IAP Standard Treatment Guidelines Committee

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Childhood obesity has a significant short- and long-term impact. The key to management lies in avoiding unnecessary work-up with physiological causes while not missing pathological causes.

- **Body mass index (after 2 years of age):** Weight (kg)/height (m²)
  - *IAP 2015 charts* derived from backtracking of adult body mass index (BMI) Indian cutoffs for overweight (23 kg/m²) and obesity (27 kg/m²).
  - *Extreme obesity:* BMI ≥ 120% of the 95th percentile or ≥ 35 kg/m².
  - *Limitations:*
    - Ethnic differences in the proportion of body fat at the same BMI.
    - Lower reliability in pubertal age (pubertal children and adolescents are more likely to be classified as obese than those who are of the same age but prepubertal).
    - Erroneous diagnosis of obesity in short and muscular individuals.
- **Weight for height (weight for length):** Till 2 years of age (>97.7th percentile suggest obesity).
Majority (~98%) do not have a pathological cause (exogenous or constitutional obesity).

- **Exogenous obesity**: Normal growth, development, and puberty are suggestive.
- **Monogenic obesity**: Early-onset obesity (before 5 years of age) with extreme hyperphagia (food-seeking behavior—stealing food, eating food leftover by others; impaired satiety).
- **Obesity syndromes**: Distinct features (abnormal facies, digits, vision) and systemic involvement, with hyperphagia.
- **Hypothalamic obesity**: Neurological features (headache, irritability, seizures) and/or neurological insult with rapid weight gain, hyperphagia. Neuroimaging is essential to identify a hypothalamic lesion.
- **Drug-induced obesity**: Associated with glucocorticoids, antipsychotics (risperidone and olanzapine), and antiepileptic drugs (valproate and carbamazepine).
- **Endocrine causes (hypothyroidism, Cushing syndrome, pseudohypoparathyroidism)**: Commonly over-diagnosed due to confounding effects, but otherwise rare. Associated short stature is the hallmark of underlying endocrine cause. Obesity causes mild elevation of thyroid-stimulating hormone (TSH) that is usually its effect and not the cause.

Key aspects include differentiation of physiological and pathological causes, identification of a cause, and assessment of complications.

Any of the following suggest a pathological cause:
- Delay in growth, puberty, or development
- Dysmorphism
- Hyperphagia
- Early-onset
- Visual symptoms
- Neurological features.
Childhood Obesity

What is the Cause?

- Birth weight, lifestyle, dietary intake, screen time, and physical activity.
- Family history of obesity, hypertension, and dyslipidemia.
- Onset and progression.
- Pubertal staging (including measurement of stretched penile length in boys).
- Treatment history for drugs causing obesity.
- Assessment of pointers and features of syndromic obesity (Tables 1 and 2).

Waist circumference: Marker of abdominal (regional) adiposity and a risk factor for metabolic syndrome.

<table>
<thead>
<tr>
<th>TABLE 1: Pointers to cause of obesity.</th>
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<tr>
<td><strong>Features</strong></td>
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<tr>
<td>Delayed puberty</td>
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<tr>
<td>Retinitis pigmentosa, polydactyly</td>
</tr>
<tr>
<td>Short hands and feet</td>
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<tr>
<td>Buffalo hump, striae, plethora, hypertension</td>
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<tr>
<td>Short fourth metacarpal</td>
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<td>Developmental delay</td>
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<th>TABLE 2: Features of common causes of syndromic obesity.</th>
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<td><strong>Disorders</strong></td>
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<td>Prader–Willi</td>
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<td>Bardet–Biedl</td>
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<td>Alstrom</td>
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</table>
Headache (benign intracranial hypertension, hypertension)
✓ Limp or leg pain (slipped capital femoral epiphysis)
✓ Day time somnolence (sleep apnea)
✓ Abdominal pain (gallstone disease and steatohepatitis) and polyuria (type 2 Diabetes).
✓ Cutaneous acanthosis.
✓ Overdiagnosis: Following conditions may be overdiagnosed in obese children.
  • Small phallic size due to buried penis.
  • Precocious puberty in girls with lipomastia.
  • Rickets in children with genu valgum.

Complication assessment (Table 3): Key investigations include oral glucose tolerance test, ALT, and lipid profile. A sleep study may be considered with headache, daytime somnolence, and lethargy.

Endocrine work-up: Only in children with short stature.
  • Morning cortisol and overnight dexamethasone suppression.
  • FT4, TSH.
  • Calcium, phosphorus, parathyroid hormone (PTH).

Targeted panel for monogenic causes: Before 5 years with severe hyperphagia, delayed development.
TABLE 3: Pediatric cut-offs for metabolic complications.

<table>
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<tr>
<th>Investigation</th>
<th>Level of concern</th>
<th>Pathological level</th>
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<tr>
<td>Blood sugar fasting</td>
<td>100–125 mg/dL</td>
<td>&gt; 126 mg/dL</td>
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<tr>
<td>Blood sugar 2 hours after glucose*</td>
<td>140–199 mg/dL</td>
<td>&gt; 200 mg/dL</td>
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<tr>
<td>Hemoglobin A1c (HbA1c)</td>
<td>5.7–6.4%</td>
<td>&gt; 6.5%</td>
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<tr>
<td>Total cholesterol</td>
<td>170–199 mg/dL</td>
<td>&gt; 200 mg/dL</td>
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<tr>
<td>Low-density lipoprotein (LDL) cholesterol</td>
<td>90–129 mg/dL</td>
<td>&gt; 130 mg/dL</td>
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<tr>
<td>Triglyceride</td>
<td>90–129 mg/dL</td>
<td>&gt; 130 mg/dL</td>
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<tr>
<td>High-density lipoprotein (HDL) cholesterol</td>
<td>40–45 mg/dL</td>
<td>&lt; 40 mg/dL</td>
</tr>
<tr>
<td>Alanine aminotransferase (ALT)</td>
<td>&gt; 25 IU/L (boys)</td>
<td>&gt; 60 IU/L</td>
</tr>
<tr>
<td></td>
<td>&gt; 22 IU/L (girls)</td>
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</table>

*1.75 g/kg of glucose, to a maximum of 75 g—oral glucose tolerance test (OGTT).

Prevention and Management

- Exclusive breastfeeding till 6 months of age.
- Regular meal timings, including breakfast.
- At-least 7–8 hours of sleep daily at night.
- Lifestyle intervention should precede and should be maintained during pharmacotherapy.
- Obesity prevention guidelines from American Academy of Pediatrics recommend Fight Childhood Obesity by '5-2-1-0' rule (Fig. 1). Accordingly, children can consume above 5 servings of fruits and vegetables, screen time below 2 hours, participate in one hour of physical activity, and consume 0 sugar-sweetened beverages daily.
Childhood Obesity

Prevention and Management

Fig. 1: Prevention of childhood obesity “Let’s Go: 5-2-1-0 Rule”.

- Early-onset obesity (before 5 years).
- Rapid progression.
- Delayed development, growth, and puberty.
- Neurological features
- Abnormal metabolic workup.

Management Targets
- Gradual and sustained loss.
- Body mass index (BMI) SD score (SDS) reduction of 5% roughly translating to 7–10% weight loss over 6 months.
- Avoid loss over 1.5 kg per month.
Childhood Obesity

**Medical Management**

*Metformin:* Approved in Type 2 DM after 8 years of age. May consider in causes related to antipsychotic medication, polycystic ovarian disease, and steatohepatitis.

*Orlistat:* Gastric lipase inhibitor that decreases fat absorption. Approved after 12 years of age.

**General Measures**

- Regular meals, including breakfast.
- 45 minutes of regular moderate to vigorous physical activity and screen time below 1 hour daily.
- Avoidance of snacking, inactivity, and screen exposure while eating.
- Avoid rigorous dieting.
- Identify red flag signs for psychosocial impact (school absenteeism, body shaming or teasing by peers regarding weight/appearance, persistent anxiety, depression or self-harm, anger outbursts, substance abuse, eating disorders) and family stressors.
- Specialist referral in the presence of complications.

**Bariatric Surgery**

- Should be discouraged as it carries more significant complications than adults.
- Indicated only with severe obesity (BMI >40 kg/m² or >35 kg/m² with complications) and only after completion of linear growth.
- A multidisciplinary obesity team with long-term follow-up is essential to maintain compliance with nutritional recommendations.
- Extreme motivation, strict diet, and activity schedule must be maintained after surgery.

