

Over- and Under-Nutrition in Toddlers: Practical management principles

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Overview

- ▶ Overnutrition
 - ▶ Obesity
 - ▶ Protein
- ▶ Undernutrition
 - ▶ Suboptimal weight gain
 - ▶ Oral nutrition supplements
 - ▶ Common deficiencies
- ▶ Case studies



Section 1 - Overnutrition

Obesity

- ▶ High incidence - significant health burden
- ▶ Now recognised that choices in early life nutrition have programming effects on later obesity
- ▶ Complex and multi factorial health issue
- ▶ Maternal BMI most established risk factor - effective family behavioural change is likely to benefit the infant
- ▶ Low veg and fruit intake and high sweetened beverage intake promote obesity - the initial building blocks to avoid this can be educated during starting solids
- ▶ Some studies have suggested that early introduction of complementary foods (before age 4 months) is associated with an increased risk of later obesity.

Obesity Statistics

- ▶ 6.7% of preschool-aged children overweight or obese worldwide
- ▶ 21% of Australian children aged 2-3 years overweight or obese
- ▶ **National Health Survey 2017-18**
- ▶ One quarter of children aged 5-17 years were overweight or obese
- ▶ Very few children meet the guidelines for vegetables

Obesity Management - Infants at risk

- ▶ Evidence based recommendations for infants to reduce obesity risk:
 - ▶ Breastfeed if possible (especially the first 6 months) or use a lower protein formula
 - ▶ Wide variety of foods including fruit and vegetables - multiple exposures, include vegetables without a sweetener
 - ▶ Do not add sugar, salt, or sugary fluids to the diet
 - ▶ Don't manage behavioural challenges with food eg to calm an irritable child or as reward
 - ▶ Mindful eating - limit TV and distractions
 - ▶ Responsive feeding

Obesity Management - older children at risk

- ▶ Evidence based recommendations to reduce obesity risk:
 - ▶ Snacks - limit packets, increase fruit and vegetables,
 - ▶ Reassurance for parents regarding self regulation and slowed rate of growth in toddler years means picky eating is common. Give usual fussy eater strategies, check routine, avoid managing behaviour with food
 - ▶ No need to feed toddlers constantly
 - ▶ Water as only fluid (low fat milk in cup - max 1 serve)
 - ▶ Simple cost effective and healthy meal suggestions

Obesity Management

- Prevention best and give **TIMELY** clear and simple instruction for treatment
 - Use these resources or similar to support individualised education points
- Do not ignore high numbers - use empathetic approach to encourage action



Practical advice

Issues and solutions

- ▶ Focus on 2 areas that are key to that family
- ▶ Ask if they have made changes before
- ▶ “Fixing” the issue is unrealistic in one session - aim to action awareness and start changes
- ▶ Phrases I use
 - ▶ What would be the easiest thing for you to change first?
 - ▶ Would you be ok if we focussed on getting _____ right everyday
 - ▶ What have you thought about changing?
 - ▶ Remember changing everything at once doesn't always work. You've mentioned _____. Could we do that as the first step?
 - ▶ What have you tried before? Why did you choose that?
 - ▶ I've noticed _____ is a time you find challenging. Should we put together a specific plan for that time of the day?

Practical advice - Protein

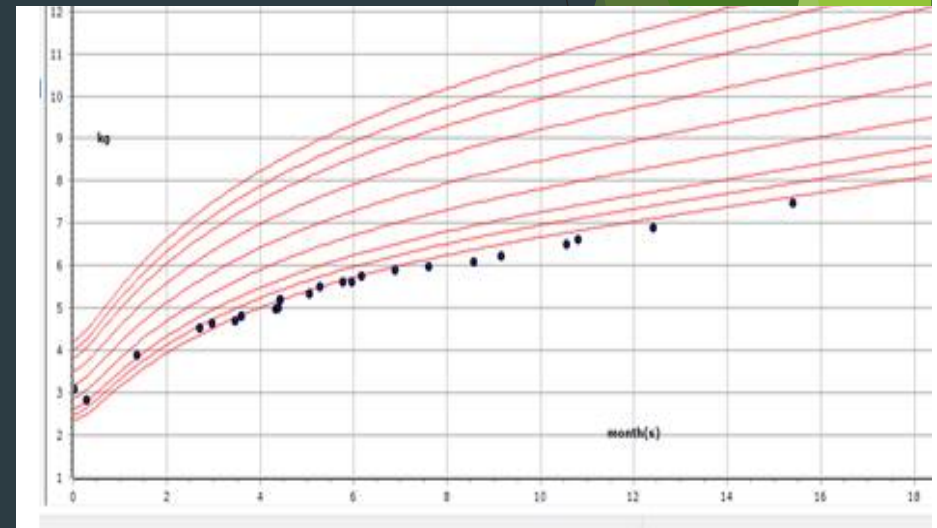
- ▶ First year of life focus on milk choices, don't limit protein-rich foods
- ▶ Second year of life - typically still some breast milk or formula, wider reaching repercussions eg use of meats, dairy or dairy alternative eg step 3-4 formula, plant based milks, nutrition support choices HEHP diets, management of picky eating,
- ▶ Support breast feeding
- ▶ Advise lower protein infant formula 1.3g protein / 100ml or less
- ▶ Avoid protein enriched foods for infants and toddlers eg yoghurts, protein balls, parent protein drinks are best avoided
- ▶ When providing nutrition support in infants and toddlers focus on a range of foods to increase all nutrients for example carbs, fats AND dairy rather than just eggs, cows milk and cheese
- ▶ Consider individual nutritional needs of the child



Section 2 - Undernutrition & supplements

Suboptimal Growth (Failure to Thrive)

- ▶ Indicated by
 - ▶ Physical appearance of reduced fat stores
 - ▶ Falling percentiles
 - ▶ Discrepant weight vs height percentiles
 - ▶ <3rd percentile parallel percentiles
 - ▶ No weight gain or weight loss in a child
- ▶ Growth charts imperative to nutrition assessment
 - ▶ Serial measurements are more accurate
 - ▶ Accuracy of measurements is important
 - ▶ Optimal growth is NOT the 50th percentile
 - ▶ Stunting indicates higher severity



Dietitian Intervention

- ▶ Oral nutrition support
 - ▶ HEHP - age and texture appropriate
 - ▶ Fortify infant formula
 - ▶ Toddlers consider commercial supplements
- ▶ Assess risk of organic causes e.g. iron deficiency, coeliac, EoE
- ▶ Assess risk of non-organic causes
- ▶ Ensure appropriate feeding practices for age
 - ▶ No force feeding
 - ▶ Milk / formula not excessive
- ▶ Escalate or refer on if required or concerned
 - ▶ Unlike obesity blood investigations are usually indicated

Dietary Supplement Regulation

- ▶ Therapeutic goods association (TGA)
- ▶ Responsible for:
 - ▶ Ensuring they contain the nutrients they say they contain
 - ▶ Labelling compliance
- ▶ Manage the health claims and marketing on labels

Dietitian Framework

- ▶ Recommending dietary supplements as a Dietitian
 - ▶ Scope of Practice and Code of Conduct must be adhered to at all times
 - ▶ Recognise your limits and refer on if necessary. Utilise the “ DA scope of practice decision making tool”
 - ▶ “promote safe and evidence-based practice”
 - ▶ Emphasis on individualised advice
 - ▶ Work collaboratively within a team of health professionals
 - ▶ Entry level dietitian competency: Skills in food fortification techniques and micronutrient supplementation
 - ▶ This includes ethical sales and recommended only to those that need it, that any conflicts/financial interests are disclosed/appropriately managed.
 - ▶ Provide information regarding supplement toxicity in paediatrics – lower threshold, developing organs,

Reality



Dietitian Assessment

- ▶ Must include questioning regarding
 - ▶ Current intake of vitamin and mineral supplements
 - ▶ Qualitative and quantitative diet history
 - ▶ Growth Assessment and growth history
 - ▶ Any history of blood tests, hospital admissions or diagnosed deficiency
 - ▶ Medical history
- ▶ Only with this information can you provide an individualised recommendation of supplements should they be required

Are there supplements you commonly recommend for infants?

- ▶ Oral Nutrition Support or fortified formula
- ▶ Multivitamins with iron
- ▶ Iron
- ▶ Calcium
- ▶ Vitamin D

Oral Nutrition Support

- ▶ High Energy dietary intake
- ▶ Fortify formula
- ▶ Fortify EBM
- ▶ Use over 1yo 1-1.5cal/ml formula
- ▶ Typical to fortify both food and milk options
- ▶ Select based on growth goal, age, capacity of parents, reliability of child's intake, limitations such as ASD and acceptability of supps to child

Multivitamin with Iron

- ▶ Look for significant iron as this is the most at risk of deficiency
- ▶ Gummies are not adequately dosed for clients that need robust supplementation, chewable or liquid are the better choice currently
- ▶ Calcium content will be low due to bulky nature of Calcium Carbonate. Use a separate strategy for those who need additional Calcium
- ▶ Look for a supplement with the following
 - ▶ > 2mg iron per day
 - ▶ > 2ug Vit D
 - ▶ Range of other nutrients specific to your clients needs.
 - ▶ Each nutrient list should provide ~10-20% RDI to make it a significant source of nutrients
 - ▶ Gummies generally don't meet these criteria

Iron

- ▶ All infants and children are at risk for iron deficiency, thus they should receive complementary solid foods rich in iron
- ▶ Important to specifically assess every paediatric diet for iron insufficiency
- ▶ Low iron stores and deficiency are common

Blood tests

- ▶ Ferritin of $<20 \mu\text{g/L}$, Low Hb, reduced MCV, reduced MCH,
- ▶ microcytic and hypochromic
- ▶ Serum iron reflects recent iron intake

Management

- ▶ Suggest iron supplementation and dietary modification if low ferritin, with or without anaemia.

Age	NHMRC RDI Iron mg/day
7-12 months	11
1-3years	9
4-8years	10
9-13years	8
14-18years	11-15

Iron supplementation

Oral iron supplementation

- ▶ 1 - 2 mg/kg/day is the preventative dose for iron deficiency
- ▶ 3 - 6 mg/kg/day is the recommended dose for treatment of iron deficiency and IDA. Higher doses should be considered in those children with severe anaemia (Hb <80 g/L).
- ▶ Iron supplements should be continued for a minimum of 3 months after anaemia has been corrected to replenish stores. Hb and ferritin should be checked at this time point.
- ▶ Individualise and escalate to MDT if

Vitamin D

Age	NHMRC RDI Vit D ug/day
0-12months	5 (AI)
1-18years	5 (AI)

- ▶ 23-40% Australian rate of deficiency, higher in winter
- ▶ Vitamin D content of breast milk is highly variable and is directly related to the mother's vitamin D status
- ▶ Vitamin D is made in the skin after sun exposure create a precursor that is then activated by the kindeys into active Vit D.
- ▶ Consequences of severe deficiency = nutritional rickets and osteomalacia → bone fractures, bone softness and abnormal growth
- ▶ Dietary sources: Eggs, Oily fish, Mushrooms with enhanced levels of vitamin D₂ from being exposed to ultraviolet light under controlled conditions are also available 9.2ug in ½ cup
- ▶ Also now implicated in skin health and immune health, cognition is being studied,

Vitamin D Supplementation

- ▶ Serum concentration of 25(OH)D is the best indicator of vitamin D status. It reflects vitamin D produced cutaneously and that obtained from food and supplements
- ▶ Breastmilk, despite its other benefits, contains low vitamin D
- ▶ Infant formula is fortified with vitamin D
- ▶ Many European countries and America suggest 400IU / 10ug per day supplement for all breast fed children
- ▶ Maternal higher dose supplementation (≥ 4000 IU/day) produced similar infant 25-OH vitamin D levels as infant supplementation of 400 IU/day

Definitions of vitamin D status

Severe deficiency	<12.5 nmol/L
Moderate deficiency	12.5–29 nmol/L
Mild deficiency	30–49 nmol/L
Sufficient	≥ 50 nmol/L
Elevated	≥ 250 nmol/L*

Calcium

- ▶ Adequate calcium intake is essential in the paediatric population because bone mineralisation occurs in the growth period
- ▶ Population movement away from cows milk
- ▶ Calcium intake is not the only determinate of optimal bone mass density. Bone mineralization is positively affected by: Low dietary sodium and phosphorous intake, exercise, optimal B12, Vit D and protein status
- ▶ Biochemistry:
 - ▶ Serum Calcium homeostasis is maintained within narrow limits irrespective of calcium intake
 - ▶ Serum calcium – unrelated to dietary adequacy
 - ▶ Can do BMD but

Age	NHMRC RDI Calcium mg/day
0-6months	100 (AI)
7-12 months	275 (AI)
1-3years	460
4-8years	500
9-18years	1250

Calcium supplementation

Oral Calcium supplementation

- ▶ Titrate supplement to meet requirements when added to dietary intake
- ▶ Difficult with Children due to bulky, chalky type of supplement and limited liquid choices
- ▶ Excess calcium intake causes

Section 3 - Case Studies

Diet History - 2.5yo fussy eater found to be overweight

ISSUES

- ▶ Nil routine
- ▶ Lots of grazing and stressful meals with limited intake
- ▶ Sugary fluids most days
- ▶ Snacks commonly high salt and sugar (biscuits, crackers)
- ▶ Nil vegetables
- ▶ Eats well at kindy

SOLUTIONS

- ▶ Implement routine - discuss hunger, strengths of kindy,
- ▶ Empower parent to say “no” to food, delay and distract
- ▶ Cease sugary fluids
- ▶ Place a limit on packet snacks, offer fruit and dairy based snacks
- ▶ Hide veg, offer regularly, parents need to eat them through the day as well as kids

This has increased fibre, reduced excess calories, reduced salt, reduced fat, promoted self regulation and encouraged healthy hunger so the child is curious and engaged at meals.

2 year old, sensory processing disorder, very selective eater, prefers to drink milk, Vit D 40nmol/l

- ▶ Nutrition Goal: Increase intake of food vs milk, correct deficiencies
- ▶ Consider Step 3-4 formula to lower protein and increase Vit D, iron and avoid the need for a separate multivitamin
- ▶ Commence iron fortified bread
- ▶ Increase fibre rich foods
- ▶ Commence Vit D supplement

18 month old, slow transition to solids, low appetite, pale, suboptimal growth 9kg

- ▶ Escalate to medical team to be investigated
- ▶ Start iron supplements at 1-3mg/kg (prevention dose) or RDI 9mg/day - liquid supplement due to age
- ▶ Specify doses recommended on report and consider investigations for iron deficiency
- ▶ Iron-rich and HEHP solids
- ▶ ONS supplement drink as multivitamin and to resolve slow weight gains

The background features a dark blue-grey central area. To the left is a solid lime green vertical strip. To the right is a complex geometric pattern of overlapping triangles in various shades of green, from light lime to dark forest green.

Thank you