Eating Disorders in Adolescents

Dr Michele Yeo
MBBS FRACP PhD
Paediatrician/Adolescent Physician
Centre for Adolescent Health
Royal Children’s Hospital Melbourne
What disorders?

- Anorexia Nervosa
- Bulimia Nervosa
- Binge eating Disorder
- Other Specified Feeding and Eating Disorders
  - Atypical AN – “normal/over weight AN”
  - Subthreshold BN
  - Others Night eating syndrome
- Avoidant Restrictive Food Intake Disorder
Binge Eating Disorder

• Objective Binge-eating
  \( \geq 1 \) / week for 3 months

• Abnormal eating behaviours

• Marked distress / guilt

• Absence of:
  - compensatory behaviours
  - Anorexia Nervosa
  - Bulimia Nervosa
Other Specified Feeding and Eating Disorders

- Atypical AN
  - ‘normal weight’ AN
- Subthreshold BN
- Subthreshold BED
- Purging Disorder
- Night Eating Syndrome
- Unspecified Feeding or Eating Disorder
Avoidant / Restrictive Food Intake Disorder (ARFID)

- Eating or feeding disturbance, with persistent failure to meet nutritional needs associated with:
  - significant weight loss / growth failure
  - significant nutritional deficiency
  - dependence on enteral feeding or oral nutritional supplements
  - marked interference with psychosocial functioning
- Not better explained by absence of food or culturally sanctioned practice
- Absence of AN, BN, absence of BI disturbance
- Not attributable to medical condition or better explained by another mental disorder

Pica

Rumination Disorder
Epidemiology

- US: incidence rates increasing in adolescent population (not adults)
- Prevalence rates
  - Anorexia Nervosa 0.5 - 1.0%
  - Bulimia Nervosa 1 - 3%
- 5-15% of Eating Disorders and 40% of binge eating occur in males

Hoek. Int J Eat Disord 2003
Epidemiology

- Most occur during adolescence but can be seen in childhood and >40 yrs
- Increased in developed societies
- Occur at all socioeconomic levels and major ethnic groups
- Subclinical much higher prevalence 3-5%

WHO. Mental health of children and adolescents
Geneva: WHO 2005
Chen Eur Eat Disord Rev 2008
Aetiology and Pathogenesis

• Multifactorial
  • Genetic
    ▪ Family studies
      ▪ $1^{st}$ deg relatives risk increased 6-10x
    ▪ Twin studies
      ▪ Monozygotic twins concordance greater
      ▪ 50% of variation of AN and BN explained by genetic factors
    ▪ Predisposing personality traits
Aetiology and Pathogenesis

• Biological
  • Starvation in itself reproduces sx of eating disorders
    ▪ preoccupation with food
    ▪ anxiety
    ▪ irritability
    ▪ low mood
    ▪ social withdrawal

Keys et al. The Biology of Human Starvation
1950
Aetiology and Pathogenesis

- Environmental
  - Sociocultural norms:
    - Eg role of women, media portrayal
    - Peer norms – eating patterns, dieting behaviour, social pressures
  - Familial:
    - Eating behaviour, weight concerns, communication
- Ballet, gymnastics, modelling
### Spectrum of eating disorders

**Normal, natural eating**
- Eat in response to hunger and satiety most of the time, accepting of body shape and size.

**Dieting**
- Counting calories, skipping meals or food groups, eating from lists of ‘good’ and ‘bad’ foods, following a diet program or a magazine diet for a period of time.

**Sub clinical Eating Disorder (EDNOS, partial)**
- Occasionally binge or purge, take diet pills, feel disgusted/preoccupied about body and/or behaviours, go for extended periods without eating much, feel some loss of control around food.

**Clinical Eating Disorder**
- Anorexia nervosa, bulimia nervosa, binge eating disorder.
Continuum of eating and weight related behaviour

Risk Factors

Healthy Eater ↔ Typical Dieter ↔ Pathological Dieter ↔ Partial Syndrome ↔ Eating Disorder

Protective Factors
Onset of adolescent eating disorders

• Moderate dieters have 5 times the rate of eating disorders; extreme dieters have 18 times the rate.
• High levels of psychiatric morbidity bring a further 7 fold increase in risk for eating disorders.
• Around 2/3 of eating disorders arise in girls who have been moderate dieters in the past.
• Daily exercise in the absence of dieting may be a less risky weight control strategy for adolescent girls.

Patton et al VAHCS, 2000
What is abnormal dieting?

- Associated with decreasing weight goals
- Associated with increasing body criticism
- Increasing social isolation
- Loss of menstruation or failure to start menstruation at the right time
- Evidence of vomiting
Anorexia Nervosa
Believed in seizing control of the patient after a period of watchful waiting.
Sir William Gull: *Anorexia Nervosa (Apepsia Hysterica, Anorexia Hysterica)*
Transactions of the Clinical Society of London, 1873

- “Food should be administered at intervals inversely with the exhaustion and emaciation. The inclination of the patient must be in no way consulted….By warmth, and steady supplies of food … the strength may be gradually resuscitated…”
- Diet recommended: milk, cream soup, eggs, fish, chicken every 2 hours
DSM-IVR: Anorexia Nervosa

- Refusal to maintain body weight at or above a minimally normal weight for age and height (i.e. <85% expected IBW)
- Intense fear of gaining weight or becoming fat
- Disturbed body image
- Amenorrhoea for at least 3 months
  - Restricting and binge/purging subtypes
In younger patients

- Body image concerns may not be well articulated
- Prepubertal, therefore amenorrhea not diagnostic criteria
- (DSM 5)
- Overlap with anxiety disorders, OCD, depression
DSM 5: Anorexia Nervosa

- A. Restriction of energy intake relative to requirements leading to a significantly low body weight in the context of age, sex, developmental trajectory, and physical health. Significantly low weight is defined as a weight that is less than minimally normal, or, for children and adolescents, less than that minimally expected.

- B. Intense fear of gaining weight or becoming fat, or persistent behavior that interferes with weight gain, even though at a significantly low weight.

- C. Disturbance in the way in which one's body weight or shape is experienced, undue influence of body weight or shape on self-evaluation, or persistent lack of recognition of the seriousness of the current low body weight.
DSM5: Bulimia Nervosa

- Recurrent binge eating
- Inappropriate compensatory weight control behaviours
- Frequency $\geq 1$ / week for 3 months
- Self-evaluation unduly influenced by body weight / shape
- Absence of Anorexia Nervosa

Binge eating = eating in a discrete period an amount of food that is definitely larger than most would eat in a similar situation & time period + a sense of lack of control over eating during episodes
DSM-IVR Eating Disorder Not Otherwise Specified (EDNOS)

- Clinically important disordered eating, inappropriate weight control or excessive concern about body shape that does NOT meet all the criteria for anorexia nervosa, bulimia nervosa or binge-eating disorder
- Does not exist in DSM 5
Common ways of presenting

- Via GP referral to clinic
- Via mental health services
- Via emergency/ cardiology with unexplained faints/collapses
- Via gynaecology for investigation of primary or secondary amenorrhoea
- Via gastroenterology for weight loss FI
Screening for Eating Disorders

“The most effective screening device probably remains the health professional thinking about the possibility of an eating disorder.”

(NICE, 2004)
Role of the Paed: Medical assessment

Assess:
- Type
- Duration
- Severity and
- Complications of the eating disorder

- Confidentiality
- Normal medical history
  - Ddx organic causes for wt loss
- Family history
- Specific ED questions
- 24 hour dietary history
- Exercise history
- Periods
- HEADSS assessment
- Mood/Anxiety/OCD
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Dietary History

24 hour dietary history

- Quantities
- Variety
- Fluids
- Habits
- Dairy products
- Family dietary patterns
Useful questions on history

- Restricting – skipping meals/snacks, reducing portion sizes
- Typical patterns of food consumed
- Exercising – include walking, PE, after school sport, gym, exercising in their room eg sit ups, star jumps etc
- Maximum weight and minimum weight
- Rapidity of weight loss
• Physical sx:
  • Cold intolerance
  • Constipation
  • Fatigue
  • Poor concentration
  • Dizziness/syncope

• Bingeing – amount, time of day
• Purging – methods used
Mental State

• Common to AN and BN
  • Anxiety
  • Depression
    ▪ Risk assessment

• AN
  • Obsessive Compulsive Disorder

• BN
  • Substance abuse
  • Sexual abuse
Examination

- Temperature
- Lying and standing PR
- Lying and standing BP
- Capillary refill
- Weight, Height (nb growth chart)
- BMI, BMI centile & % Median BMI (% of 50th centile BMI)
- Tanner staging
- Signs of severity
- Signs of purging
Symptoms, Signs and Complications

- **OROFACIAL**
  - caries
  - parotid enlargement
  - submandibular adenopathy

- **CARDIOVASCULAR**
  - Postural hypotension
  - Acrocyanosis
  - QT prolonged, prominent U waves
  - Sinus bradycardia
  - LV mass decreased
  - Mitral Valve Prolapse

- **GASTROINTESTINAL**
  - Oesophagitis
  - delayed gastric emptying
  - decreased intestinal motility
  - constipation
  - rectal prolapse
  - abnormal LFT
  - elevated serum amylase

- **ENDOCRINE & METABOLIC**
  - Low K, Na, Mg, PO4, Glc, temp
  - Sick Euthyroid Syndrome (low T4, T3, N or low TSH)
  - Low Oestradiol, FSH, LH, Testosterone
Symptoms, signs and complications

- **ENDOCRINE cont.**
  - Oligo/amenorrhoea
  - pubertal delay
  - osteoporosis
  - lipid abnormalities
  - hypercortisolism (incr. cortisol in urine)

- **RENAL**
  - renal calculi

- **REPRODUCTIVE**
  - infertility
  - insufficient antenatal weight gain
  - LBW infant

- **SKIN**
  - dry skin, hair
  - lanugo
  - hypercarotenemia
  - hair loss

- **NEUROLOGIC**
  - peripheral neuropathy
  - reversible cortical atrophy
  - ventricular enlargement

- **HAEMATOLOGIC**
  - anaemia, leukopenia, neutropenia, thrombocytopenia
Reversible brain atrophy and subcortical high signal on MRI in a patient with anorexia nervosa
For Children, BMI Changes with Age

Example: 95th Percentile Tracking

<table>
<thead>
<tr>
<th>Age</th>
<th>BMI</th>
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<tr>
<td>2 yrs</td>
<td>19.3</td>
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<td>4 yrs</td>
<td>17.8</td>
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<td>9 yrs</td>
<td>21.0</td>
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<tr>
<td>13 yrs</td>
<td>25.1</td>
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</table>
Baseline investigations

- FBE, ESR, EUC, Ca, Phosphate, Mg
- Venous Blood Gas
- FSH, LH and Oestradiol
- Vit D
- Bone age
- Bone densitometry
- Sometimes - LFT, Iron levels
- ESR
- Coeliac screen
- If bradycardia is severe, ECG +/- monitoring may be required
Assessing complications

- Hydration
- Electrolytes
- Growth
- Puberty
- Bones
- Brain
- Constipation
- Other co-morbid symptoms e.g. depression, OCD, anxiety, social phobia
Amenorrhoea

- Due to decreased pulsatility of GnRH
- Hypogonadotrophic hypogonadism
- Arrested growth due to pubertal delay
- Threshold level of weight or body fat thought to be necessary for pulsatility of GnRH
- Mechanism unknown
Amenorrhoea

• Due to leptin - *ob* gene on fat cells
  • regulate reproductive function and signal the hypothalamus when fat mass is decreased
  • leptin levels decreased in anorexia nervosa

• Resumption of menses with weight gain

• Can’t predict at what body weight menses will recur
  • low dietary fat, excessive exercise, depression etc
Bone Density in Anorexia Nervosa

- BMD increases 45-60% in second decade
- Peaks by end of third decade
- Declines at a rate of 1-2% per year
- 50% of A.N. can have BMD >2.5 SD below normal
- Bone loss can persist even after restoration of ideal body weight -> inc risk for long term fractures
Bone mineral density

Age (years)

% bone mineral density
Causes of low bone density in AN

- Osteopenia is due to multiple causes:
  - amenorrhea - oestrogen deficiency
  - low BMI
  - Low dietary calcium
  - Vitamin D deficiency
  - high cortisol levels
  - deficient IGF-I levels
  - very strenuous exercise
What makes us worry?

- Rapid weight loss over a short period
  - More likely to become haemodynamically unstable
- Period of starvation/very low intake followed by increased eating
  - Development of the refeeding syndrome
- Frequent vomiting
  - Hypokalaemia
Approach to management of Eating Disorders
Goals of treatment

- Correcting medical complications
- Restoration of weight and body composition so that...
  - Growth and puberty can resume
  - Return to menstruation
- Normalisation of eating
- Treatment of underlying psychological or co-morbid conditions
Management

- Disordered eating/ dieting
  - Education about normal adolescent physical development
  - Encourage healthy eating (not taken to extremes) and physical activity that has a social aspect
  - Regular monitoring
  - Early referral to specialist services if poor response/ suspect development of ED
Treatment approaches

• Inpatient
• Outpatient
  • Day program (Southern Health, Butterfly Foundation)
  • Individual therapy
    • CBT-E*
  • Family therapy
    • Multifamily therapy *
  • Family Based Treatment (Maudsley)**
  • Karolinska Institute (Mandometer Clinic)

* Denotes evidence for Rx
Management - AN

- Inpatient vs Outpatient
  - First line inpatient Rx does not provide advantages over OP
  - Outpatient failures do poorly on transfer to inpatient Rx

Gowers et al 2007
Criteria for admission

Medical Instability

• Postural hypotension (>20mmHg systolic)
• Resting bradycardia (<50 beats/min)
• Temperature <36 degrees
• Electrolyte imbalances e.g. low K+

Failure of outpatient treatment

Concerns of growth failure
First admissions

Physiological stabilisation
  – Bed rest
  – Nutrition
  – NGT (Gastrolyte) is used initially if dehydration is severe and needs to be corrected urgently

Nutrition
  – 3 meals and 3 snacks per day as per meal plan on ward
  – NGT after grace period of 24hrs
First admissions cont...

Making links

• Mental health assessment (individual and family)
• Finding a community individual/family therapist
• Finding a community dietician
• Finding a paediatrician

Overall, a first admission usually lasts 2-3 weeks and is a good opportunity to observe behaviour (not just for the young person!)
Refeeding syndrome

• Syndrome of electrolyte disturbance seen after feeding introduced after period of starvation
  • Arrhythmias, cardiac failure, confusion, convulsions, coma,
  • Starvation – fat and protein catabolism, insulin secretion suppressed
  • Refeeding – insulin secretion increases intracellular uptake of PO4, fall in serum levels
  • Can occur with oral/ ng/ iv feeding

• Hypophosphataemia
  • Other electrolytes – K, Mg
Refeeding syndrome

• Phosphate and K+ generally drop after 48 hours of refeeding (Mg may also drop but ?significance)
• In the context of arrhythmias/severe bradycardias, it is important to replace them
• Start off with Phosphate 500mg tds and daily phosphate levels initially. Should be able to wean phosphate by week 2
• Thiamine (some ED units)
Therefore...

- Rehydrate as required
- Monitor electrolytes (esp PO₄) regularly
- Involve Dietitian early
- If using NG feeding, start low (calorie content and low CHO) and grade up
Sir William Gull
1816-1890

“The patients should be fed at regular intervals and surrounded by persons who would have moral control over them; relatives and friends being generally the worst attendants”
Outpatient treatment
The Family and Anorexia Nervosa

- Maudsley Hospital, London, late 1970s – 1980s
- Christopher Dare, Ivan Eisler, Gerald Russell, George Szmukler
  - New family therapy - “Maudsley Approach”
  - Families as a resource for recovery
  - Support and empower families to eliminate anorexia nervosa in their children
Family-Based Treatment (FBT)

- First RCT published 1987
- Manual published 2002
- Outpatient program
- 20 sessions, 6-12 months
- Working intensively with the parents, young person and siblings
3 Phases of FBT

**Phase 1**
Parents restore their child’s weight
- Refeeding
- Parental control – meal support
- Do not engage in anorexic debate

**Phase 2**
Transfer control back to the young person/adolescent
- One meal at a time
- With weight maintenance

**Phase 3**
Adolescent developmental issues then termination
- Control of eating returned to young person
- Weight and food no longer the focus of parent-child communication
Key Tenets of FBT

- Agnostic view of cause of illness (parents are not to blame)
- Initial focus on symptoms and refeeding (pragmatic)
- Parents are responsible for weight restoration (empowerment)
- Authoritative therapeutic stance (joining)
- Separation of adolescent and illness (respect for adolescent)
The First Maudsley Study:
Weight Chart for Patients in Subgroup 1
(Five Year Follow-up)

Eisler, Dare, Russell, Szmukler, Le Grange, & Dodge (1997)
The Second Maudsley Study: Outpatient Family-Based Treatment

- Mean Age = 15.3yr (1.8)
- Duration = 13.7mo (8.4)
- 6 months of treatment

Le Grange, Eisler, Dare, & Russell, 1992
Psychopharmacologic agents

AN

SSRIs (eg Fluoxetine)

- most trials show no benefit of SSRIs on underweight patients in weight restoration
- Useful with comorbid depression + OCD
- No evidence of benefit (decreased relapse) after wt restoration

Kaye et al, Biol Psychiatry 2001
Walsh et al, JAMA 2006
Psychopharmacologic agents

- Atypical Antipsychotics (e.g., Quetiapine, Olanzapine, Metazapine)
  - Weak evidence of small benefit
  - No evidence course of illness is altered
  - Decreased anxiety and low mood
  - Decreased obsessive thinking

BN – Treatment

• Self-help

• Therapy
  • CBT first line
  • Increasing evidence for Family Based Therapy (FBT)
  • Dialectic Behavioural Therapy
BN- Treatment

• SSRIs
  • >20 db placebo controlled trials showing antidepressants decrease binge/purge behaviour (Not a cure)
  • Fluoxetine only SSRI shown to be better than placebo (60mg dose)

• Topiramate – also shown to decrease binge eating
AN - Mortality and morbidity

- AN still reported to have mortality of ~6% (adolescents + adults); adol only ~2%
  - 50% due to cardiovascular complications, 50% due to suicide
  - Much higher suicide rate than peers
  - **Highest mortality rate of all mental disorders**

- Average duration of illness is 5-7 years (adult data)
- Shorter in adolescents
Prognosis

• <50% fully recovered
• 30% partial recovery
• 20% remained chronically ill
• Core symptoms
  • Weight restoration 60%
  • Menstruation 57%
  • Normalised eating behaviour 47%
• Better prognosis if age of onset in adolescence, longer duration of follow up
• Unfavourable factors: vomiting, bulimia, chronicity, OCD
• High rates of residual psychiatric illness – anxiety, depression

Steinhausen, Am J Psych 2002
Summary

• Maintain a high index of suspicion in young people who are underweight, also with rapid weight loss in overweight population
• Morbidity from EDNOS is just as significant as AN/ BN
• Early access to specialised ED services important
• Weight restoration is the mainstay of therapy
• Involvement of the family is crucial. Family based treatment offers best chance of improved outcomes
Reading

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<tr>
<th>Likely Diagnosis</th>
<th>AN</th>
<th>ARFID</th>
<th>AN</th>
<th>OSFED - AAN</th>
<th>BN</th>
<th>BED</th>
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