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Medi Quest BRS Hospital

A monthly News letter from BRS Hospital

OBESITY IN CHILDREN - PART 1
DIAGNOSIS, INVESTIGATIONS AND PREVENTION

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Introduction

Obesity is an excess accumulation of body fat. Exogenous or nutritional obesity is the commonest cause of obesity in children. It is essential for a physician to differentiate nutritional from non-nutritional or endogenous obesity and to identify co morbid conditions associated with obesity.

Identification of Obesity

Deriving BMI for children above five years of age from IAP charts, and from weight for height WHO charts for children below 5 years of age.

The cut offs in BMI used for 5 years is above 23 kg/m2 is overweight and above 27 kg/m2 is obesity.

For under 5, overweight is defined as weight for length/height > 2 SD (>97th percentile) but less than +3 SD (<99.9th percentile) and obesity as values >+3SD (>99.9th percentile) on the WHO charts

Waist circumference to Identify obesity

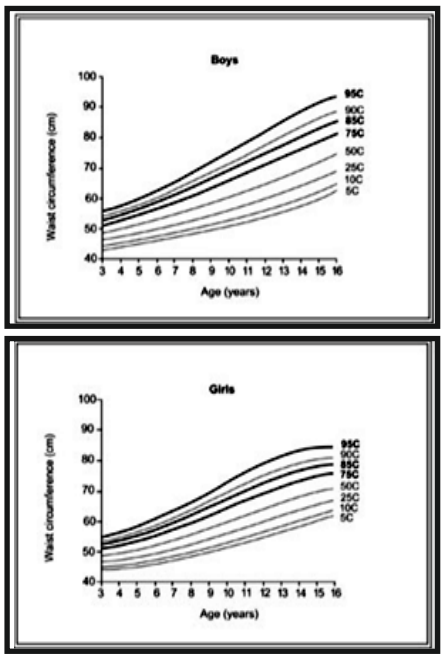
A 2011 study from St Johns Hospital of 9060 children from Bangalore gave percentile charts for waist circumference and advised that 75th percentile and greater could be used

Smoothed and Weighted Age and Sex-Specific Waist Circumference Percentile Values(cm)

for Indian Children 3-16 Years of Age

Sex	Age (y)	Percentiles							
		5th	10th	25th	50th	75th	85th	90th	95th
Boys	3	42.9	44.0	46.0	48.4	51.1	52.7	53.9	55.7
	4	44.1	45.3	47.4	49.9	52.8	54.5	55.7	57.6
	5	45.2	46.5	48.7	51.5	54.6	56.4	57.8	59.8
	6	46.3	47.6	50.1	53.1	56.5	58.6	60.0	62.4
	7	47.4	48.8	51.5	54.8	58.6	60.9	62.5	65.2
	8	48.5	50.0	52.9	56.6	60.8	63.4	65.2	68.2
	9	49.6	51.3	54.4	58.4	63.1	66.0	68.1	71.5
	10	50.8	52.6	56.0	60.4	65.6	68.8	71.1	74.9
	11	52.2	54.1	57.8	62.5	68.1	71.7	74.2	78.5
	12	53.7	55.7	59.6	64.7	70.7	74.6	77.4	82.0
	13	55.4	57.6	61.7	67.0	73.4	77.5	80.4	85.4
	14	57.4	59.6	63.9	69.4	76.1	80.3	83.4	88.5
	15	59.7	62.0	66.3	72.0	78.7	83.0	86.1	91.3
	16	62.4	64.7	69.0	74.7	81.3	85.5	88.6	93.6
Girls	3	44.3	45.3	47.1	49.3	51.8	53.3	54.4	56.1
	4	44.6	45.7	47.7	50.2	52.9	54.6	55.8	57.7
	5	45.3	46.5	48.7	51.4	54.5	56.4	57.8	59.9
	6	46.3	47.6	49.9	52.9	56.4	58.6	60.1	62.6
	7	47.5	48.9	51.5	54.8	58.7	61.1	62.8	65.6
	8	48.9	50.4	53.2	56.8	61.1	63.8	65.8	69.0
	9	50.5	52.1	55.1	59.0	63.7	66.7	68.9	72.4
	10	52.2	53.9	57.1	61.3	66.4	69.6	72.0	75.9
	11	54.0	55.8	59.2	63.7	69.1	72.5	75.0	79.3
	12	55.8	57.7	61.3	66.0	71.6	75.2	77.9	82.3
	13	57.7	59.7	63.4	68.2	74.0	77.7	80.4	84.9
	14	59.7	61.7	65.4	70.2	76.1	79.7	82.5	87.0
	15	61.7	63.7	67.3	72.1	77.7	81.3	83.9	88.2
	16	63.7	65.6	69.1	73.6	79.0	82.3	84.7	88.6

Age: completed age, e.g. 3 y = 3.00-3.99 y



as a action point for obesity in Indian Children.

Causes of Endogenous or Non Nutritional Obesity

1. Monogenic obesity : Early - onset obesity (before 5years of age) with extreme hyperphagia

(food-seeking behavior–stealing food, eating food leftover by others; impaired satiety).

2. Common Obesity Syndromes: Distinct features (abnormal facies, digits, vision) and systemic involvement with hyperphagia.

a. Prader - Willi Syndrome : Infantile hypotonia and failure to thrive followed by rapid weight gain after two years. Dysmorphic facies, hypogonadism, hyperphagia, and behavioral abnormalities

b. Bardet-Biedl Syndrome : Polydactyly, retinitis pigmentosa, developmental delay, polyphagia, and renal abnormalities

c. Alstrom Syndrome : Dilated cardiomyopathy, type 2 diabetes, progressive loss of vision and hearing

3. Hypothalamic obesity: Neurological features (headache, irritability, seizures) and /or Neurological insult with rapid weight gain, hyperphagia. Neuroimaging is essential to identify a hypothalamic lesion.

4. Drug-induced obesity: Associated with glucocorticoids, antipsychotics (risperidone and olanzapine), and antiepileptic drugs (valproate and carbamazepine).

5. Endocrine causes :

a. Hypothyroidism

b. Cushing syndrome

c. 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.

Exogenous Obesity

The commonest cause of childhood obesity is exogenous /nutritional. Nutritional obesity is a result of excess of calorie intake over expenditure

Co morbid conditions associated with Nutritional Obesity

1. Idiopathic raised intracranial tension
2. Obstructive sleep apnoea syndrome
3. Type 2 Diabetes Mellitus
4. Hypertension
5. Metabolic Syndrome
6. GE reflux
7. Fatty liver and gall stones
8. Slipped Capital Femoral Epiphysis Syndrome.

Investigations :

Endocrine work up: Only in children with short stature

- Morning Cortisol and overnight Dexamethasone suppression.
- FT4, TSH
- Calcium, phosphorus, parathyroid hormone (PTH)

Genetic Testing :

1. Targeted panel for monogenic causes: Before 5years with severe hyperphagia, delayed development.

2. Prader-Willi Syndrome : Methylation – sensitive polymerase chain reaction (PCR) for chromosome 15 (Imprinting disorder)

3. Bardet-Biedl : Next generation sequencing (NGS) (Oligogenic chromosome 11)

4. Alstrom Syndrome **:** NGS (ALMS1 gene mutation)

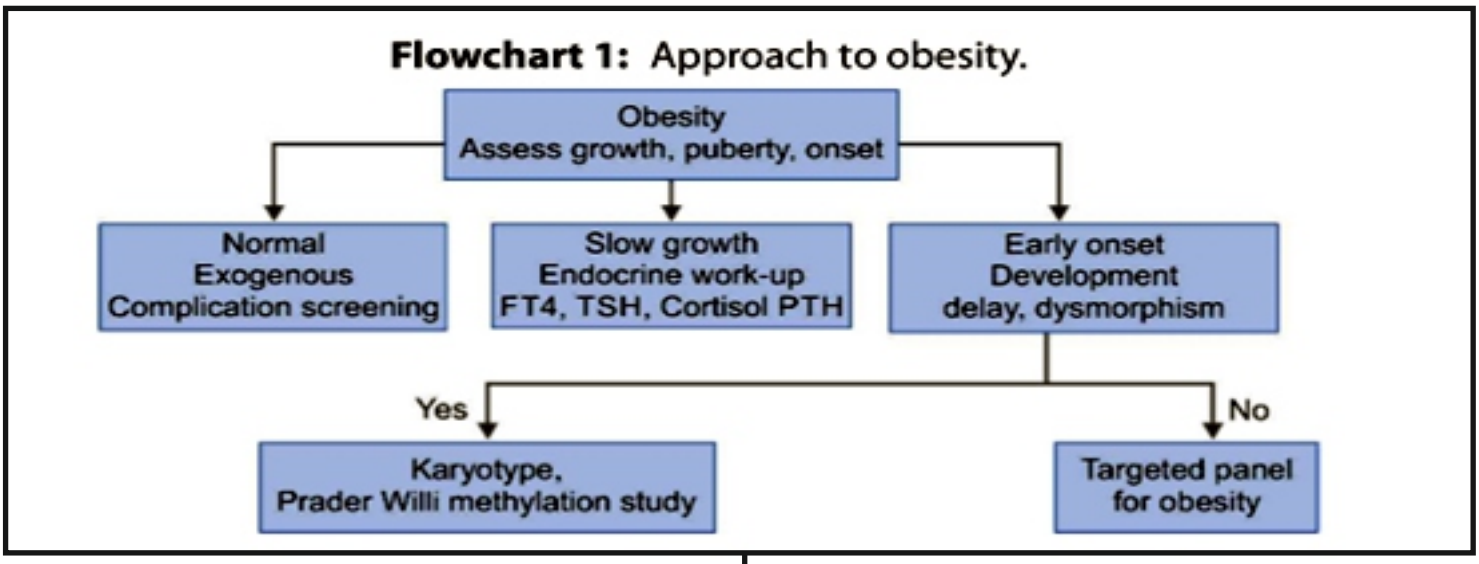
Investigations in Exogenous Obesity to identify co-morbidities:

1. Fasting glucose, HbA1c, Oral Glucose tolerance test
2. SGPT
3. Lipid profile
4. Sleep study if needed.

Investigations for metabolic complications in Exogenous obesity and their cut off values

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

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



Prevention of Childhood Obesity

1. Promotion of healthy maternal weight during the prenatal weight.
2. Exclusive breast feeding for six months.
3. Complementary foods at 6 months of age.
4. Avoid salt first year of life and extra sugar for first two years of life.
5. Avoiding packaged food.
6. Avoid the consumption of **JUNCS** food. (**J**unk Food high in salt, sugar and fat, **U**ltra processed Foods, **N**utritionally inappropriate food, **C**affeinated, **C**arbonated **C**olored foods, and **S**ugar sweetened food and beverages.
7. An average of at least **60 minutes** of moderate to vigorous physical activity spread throughout the day is recommended for children aged **5- 17 years**.
8. Adequate sleep:

0-5 years at least **11 hours**

5-10 years at least **10 hours**

10 years and above at least **9 hours**.

9. Recommended screen time:

Introduce digital media: 18-24 months

2 - 5 year : Limit screen time to **one hour**

5 - 12 years: Limit screen time to two hours

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BRS Hospitals remembers Dr. B.R Santhanakrishnan on his 96th birth anniversary day

Portrait of
Prof. Dr. B.R Santhanakrishnan

Dr. S Ramesh
remembering Prof BRS

Prof V.S. Sankaranarayanan
Gastroentrologist
BRS HOSPITAL, third from right, along with
Mr. Venkatesan (Acct), Mr AKR (AO) and
Mrs. Vijayalakshmi (Insurance desk)

Dr Khan Senior DMO
BRS Hospital

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