

Management of child & adolescent obesity

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**Childhood obesity prevalence:
higher in clinical settings than in the
general population of children**

High prevalence rates in GP surgeries in Australia - 1

- LEAP Study*
 - Melbourne GP setting
 - 34 GP surgeries surveyed in 2002 & 2003
 - 2,112 children aged 5-10 y measured



*Live, Eat And Play Stud
McCallum et al, 2005

High prevalence rates in GP surgeries in Australia - 2

- LEAP Study*
 - Melbourne GP setting
 - 34 GP surgeries surveyed in 2002 & 2003
 - 2,112 children aged 5-10 y measured
 - 28% overweight/obese:
 - 18% overweight
 - 10% obese (4% very obese ie BMI Z-score 100th centile for age)



*Live, Eat And Play Stud
McCallum et al, 2005

High prevalence rates in GP surgeries in Australia - 3

- BEACH Study of paediatric obesity in GP surgeries*
- Annual, national random sample of 1000 GPs - 100 consecutive visits recorded for each GP
- In the 4 year period 2002-2006:
 - 42 515 encounters in children aged 2-17 years
 - Self-reported height & weight

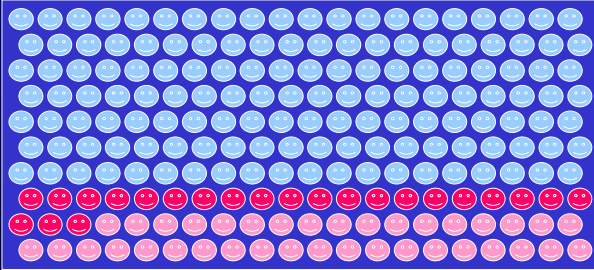
Cretikos M et al, manuscript submitted, 2007

High prevalence rates in GP surgeries in Australia - 4

- BEACH Study of paediatric obesity in GP surgeries*
- Annual, national random sample of 1000 GPs - 100 consecutive visits recorded for each GP
- In the 4 year period 2002-2006:
 - 42 515 encounters in children aged 2-17 years
 - Self-reported height & weight
 - 30% children overweight or obese (similar for Indigenous status)
 - 0.5% children overall offered some form of weight management (but only 0.16% if Indigenous)

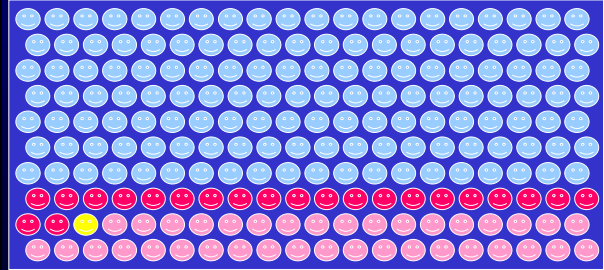
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Study findings – children attending Australian GP surgeries



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Study findings – children attending Australian GP surgeries



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High prevalence rates in clinical settings in Australia – tertiary settings

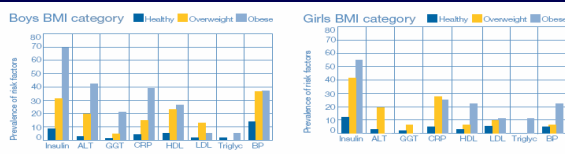
	Inp'ts* (n=245)	Outp'ts* (n=272)	Acquired brain injury [§] (n=88)	Developm. disability [¶] (n=98)
Overweight/obese[#]				
Overweight	18%	20%	19.3%	24%
Obese	4%	12%	15%	15%
Under-nutrition[†]				
Underweight	6%	6%	-	-
Wasted	4%	4%	-	-

*O'Connor et al, J Paediatr Ch Health 2004; Ages 2-18 y; [#]IOTF criteria (Cole et al, 2000); [†]WHO criteria; [§]Ho et al, Pediatr Rehab 2005; ABI: Acquired brain injury; [¶]De et al, 2007

High prevalence of overweight & obese children and adolescents in clinical settings in Australia

Even overweight adolescents have risk markers for CVD: NSW Schools Physical Activity and Nutrition Survey (SPANS) 2004

- Biomarkers study performed on a sub-set of 500 Year 10 students (aged 15 years)
- Overweight associated with abnormal levels of:
 - Boys: insulin, HDL, hs-CRP, ALT, GGT and BP
 - Girls: insulin, HDL, hs-CRP



Prevalence of abnormal biomarkers in boys and girls in year 10 by BMI category (%)

Given the large numbers of affected children & adolescents, and the health consequences

BOTH effective treatment (of young people with established obesity), as well as effective prevention are required

What is the evidence for treatment interventions?

Cochrane review of treatment of childhood obesity

- 18 RCTs included
- Different study designs, sample sizes and outcome measures
- Most studies from USA, among children aged 7-12 y
- Many studies under-powered
- Seven studies by one research team – implications for generalisability to other settings
- Few have used intention to treat analyses
- Attrition rates usually not recorded
- Many studies were run in tertiary centres and were very resource-intensive

* Summerbell C, et al Cochrane Database Syst Rev 2003

NHMRC Clinical Practice Guidelines: Oct 2003 (www.obesityguidelines.gov.au)



Elements of effective management of overweight & obesity in children and adolescents

- Assessment & management of severity & complications
- Long-term behavioural change
- Family involvement
- Developmentally appropriate approach
- Long term dietary change
- Increase in physical activity
- Decrease in sedentary behaviour
- Consider non-conventional therapies – for severe obesity, in a multi-disciplinary setting

Medical assessment of the obese child or adolescent

Medical assessment: Check anthropometry

- Height, weight and BMI
 - Careful height and weight measurement
 - Calculate BMI and plot on BMI for age charts
- Waist circumference
 - Serial measurements (taken at natural waist OR at level of umbilicus) useful
 - No readily available waist for age charts

Clinical example of Katie

Girl aged 6 years
Weight 33 kg
Height 120 cm
BMI 22.9 kg/m²

Overweight or obese?

Normal weight?

Unsure?

Katie

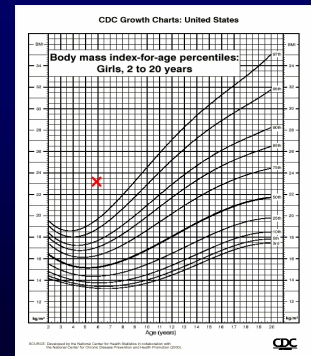
Girl aged 6 years

Weight 33 kg

Height 120 cm

BMI 22.9 kg/m²

(>97th centile for age;
obese range)



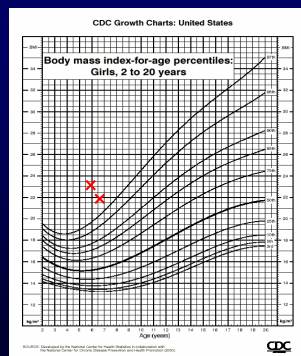
Katie

6 months later

Weight unchanged

Height 123 cm (↑ 3 cm)

BMI 21.8 kg/m²



Medical assessment: Check on family history for

- F/H of obesity and type 2 diabetes:
 - Obesity, type 2 diabetes, premature heart disease, obstructive sleep apnoea, hypertension, dyslipidaemia
- Parental eating disorders & bariatric surgery
- Ethnic groups at higher risk of diabetes etc:
 - Aboriginal & Torres Strait Islander, Indian sub-continent, Mediterranean/Middle-Eastern, Maori & Pacific Islander, probably east Asian

Medical assessment: Check on history for:

- Psychosocial distress:
 - Teasing & bullying
- Joint & feet problems
- ?Obstructive sleep apnoea:
 - Snoring, lack of refreshment after sleep, day-time sleepiness, witnessed apnoeas – can be hard to screen adequately on history
- Pubertal girls:
 - Menstrual irregularities

Medical assessment: Check on examination for:

- Blood pressure (wide cuff)
- Gait; hip/knee and ankle problems; flat feet
- Airway: Small oropharyngeal airway, thick neck
- Skin (in adolescents especially): stretch marks, acanthosis nigricans, acne, thrush in skinfolds
- Hepatomegaly (fatty liver) – but can be very difficult to palpate in obese patients
- Stigmata of other causes of obesity (developmental delay, short stature etc)

Acanthosis nigricans – indicator of insulin resistance



Thickened pigmented skin in the skinfolds, at base of neck, armpits ...

Acanthosis nigricans neck severity scale

0 absent



1 present
close visual inspection, extent not measurable

2 mild

limited to base of skull, <3 inches in breadth



3 moderate

to lateral margins of neck, 3-6 inches in breadth, not visible from front



4 severe
visible from front



In what circumstances would you organise further investigations?

If so – what ones?

Further investigations – when?

- Severe obesity (especially central obesity)
- High risk family history (diabetes, premature heart disease etc)
- High risk ethnic group
- Obesity in an adolescent
- Co-morbidities suggested by history and physical examination of the child

Further investigations – what ones?

- Initial fasting blood tests (others dependent upon results):
 - Glucose
 - LFTs (ALT, AST)
 - Lipids (TG, HDL cholesterol, LDL cholesterol)
 - Insulin?
 - ?TSH???
- Consider a sleep assessment
- Other investigations that MAY be warranted: OGTT, liver ultrasound

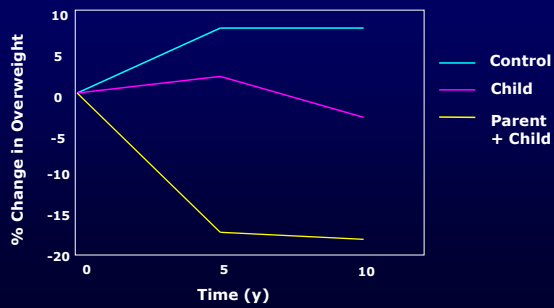
Approach to clinical management

“Just eat less and exercise more”

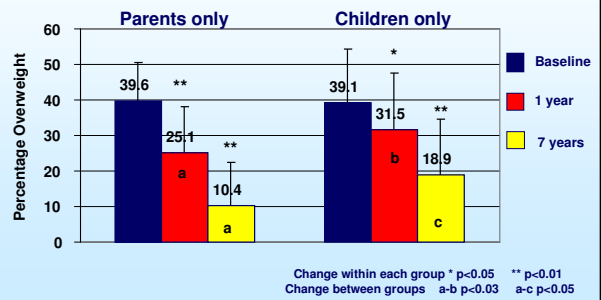
It's really simple or is it?

Families, pre-adolescents and adolescents
Be developmentally appropriate

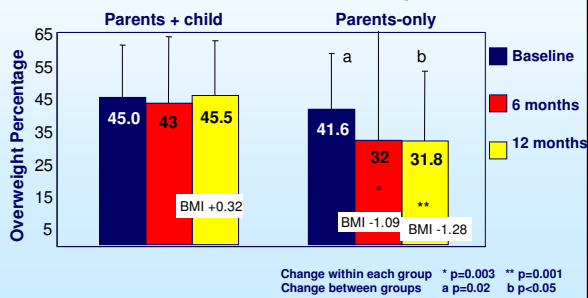
**Child OR Parent + Child?
Effect of type of intervention (Epstein, 1996)**



Parents as agents of change in childhood obesity: Weight status of children in the Parents-only vs. Child-only treatments (Golan. Int J Pediatr Obesity 2006)



Weight status of children in the Parents-only vs. Parents + Child treatments (Golan. Int J Pediatr Obesity 2006)



Families, pre-adolescents and adolescents
Be developmentally appropriate

• Pre-adolescent children

- consider excluding the child from the management part of the consultation - "parent as the agent of change"
- consider scheduling separate time for parent-focussed or whole-of-family focussed interventions

Families, pre-adolescents and adolescents Be developmentally appropriate

- **Adolescents**

- Fewer studies – 12 RCTs in past 2 decades (8 in the USA)
- All involved intense behavioural support and none were in a community setting
- Most follow-up periods only short ie <6 months
- Better outcomes with separate sessions for adolescent versus parents (Brownell et al, 1983)
- **Implications for practice:**
 - Consider separate sessions for the young people of parents

The first law of thermodynamics

Energy is conserved

Energy in = energy out

Clinical implications

It is not possible to gain weight when in negative energy balance

Consider both sides of the energy balance equation

Dietary change in obesity management - 1

- All childhood obesity treatment studies include dietary change as a fundamental element
- Elements:
 - Energy reduction:
 - Lower fat and energy food & drink choices
 - Reduction in high-sugar drinks and foods (? lower GI intake generally)
 - Reduction in portion sizes
 - Whole-family approach
 - Generally - avoidance of calorie-counting or prescribed diet

Dietary change in obesity management - 2

- Long-term weight control "success" is associated with initial dietary fat reduction¹
- Low GI diets - one RCT (12 month follow-up, 16 adolescent subjects²)
- Very low calorie diet? No RCT of its use in adolescence. May be effective as part of a multi-disciplinary approach in adolescence - one study with 12 month outcome³

¹Nuutinen & Klip, 1992 ²Ebbeling et al 2003 ³Sothorn MS et al 2000



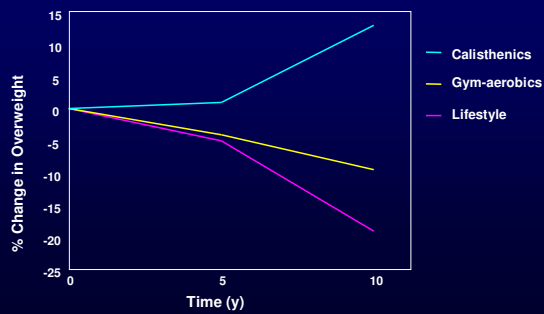
Practical advice about food - 1

- One approach for the whole family
- Whoever buys and cooks the food needs to be involved
- Regular meals – especially breakfast
- Eat together as a family
 - Make a ritual of meal-times
 - No TV or other distractions
- Involve the child or young person in food preparation

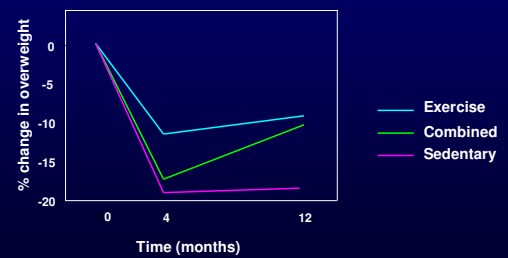
Practical advice about food - 2

- Water as the main beverage
 - limit soft drinks, fruit juice, cordial
- Store healthy snacks
- What foods are in the cupboards? These will always be eaten!
- Check serve sizes – are these appropriate for a child?

Different "exercise" programs (Epstein, 1996)

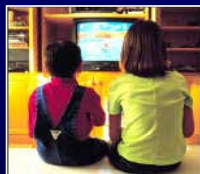


Targeting sedentary behaviour (Epstein, 1996)



TV viewing and a screen-friendly lifestyle

- Look at TV, video game and computer usage - for the whole family
- Who turns the TV(s) on or off?
- Is there a TV in the bedroom?
- What about DVDs, computers, playstations etc etc?
- Explore alternatives. Parental overview vital



Practical advice about physical (in)activity - 1

- Transport to/from school & surrounds
 - Walking instead?
- Use of the family car
- Family approach to television, video-games etc

Practical advice about physical (in)activity - 2

- For most, organised activity is less important than increased opportunities for incidental activity
- "Mucking around" outside is vital:
 - balls, skipping ropes, swings, frisbees ...
 - backyards?, playgrounds?, youth-friendly environments?
- Whole-family opportunities for physical activity?
- Role-modelling of parents

CHW Program (for families of obese children) – the Big Five

1. Limit screen time to less than 2 hours per day
2. Eat together at least one meal a day without the TV being on
3. Spend at least 60 minutes outside every day (playing or being physically active)
4. Choose water as your main drink
5. Eat breakfast each day

Who should see these children and adolescents?

What about referral?

Which therapists should be involved?

- Will depend upon your expertise and the resources available
- Paediatrician involvement:
 - Ideally for patients with severe obesity, co-morbidities, strong family history of co-morbidities
- Dietitian, nurse or other health professional (psychologist, physiotherapist, exercise scientist etc):
 - Ideally for all patients, but cost and access issues are very significant
 - Enhanced Primary Care Plan (with GPs and AHPs) – only if child has co-morbidities

Which therapists should be involved?

- Most important qualities of whichever therapist is involved:
 - Ability to engage the young person and the family
 - Good basic understanding of weight management issues:
 - Energy balance equation ie both food & activity
 - Food & activity environment in which the young person lives
 - Family dynamics
 - Basic behavioural change approaches
 - Regular (and initially frequent) follow-up with the patient, family and other relevant adults

What about other therapies in children and adolescents?

Other therapies in childhood/adolescence?

Hospitalisation Very Low Calorie Diets

- Little evidence, as yet, for their effectiveness long-term in childhood or adolescence
- Need to be allied with a basic behavioural management approach
- There is a role when basic management approach is ineffective and in the presence of severe complications: requires specialist centres

New-ish drug therapies - 1

- **Orlistat (Xenical™)**
 - Pancreatic lipase inhibitor causes ~30% fat malabsorption
 - GI side effects reinforce adherence to a low fat diet
 - Effective in adult trials (~ 10% weight loss) when patients are part of a lifestyle change program
 - Over the counter medication in Australia & elsewhere
 - Efficacy established in adolescents; but issues of compliance due to GI side effects (McDuffie et al, 2004)

New-ish drug therapies - 2

- **Sibutramine (Reductil™)**
 - SNRI (serotonin & noradrenaline re-uptake inhibitor)
 - Centrally acting appetite suppressant
 - Side-effects: cardiovascular – minimised if lower dose (10 mg daily)
 - 2 RCTs (each of 6 months duration) in adolescents: significant weight loss (means 7.8 & 10.8 kg) cf placebo (2.4 & 3.2 kg); Berkowitz et al 2003; Godoy-Matos et al 2005

New-ish drug therapies - 3

These only work as an adjunct to behavioural change

Issue of cost for many patients

Role of metformin

- Insulin-sensitising agent
- 3 RCTs in children/adolescents with obesity and insulin resistance showing a mild-moderate weight loss, and improvement in insulin sensitivity (Freemark et al, 2001; Kay 2001; Srinivasan, JCEM 2006)
- When do we use metformin at CHW?
 - Clinical evidence of insulin resistance eg acanthosis nigricans, PCOS, significant hyperinsulinism
- How do we use it?
 - As an adjunct to lifestyle intervention
 - Dosage graded up
 - Long-acting metformin??????

Bariatric surgery?

- Effective form of therapy in severely obese adults
- In adolescents: Case series etc, no RCTs
- In 2004: Recommendations put forward in **Pediatrics** (Inge et al. Bariatric surgery for severely overweight adolescents: concerns and recommendations. *Pediatrics* 2004; 114: 217 ff; see other reports)
- Criteria: severely obese (BMI >40), skeletal maturity (girls 13 y, boys 15 y), presence of co-morbidities, failure of 6 months of organised weight loss attempts
- Should be managed in centres with multidisciplinary weight management teams with requisite surgical and other expertise
- Major need for research in this area
- Issues of access and equity

Issues to consider in managing very severe paediatric obesity

1. Designated centres for management of severe obesity – trained staff, specific equipment etc
2. Consider implications for other services (eg Endocrinology, Sleep, Orthopaedic, Psychiatry)
3. Role of hospitalisation, strict dietary regimens
4. Type of outpatient services needed for support & monitoring
5. Bariatric surgery
6. Equitable access to treatment services
7. Child protection issues

Unanswered questions regarding management

We need more information on the following issues in management - 1

- Effective strategies for:
 - Different developmental levels:
 - Different settings
 - Long-term weight management support
 - Different levels of severity of obesity
- Types of service delivery eg group programs, individual consultations, existing parenting programs

We need more information on the following issues in management - 2

- What is sustainable in a given health service?
- Equitable access to services
- Health professional training: what and how?
- Are there any child protection issues in severe obesity?

Summary - 1

- The epidemic of obesity is real and it is a problem
- Management of overweight & obesity
 - Take a whole-family (whole-community) approach
 - Long-term behavioural change required
 - Be developmentally aware
 - Pre-adolescents
 - Adolescents
 - Look at both sides of the energy balance equation

Summary - 2

- In severe obesity – possible roles for hospitalisation, VLCDs, drug therapy, bariatric surgery
- Current studies underway looking at primary care treatment strategies
- Challenge of:
 - Resource-effective approaches to obesity management
 - Management of severe obesity
 - Health professional training

Useful web-sites

- BMI for age charts: www.cdc.gov/growthcharts/
- NAASO – the Obesity Society:
www.obesityonline.org
- NHMRC Clinical Practice Guidelines for the Management of Overweight & Obesity:
www.obesityguidelines.gov.au
- CHW Fact Sheets:
<http://www.chw.edu.au/parents/factsheets/>