing changes.
 - Considering how to prevent relapse.
 - Strategies for dealing with weight regain.
- Consider other techniques such as mindfulness, meditation, and relaxation for stress eaters [**R-GDG**].

9.3.3 Dietary Modifications

There is no evidence to recommend one diet over another for children^{1,3}. Recommendations given below are not universal and should be adapted for personal needs of each child diagnosed with obesity.

Consider the following dietary advice² [**L1, RGA**]:

- Healthy eating is better than dieting.
- Tailor dietary changes to individual food preferences.
- Allow for a flexible and individual approach to reducing calorie intake.
- Do not use unduly restrictive and nutritionally unbalanced diets.
- Encourage patients to improve their diet even if they do not lose weight, as there are health benefits from dietary improvement alone.
- Total energy intake should be less than their energy expenditure.
- Dietary recommendations should be a part of a multicomponent intervention.

Advise patients to^{1,3,4,6,8} [**L1, RGA**]:

- Have 3 meals plus 1–2 snacks every day.
- Consuming breakfast regularly²¹.
- Reduce their intake of:
 - Sugar-sweetened beverages (no more than twice a week).
 - Energy-dense foods:
 - Animal fats.
 - Other high fat foods.
 - Confectionery (no more than twice a week).
 - 'Fast foods'.
 - High sodium processed foods.
 - Calorie-dense snacks.
- Select low energy-dense foods, e.g.:
 - Wholegrains.
 - Cereals low in sugar.
 - Fruits.
 - Vegetables – particularly greens.
- Decrease portion sizes when needed. The serving size should be measured after cooking and should be appropriate for the child's age and energy needs [**R-GDG**]:
- Consume whole fruit rather than fruit juices.
- Increase intake of dietary fibres:
 - Boys 1–3 years: 19g; 4–8 years: 25g; 9-13 years: 31g; 14-18 years: 38g^{49,50}.
 - Girls 1–3 years: 19g; 4–8 years: 25g; 9-13 years: 26g; 14-18 years: 26g^{49,50}.
 - ≤2 years – an intake of 5 g per day is beneficial^{51,52}.
 - >2 years – fibre intake equals the age (in years) plus 5 to 10 g per day (maximum 30 g per day)^{51,52}.
 - NB: One-half cup (approximately 120 mL) of vegetables or one piece of fruit provides approximately 3 g of fibres.
- Encourage the use of mobile applications that allow monitoring/tracking of dietary intake and activity. Several applications are now available with culturally relevant foods included [**R-GDG**].
- Avoid extreme diets, low calorie diets, and fasting that may result in serious nutritional deficiencies and lead to delay in linear growth.

NB: Reduce calories by lowering the carbohydrate and unhealthy fat content^{32,53}. Energy intake can include meal replacements⁵³.

9.3.4 Physical Activity

Ensure patients and their parents or carers are aware of the significant health benefits associated with an active lifestyle³² [L1, RGA].

Advise patients and their family members of the following key points regarding exercise^{1-4,6,8,11} [L1, RGA]:

- To reduce sedentary behaviour.
- Allow babies to crawl and move around in a safe environment.
- Encourage walking where possible⁵⁴. Increase number of steps gradually over several weeks.
- Encourage active play and movement such as marching, jumping, throwing, kicking, and hopping.
- Involve the child in household chores (e.g. washing, sweeping, and carrying).
- To be physically active:
 - At least 60 minutes of moderate to vigorous physical activity is required per day.
 - Overweight children may need more than 60 min of activity.
 - The activity can be done in 1 session or several sessions, each lasting ≥ 10 min.
 - Consider structured physical activity (e.g. football, swimming, dancing).
- Discretionary screen time (e.g. computer and video games, TV, and internet) should be limited to <2 hours per day.

9.3.5 Psychological Support

Children and adolescents with obesity are at increased risk for mood disorders and psychological diseases^{3,55}. Consider whether depression or anxiety is present and refer appropriately to the psychiatrist.

NB: Patients with ongoing depression should be excluded from weight loss medications that may exacerbate their mental health condition [R-GDG]. However, such patients should not be excluded from other weight management treatments [R-GDG].

9.3.6 Maintaining Sleep Hygiene

Poor sleep is increasingly seen in children and associations between inadequate sleep duration in early childhood and obesity have been consistently reported⁵⁶⁻⁶². Patterns of sleep time may also contribute to obesity risk. To maintain proper sleep hygiene, optimal health, and development, the following sleep times are recommended on a regular basis (see *Table 9.3.6* below).

Children Age Category	Recommended Sleep Duration
Less than 1 year	12 - 16 hours (plus period of naps)
1 - 2 years	11 - 14 hours (plus period of naps)
3 - 5 years	10 - 13 hours (plus period of naps)
6 - 12 years	9 - 12 hours
13 -18 years	8 - 10 hours

Table 9.3.6: Recommended sleep times in paediatric age-group⁶³.

9.3.7 Recommendations for Parents or Carers of Obese Children and Adolescents

Parents or carers of the patient should be informed that the involvement of family members is critical for success in weight maintenance or weight loss in obese children^{1,2}.

Encourage patient's parents or caregivers to^{1,4,5,64} [L1, RGA]:

- Cook family meals.
- Give preference to grill or boil foods rather than fry foods.
- Offer healthy food choices for the child in school.
- Remove unhealthy foods from home.
- Model the eating behaviour they want their child to have, including:
 - Good meal hygiene.
 - Family based meals.
 - No media while eating.
 - No food rewards.
 - No over controlling behaviours toward consumption of meals.
- Enforce limitations on screen time and to set a healthy example of screen-based behaviour.
- Remove screens from bedrooms and during meals.
- Be involved in promoting physical activity in the family.
- Use appropriate and fun activities for the child.
- Promote daily device-free social interactions and outdoor play.
- Consider activity-oriented video games if other options are unavailable.

9.4 Monitoring and Review

The progress of the weight loss should be monitored over time⁶:

- Determine whether the intervention have been implemented as planned.
- Measure BMI and plot it on a BMI chart regularly.
- Check attainment of goals.
- Gather information about possible reasons for the lack of progress.
- Adjust nutrition plan when required.
- Treat comorbid conditions when required.

NB: Inadequate weight response is defined as:

- The failure to achieve a $\geq 5\%$ reduction in initial weight in the first 6 months despite optimal lifestyle intervention, a criterion for clinically meaningful weight loss⁶⁵.

9.5 Management of Comorbidities

Severe comorbid conditions should be managed when identified^{7,66} [L1]. It is not necessary to wait until weight loss has been achieved.

In paediatric patients with obesity associated hypertension, a trial diet and lifestyle modifications should be applied prior to use of medication³ [L1, RGA]:

- Weight loss is recommended as the primary treatment.
- A low sodium (< 1,500 mg/day) diet is recommended.
- DASH (Dietary Approaches to Stop Hypertension) diet is recommended.
- Pharmacotherapy may be used only if the blood pressure is persistently elevated over 3 separate measurements and does not respond to lifestyle intervention.

Dyslipidaemia of obesity in children should be treated with dietary modifications^{3,67} [**L1, RGA**]:

- Even small amounts of weight loss are highly beneficial.
- For children with combined dyslipidaemia and severe hypertriglyceridemia unresponsive to diet and exercise interventions, consider medication options (e.g. omega-3 fish oil capsules).

Children with obesity and comorbid sleep disorders should be advised on proper sleep hygiene^{3,12} [**L1, RGA**]. Referral for sleep studies or possible removal of tonsils and/or adenoids may be required and should be based on clinical evaluation^{12,68}[**L1, RGB**].

The primary treatment of type 2 diabetes mellitus in obese children is diet and lifestyle modifications³ [**L1, RGA**]:

- Low glycaemic index food choices are recommended.
- Consider weight loss through aggressive diet and modified carbohydrate diets if required, combined with physical activity.
- Metformin may be used in children ≥ 10 years of age for whom diet and life modification are insufficient interventions^{3,69,70}.

PCOS is one of the most common endocrine disorders associated with menstrual irregularity in obese adolescence^{3,70} [**L1, RGA**]:

- Hormonal evaluation is indicated.
- Consider pelvic ultrasound when necessary.
- Lifestyle modification and dietary control are recommended as the first line treatment.
- Oral contraceptive pills may be used to regulate menstrual cycles.
- If oral contraceptives are contradicted, consider progestin monotherapy.

Nutritional supplements may be used to treat vitamin D deficiency³ [**L1, RGA**]. Children should be advised to increase sun exposure and modify dietary intake to receive sufficient amounts of the vitamin^{3,71} [**L1, RGA**].

Asthma should be managed with controller medications instead of systemic steroids if clinically possible³ [**L1, RGA**].

9.6 School Awareness and Involvement

Considering that children and adolescents spend a significant time of their young lives in schools, the school environment is an ideal setting to acquire knowledge and skills about healthy choices and to increase physical activity levels:

Health promotion in schools:

- School nurses, in coordination with school authorities, should provide health education to help students gain knowledge, attitudes, beliefs and skills needed to make informed decisions and practice healthy behaviours.
- Follow up with school nurse about the weight, height, and BMI measurement in a timely manner.
- Parents and school staff should be involved in creating awareness to encourage the students to achieve their targets.
- Ensure that food served in schools comply to minimum nutrition standards.
- Encourage extracurricular activities including school sports and non-competitive school programmes.

9.7 Ramadan Fasting and Weight Management

Prepubertal children are exempt from fasting during Ramadan^{72,73} [L2, RGB]. Advise parents who wish their children to fast during Ramadan to see a paediatrician⁷³ [L3]:

- Children who wish to fast should be medically fit⁷⁴ [L3].
- Fasting is not medically recommended for children with chronic diseases and psychological problems (e.g. depression or anxiety)^{72,73} [L2, RGB].
- Fasting should not interfere with any medical treatment⁷³ [L3].

10 Referral to Specialist Care

Consider referral to Specialist Care if any of the following apply⁷ [L1]:

- The underlying causes of being overweight or obese need to be assessed⁷, e.g.:
 - Medical problems.
 - Medication.
 - Psychological problems and psychosocial distress.
- The patient is obese, has inadequate weight response, and needs medication for weight management¹.
- The patient is severely obese, has inadequate weight response and:
 - Requires medication for weight management; or
 - Bariatric surgery.
- The patient has already had bariatric surgery and presents with a problem, such as weight regain or nutritional deficiency, or where revisional surgery might be considered⁶⁶.
- Patient needs to lose weight for⁷:
 - A surgical procedure that is not directly related to obesity, e.g. knee replacement.
- There is clinical suspicion of an eating disorder, such as binge eating disorder⁷⁵.
- The patient has complex disease states or needs that cannot be managed adequately in primary care, e.g.⁷ additional support needs for patients with learning disabilities.

NB: All obese children should be assessed by a dietitian, either in primary care or as part of a specialist MDT [R-GDG].

Consider referral to tertiary specialist services for the following:

- Paediatric Endocrinology:
 - Consider if the child has any of the following abnormalities:
 - Short stature (Height <3rd percentile for Height SDS <-2).
 - Abnormal fasting blood glucose (>5.8 mmol/L) or HBA_{1c} (>5.76 %).
 - Abnormal thyroid function (FT₄ <10 pmol/L or TSH >10.5 mIU/ml).
 - Abnormal lipid profile.
- Paediatric Gastroenterology:
 - Consider if the child has any of the following:
 - Elevated liver enzymes (ALT, AST).
 - Fatty liver on ultrasound.

11 Management in Paediatric Specialist Care

11.1 Multidisciplinary Team Management

A multidisciplinary team (MDT) approach is required to treat obesity in children^{2,4,48}. The composition of the MDT and the roles of specialists may vary depending on their expertise and resources available in clinical setting^{4,76}.

Generally, MDT should include the following paediatric specialists^{11,76}:

- Physician with training in obesity medicine or a paediatric gastroenterologist with expertise in nutrition (the coordinator of MDT).
- Physician assistant.
- Nurse practitioner.
- School nurse.
- Dietitian.
- Psychiatric social worker.
- Psychiatrist or psychologist.

11.2 Investigation of Underlying Causes of Obesity

Underlying causes of obesity should be identified (if not previously investigated in Primary Care) and treated.

Possible underlying causes include^{32,33,77,78}:

- Hypothyroidism.
- Cushing's syndrome.
- Growth hormone deficiency.
- PCOS.
- Hypothalamic damage, e.g. tumour or surgery.
- Genetic syndromes associated with hypogonadism.
- Medication:
 - If the patient requires medication associated with weight gain to treat comorbidities⁵ [L2]:
 - Provide specific advice and support for weight loss.
 - Consider substitution with an alternative medication or a change in dosage.

11.3 Pharmacological Intervention

Pharmacotherapy is reserved for severely obese children or obese children with other risk factors^{1,2}. It is not generally recommended for:

- Children <12 years of age² [L1, RGC].
- Children and adolescents <16 years of age who are overweight but not obese⁸ [L1, RGB].

Drug treatments may be prescribed after discussing potential benefits and limitations (including side effects) with the patient and their parents or caregivers^{4,7} [L1]. Patients and their parents or caregivers must be informed that drugs cannot cure obesity but can only induce remission of obesity [R-GDG].

The use of weight loss medications in children with obesity is limited:

- Orlistat (120 mg 3 times per day):
 - Is approved for weight loss in children >12 years^{1,3,11,13,14} [**L1, RGA**].
 - May be prescribed only in cases of physical comorbidities (such as orthopaedic problems or sleep apnoea) or severe psychological comorbidities².
 - Treatment should be started in a specialist paediatric MDT setting².
 - If prescribed, a 6–12 month trial, with close monitoring, is recommended².
 - Side effects may be not tolerated by many children^{3,79}.
 - Before Orlistat is prescribed, blood levels of lipid soluble vitamins should be monitored [**R-GDG**].
- Metformin^{1,14}:
 - Can be used to treat obesity in children with T2DM >10 years of age.
 - Paediatric randomised, controlled trial studies have shown improvement in BMI, fasting serum glucose, fasting insulin, homeostasis model assessment-estimated insulin resistance (HOMA-IR) and lipid profile in patients on Metformin therapy for exogenous obesity associated with insulin resistance^{15,16}.

NB: Sibutramine is **NOT** recommended for weight control due to the increased risk of cardiovascular events^{1,13,17} [**L1, RGC**].

Physicians prescribing weight management medication should be [**R-GDG**]:

- Physician with training in obesity medicine or gastroenterologist with expertise in nutrition.
- Be familiar with and prescribe in accordance with the drug's Summary of Product Characteristics and relevant guidelines.
- Work within MTD that is able to assess the full extent of obesity comorbidities and provide individualised lifestyle advice⁴.
- Reassess patients on at least a three-monthly basis, or more frequently, as determined by the medication prescribed or the patient's comorbidities.
- Conduct and report an audit of their weight management outcomes.

When drug treatment is prescribed^{7,32} [**L1**]:

- Do not discontinue pharmacological treatment for comorbidities.
- Monitor the effect of drug treatment and reinforce lifestyle advice through regular reviews.

Discontinue medication in patients who have not reached weight loss targets^{7,8} [**L1, RGB**]:

- >4% BMI/BMI Z-score reduction after taking medication for 12 weeks at the medication's full dosage.

11.4 Surgical Interventions and Endoscopic Procedures

Bariatric surgery is reserved for sexually mature adolescents in Tanner 4 or 5 pubertal development and final or near-final adult height with severe obesity and moderate to severe comorbidities^{1,3,18} [**L1, RGA**]. Skeletal maturation (adult stature) is usually attained by the age of 13 - 14 years in girls and 15 - 16 years in boys. However, if there is uncertainty on whether adult stature has been attained, skeletal maturation (bone age) should be objectively assessed with a radiograph of the hand and the wrist.

Bariatric surgery should not be recommended for pre-pubertal adolescents. Consider bariatric surgery and endoscopic procedures as the last treatment option in patients resistant to all other interventions^{7,80} [**L1, RGA**]. Surgery and endoscopic procedures for obesity should only be considered by a specialist MDT² [**L1, RGA**].

12 Follow-Up in Primary Care

Following review and intervention by the specialist MDT, discharge the patient back to their primary care physician for follow up, if⁶⁶:

- Obesity-related diseases have been addressed, ongoing treatment can be continued by a primary care physician, and the patient does not require assessment for bariatric surgery; or
- The patient does not engage with the specialist team.

In primary care^{7,13,81,82}:

- Encourage patients and their parents to:
 - Check weight of the child regularly.
 - Undergo regular BMI and diet review with a health professional.
 - Undergo blood tests when needed.
- Continue reviewing comorbidities (see *Section 9.5*).
- Review possible adverse effects of weight loss medications and make sure they resolve completely.
- For patients who underwent bariatric or endoscopic procedures:
 - Keep a register of bariatric surgery patients.
 - Record the type of procedure in the register:
 - Different procedures have different risks regarding nutritional deficiencies; and
 - Some patients may require more extensive monitoring than others.
- Review regular medications:
 - Formulations may need to be adjusted post-surgery to allow for any changes in bioavailability.

13 Key Considerations for Patient Preferences

Patient preferences refer to patient perspectives, beliefs, expectations, and goals for health and life, and to the steps employed by individuals in assessing the potential benefits, harms, costs, and limitations of the management options in relation to one another. Patients may have preferences when it comes to defining their problems, identifying the range of management options and selecting or ranking the outcomes used to compare these options.

It is important for healthcare professionals to develop an understanding of the patient as an individual and the unique way in which each person experiences a condition and its impact on their life.

The following recommendations are therefore made for physicians and other healthcare professionals regarding general principles of patient care in Qatar:

- **Respect Patients:** Treat patients with respect, kindness, dignity, courtesy and honesty. Ensure that the environment is conducive to discussion and that the patient's privacy is respected, particularly when discussing sensitive, personal issues. Ask the patient how they wish to be addressed and ensure that their choice is respected and used.
- **Maintain Confidentiality:** Respect the patient's right to confidentiality and avoid disclosing or sharing patients' information without their informed consent. In this context, students and anyone not directly involved in the delivery of care should first be introduced to the patient before starting consultations or meetings, and let the patient decide if they want them to stay.
- **Clarify Third-Party Involvement:** Clarify with the patient at the first point of contact whether and how they like their partner, family members or carers to be involved in key decisions about their care or management and review this regularly. If the patient agrees, share information with their partner, family members or carers.
- **Obtain Informed Consent:** Obtain and document informed consent from patients, in accordance with MOPH policy and guidance.
- **Encourage Shared Decision Making:** Ensure that patients are involved in decision making about their own care, or their dependent's care, and that factors that could impact the patient's participation in their own consultation and care including physical or learning disabilities, sight, speech or hearing impairments and problems with understanding, reading or speaking English are addressed.
- **Disclose Medical Errors:** Disclose errors when they occur and show empathy to patients.
- **Ensure Effective Communication:** Explore ways to improve communication including using pictures, symbols or involving an interpreter or family members. Avoid using medical jargon. Use words the patient will understand and confirm understanding by asking questions.
- **Ensure Continuity of Care:** Provide clear and timely sharing of patient information between healthcare professionals especially at the point of any transitions in care.

14 Performance Measures

A list of potential performance measures is given below in *Table 14.1*:

Number	Numerator	Denominator
OBC01	The number in the denominator who are identified as overweight or obese in the last 12 months.	The total number of children aged less than 18 years of age.
OBC02	The number in the denominator referred to specialist services for investigation or management of overweight or obesity in the last 12 months.	The number of people aged less than 18 years of age, identified as being overweight or obese.
OBC03	The number in the denominator who have had an assessment with a dietitian recorded in the last 12 months	The number of people aged less than 18 years of age, identified as being overweight or obese.
OBC04	The number in the denominator who have undergone bariatric surgery in the last 12 months.	The number of people aged less than 18 years of age, identified as being overweight or obese.
OBC05	The number in the denominator who were prescribed orlistat for weight management and weight loss in the last 12 months.	The number of people aged less than 18 years of age, identified as being overweight or obese.

Table 14.1: Performance Measures

15 References

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Appendix: Detailed Description of the Literature Search

A systematic search for existing literature on obesity in children was performed in the period October 7th – November 11th, 2019.

The search for clinical practice guidelines on childhood obesity diagnosis and/or management was performed in the *PubMed* database and websites of relevant organisations and societies including the *American Society for Metabolic and Bariatric Surgery*, *International Physician Society for Obesity*, *British Obesity and Metabolic Surgery Society (BOMSS)*, *World Health Organization (WHO)*, and other. The present guideline is primarily based on UK NICE and BMJ guidelines and is supplemented with other relevant studies.

Peer-reviewed scientific publications were found in PubMed and via *Google Scholar* Internet search engine. Non-peer reviewed studies were identified in *bioRxiv*. Books were checked on PubMed. Information published on medical websites and drug prescribing information sheets were found via Google search engine.

The included publications were identified using the term “obesity AND children” and specified with the following terms in combinations:

Management, paediatric, childhood, update, causes, comorbidities, depression, ethology, prognosis, screening, presentation, examination, classification, stage, score, behavioural intervention, nutrition, diet, meal plan, dietician, referral criteria, pharmacological treatment/pharmacotherapy, orlistat, metformin, alternative, medication, exercise, physical activity, primary/secondary care, weight loss, multidisciplinary, prevention, follow-up.

Figure A.1 on the next page demonstrates graphically the results of the search and application of exclusion criteria.

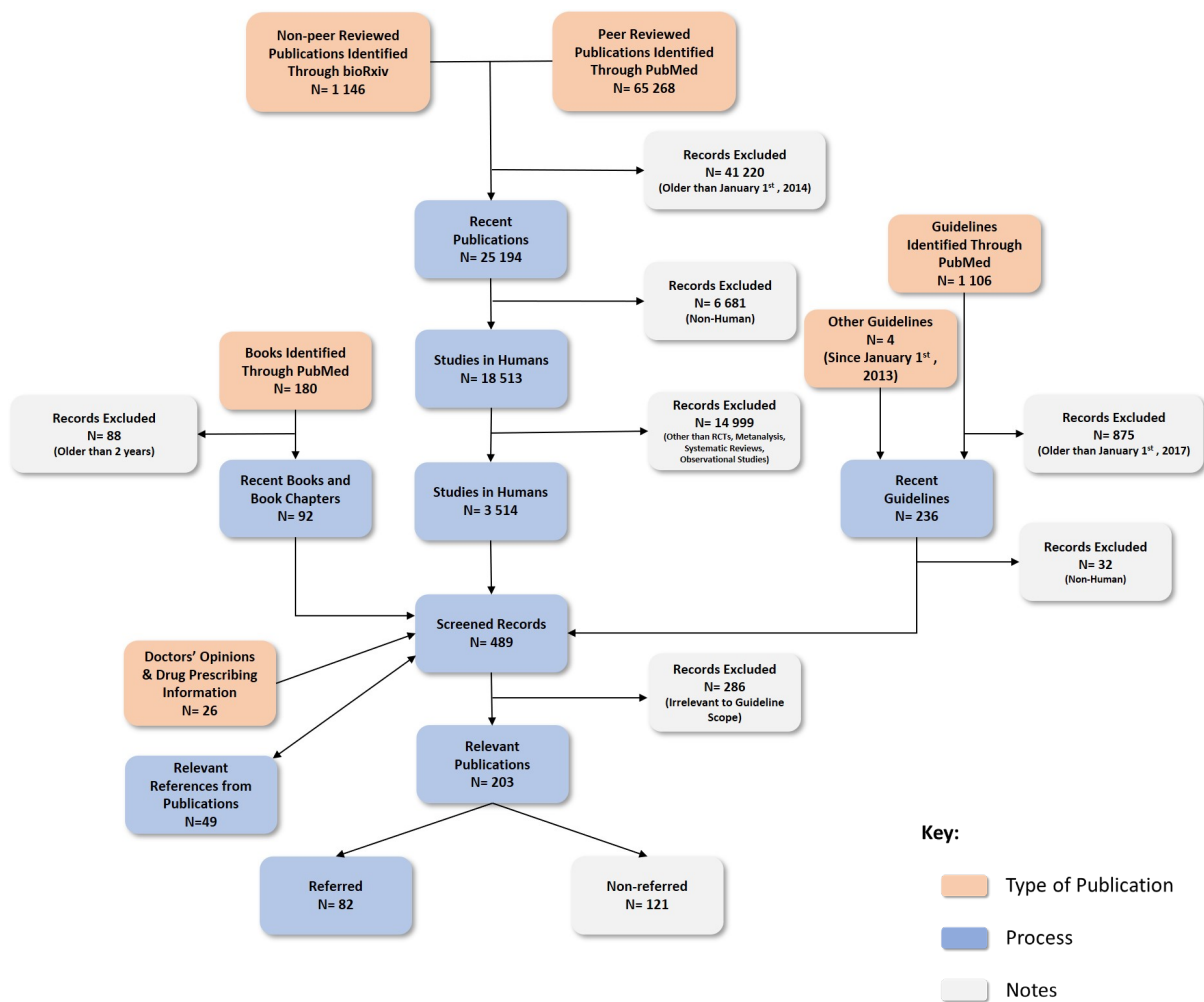


Fig A.1: Literature search results and application of exclusion criteria.

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