Medical Nutrition Therapy in Obesity Management

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Historically...nutrition & obesity

- Eat less, move more...
- Dieting...
- Linear relationship between energy restriction and weight loss...
- Focus on weight loss, not health...
The disease of obesity

- Obesity: A complex chronic disease
- Obesity: Excess or abnormal deposits of adipose tissue that impair health
Aims of nutrition interventions in obesity management?

- Improve health with obesity
  - Improve metabolic / mechanical / mental complications
  - ↓ excess / dysfunctional adiposity

- Support medical, psychological, pharmacological, physical and surgical interventions

- Promote long term nutritional strategies that are realistic → sustainable eating behaviours for that individual

- Promote a healthy relationship with food
  - Nourishment + enjoyment

- Promote satiety

Why involve Registered Dietitians in obesity management?

- Combined clinical and behavioural interventions
- Registered Dietitians:
  - Understand wider neurobiological + environmental determinants
  - Understand social context of eating
  - Advanced communication, behaviour change and motivational interviewing skills
  - Regulated to undertake ‘Medical Nutrition Therapy’: nutrition assessment, diagnostics, therapy and counselling.

Medical Nutrition Therapy

- Identify health-related goals / problem areas
- Individualise, flexible interventions
- Incorporate concepts of best weight and obesity as a complex, chronic disease

**Asking permission / raising the topic of food and weight**

- Obesity stigma ↑ in relation to food + eating behaviours
  - Judgements about food
- Sensitive topic to raise
  - Negative experiences with HCPs in the past
- Social / pleasurable context of eating often lost
- Complex emotional relationship / psychopathology relating to food + eating
- ASK permission

“Would it be alright to talk about where food fits in for you?”

“Could we look at how eating effects your health / weight?”

“It’s possible the topics of increasing weight, high blood pressure, and diet are related. Would it be OK if we looked at that together?”

Nutrition Assessment in obesity: Clinical assessment

- **Anthropometry**
  - Weight, height, BMI, waist circumference
  - BIA / DEXA / CT

- **Nutrition focused physical findings**
  - Digestive system
  - Appetite
  - Odema / wounds
  - SARC-F / Hand-grip strength / knee extensor strength / chair-stand test

- **Obesity Staging**
  - EOSS
Biochemistry
- Medical complications e.g. T2DM, NAFLD
- Micronutrient deficiencies: iron, Vitamin D, Vitamin B12, folate

Nutritional requirements
- Energy:
  - Indirect calorimetry
  - ['Mifflin St Jeor' equation] $\times$ [PAL]
    - [$\sim$30%]

- Protein:
  - $\geq$1g/kg ‘ideal’ body weight / day
  - 1.2-1.5g/kg in sarcopenic obesity

### Complications / associated conditions with (a) specific nutritional requirements or (b) impact on nutritional intake

<table>
<thead>
<tr>
<th>Condition</th>
<th>Possible therapeutic dietary factors to consider</th>
</tr>
</thead>
<tbody>
<tr>
<td>T2DM</td>
<td>Meal pattern, carbohydrate – quantity + quality; fat type</td>
</tr>
<tr>
<td>NAFLD</td>
<td>Alcohol, protein, salt, pre-sleep carbohydrate loading, fluid restrictions</td>
</tr>
<tr>
<td>Hypertension</td>
<td>Salt, alcohol</td>
</tr>
<tr>
<td>PCOS</td>
<td>Carbohydrate – quantity + quality; fat type</td>
</tr>
<tr>
<td>Kidney disease</td>
<td>Protein, potassium, phosphate, salt, fluid restrictions</td>
</tr>
<tr>
<td>OSA</td>
<td>Meal pattern, caffeine</td>
</tr>
<tr>
<td>Gastroesophageal reflux</td>
<td>Alcohol, spice, fat quantity</td>
</tr>
<tr>
<td>Sarcopenia</td>
<td>Protein</td>
</tr>
<tr>
<td>IBS</td>
<td>Meal pattern, fibre, probiotics</td>
</tr>
</tbody>
</table>
Nutrition Assessment in obesity: Behavioural assessment

- Weight history + weight targets
  - Nutrition interventions: ~3-8%
- Previous nutrition interventions
- Current eating behaviours
  - Diet history / 24 hour recall /Typical day
  - Self-monitoring records
- Food environment
  - Food access
  - Food preparation facilities + skills
  - Budget / food security
  - Social eating
- Food likes + dislikes

Disordered eating in obesity

- Associated with ↑ weight, metabolic dysfunction, ↑ psychopathology, ↓ mood, ↑ anxiety + sleep disorders
- Most common
  - Binge Eating Disorder: 1-47% (10% LABS)
    - Characterised by consuming an objectively large amount of food over a discrete period of time; accompanied by a sense of loss of control and distress
  - Night Eating Syndrome: 2-20%
    - Characterised by nocturnal hyperphagia, insomnia and morning anorexia
- Screening (in conjunction with Psychology colleagues in MDT)
  - Questionnaires: QEWP, EDE-Q, NEQ
  - Interviews: EDE, NESHI, SCID-1, SIAB
- Treatment
  - Medications: Lisdexamfetamine + SSRIs
  - CBT – incl. regulation + self monitoring of eating patterns

No single best nutrition intervention has been shown to sustain weight loss long-term

- Literature supports the importance of long-term fidelity, regardless of the intervention
- Tailored to meet individuals health- or weight-related outcomes

Consider:

- Nutritional requirements
- Eating behaviours

Explore:

- What fits best with patients daily routines / food likes / budget / skills
- Value of dietary self-monitoring
- What building a healthy relationship with food and eating looks like for that person
  - Short term vs longer term strategies
- Likely outcomes of various dietary interventions

Eating pattern
- Chrononutrition: Aligning feeding/fasting cycles with clock-regulated cycles helps maintain behavioral and physiological circadian rhythms and health
  - OSA: sleep hygiene
  - Disordered eating

Dietary quality
- Reduce sugary sweetened beverages and high calorie (high fat / sugar / salt) processed foods
- Increase fibre, lean protein, fruit, vegetables and unsaturated fat sources
Nutrition Advice in obesity: Lower calorie diets

- 800-1500 kcals/d (30% energy deficit)
  - ↓ energy density by ↓ portions of higher calorie foods + ↑ fibre (fruit / vegetables)
  - Manipulating macronutrients e.g. ↓ fat / carbohydrate / ↑ protein diets

- 811 adults with overweight
- 4 diets: fat / protein / carbs:
  - 20, 15, and 65%;
  - 20, 25, and 55%;
  - 40, 15, and 45%;
  - 40, 25, and 35%.
- 2 year follow-up
- Satiety, hunger, satisfaction similar
- All improved CV risk factors
- Attendance strongly associated with weight loss (0.2kg / session)

Nutrition Advice in obesity: Lower calorie diets

MA – Johnson (2014)

- 48 RCTS (n7286)
- Significant weight loss with any low-carbohydrate or low-fat diet
- Weight loss differences between individual named diets were small

Quality of macronutrients

- Isocaloric replacement of refined carbohydrate + SFA with high-quality MUFAs (from olive oil, avocado, nuts and seeds), protein + high-quality low GI carbohydrates is associated with weight maintenance (following LED), ↓ CHD + ↓ mortality

<table>
<thead>
<tr>
<th>12-mo Weight Loss, kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>No diet (6 mo: 0; 12 mo: 0)*</td>
</tr>
<tr>
<td>LEARN (6 mo: 0; 12 mo: 0.02)*</td>
</tr>
<tr>
<td>Moderate macronutrients (6 mo: 0; 12 mo: 0)*</td>
</tr>
<tr>
<td>Low carbohydrate (6 mo: 0.83; 12 mo: 0.48)*</td>
</tr>
<tr>
<td>Low fat (6 mo: 0.17; 12 mo: 0.50)*</td>
</tr>
</tbody>
</table>

Nutrition Advice in obesity: Specific dietary patterns

- Mediterranean dietary pattern:
  - Improve glycaemic control, ↓ HDL-C, ↓ triglycerides, ↓ CV events + ↓ T2DM risk

- DASH dietary pattern:
  - Improve glycaemic control, ↓ body weight, ↓ waist circumference, ↓ LDL-C, ↓ blood pressure, ↓ CRP, ↓ CVD risk, ↓ CHD risk, ↓ T2DM risk + risk of stroke

- Low-glycaemic index dietary pattern:
  - Improve glycaemic control, ↓ body weight, ↓ LDL-C, ↓ blood pressure, ↓ CHD risk + ↓ T2DM risk

- Vegetarian dietary pattern:
  - Improve glycaemic control, ↓ LDL-C, ↓ body weight, ↓ CV disease incidence, ↓ risk of T2DM + ↓ mortality

- Nordic dietary pattern:
  - Improve blood pressure, ↓ body weight, ↓ weight regain, ↓ LDL-C / Apo B / non-HDL-C, ↓ CVD risk + ↓ all cause mortality

Low calorie (>800 ≤ 1600 kcal/day)
- 1-2 portioned-controlled, micronutrient fortified products + reduced calorie meals/snacks
- Soups / shakes / bars / ready meals

Products typically ~250 calories / serving
- 2 x 250 kcal MRs
- 1 x 500 kcal balanced meal
- +/- 100 kcal snacks

Higher vs. lower use associated with:
- 4 x likelihood of achieving ≥7% weight loss goal at 12 mo
- ↓ HbA1c, lipids + blood pressure

Longer term use assoc/w 3 year wt stability

Enhanced outcomes w/ behavioural intervention

Nutrition Advice in obesity: Partial meal replacements

Nutrition Advice in obesity: Total diet replacement

- Low calorie (>800≤1200 kcal/day) diet
  - Total food replacement with micronutrient fortified liquid formula
  - Soups / shakes / milk-based
- Typically 8-20 weeks duration
  - Structured food reintroduction
- 7-10kg weight ↓ @ 12/12
- Enhanced outcomes with behavioural intervention
- Intermittent use (3 x 5/52/year) assoc/w 3 year weight maintenance
- Type 2 diabetes remission + ↓ insulin req
  - 36% of participants @ 24/12
  - 73% of participants with >10 kg weight loss @ 12/12

**Nutrition Advice in obesity: Very low energy diets**

- **Very low energy diets (<800 kcal/day)**
  - Total food replacement with micronutrient fortified liquid formula

- **Short-term weight ↓ with VLED > LCD (16.1±1.6 vs. 9.7±2.4%)** but similar long-term losses (6.3±3.2 vs. 5.0±4.0%)

- **Enhanced outcomes with behavioural intervention**

### Study Results

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>VLED programme</th>
<th>Control</th>
<th>Mean Difference</th>
<th>Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Total</td>
<td>Mean</td>
</tr>
<tr>
<td>Purol 2014</td>
<td>6.9</td>
<td>7</td>
<td>97</td>
<td>6.7</td>
</tr>
<tr>
<td>Rossner 1997 (VLED 1)</td>
<td>-10.4</td>
<td>12.3</td>
<td>30</td>
<td>-6.6</td>
</tr>
<tr>
<td>Rossner 1997 (VLED 2)</td>
<td>-9.2</td>
<td>10.6</td>
<td>32</td>
<td>-6.6</td>
</tr>
<tr>
<td>Rytting 1997 BAC</td>
<td>-11.2</td>
<td>11.95</td>
<td>54</td>
<td>-9.3</td>
</tr>
<tr>
<td>Stensmo 2000</td>
<td>-11.1</td>
<td>5.35</td>
<td>19</td>
<td>2.9</td>
</tr>
<tr>
<td>Torgerson 1997</td>
<td>-11.3</td>
<td>11.9</td>
<td>58</td>
<td>-5.5</td>
</tr>
<tr>
<td>Wadden 1994 (VLED+BCT)</td>
<td>-9.5</td>
<td>9.8</td>
<td>23</td>
<td>-8.4</td>
</tr>
<tr>
<td>Wadden 1994</td>
<td>-14.2</td>
<td>11.2</td>
<td>28</td>
<td>-11.7</td>
</tr>
<tr>
<td>Wing 1991</td>
<td>-6.6</td>
<td>5.6</td>
<td>17</td>
<td>-5.7</td>
</tr>
<tr>
<td>Wing 1994</td>
<td>-12</td>
<td>11.8</td>
<td>45</td>
<td>-9.97</td>
</tr>
<tr>
<td>subtotal (95% CI)</td>
<td></td>
<td></td>
<td>493</td>
<td></td>
</tr>
</tbody>
</table>

**Heterogeneity:** Tau² = 14.42, CI² = 38.67, df = 9 (P = 0.0001); I² = 77%

Test for overall effect: Z = 2.74 (P = 0.006)

1.66.2 VLED vs. brief intervention

- **Test for overall effect:** Z = 5.17 (P < 0.00001)

2.1.63 VLED vs. behavioural programme

- **Test for overall effect:** Z = 1.93 (P = 0.05)

Test for subgroup differences: Chi² = 16.69, df = 2 (P = 0.0001), I² = 89.3%

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**Nutrition Advice in obesity: Additional considerations with formulae diets**

- Weight loss / maintenance outcomes improved with:
  - Concurrent multicomponent behavioural intervention (+ group support)
  - Gradual food reintroduction (> 6/52)
  - Use of obesity pharmacotherapy
  - Higher protein diets
- Better maintenance of lean tissue
  - Include physical activity
- Lower calorie options under medical supervision:
  - Reduce insulin, oral hypoglycaemics, anti-hypertensives
- Common side-effects:
  - Constipation, fatigue / muscle weakness, headache, dizziness, gallstone event
- Limited evidence in CKD / NAFLD

Dietary strategies to maximise satiety

- \(\uparrow\) protein
- \(\uparrow\) fibre (insoluble)
- \(\uparrow\) water
- \(\uparrow\) food volume
- \(\downarrow\) glycaemic index
- Non-distracted eating

<table>
<thead>
<tr>
<th>Agent</th>
<th>Orlistat (Xenical)</th>
<th>Liraglutide (Victoza) / Semaglutide (Ozempic)</th>
<th>Naltrexone/ Bupropion (Mysimba)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Side effects</td>
<td>• Loose oily stools (steatorrhea), flatus</td>
<td>• Transient nausea, constipation, vomiting, diarrhoea</td>
<td>• Transient nausea, constipation, dry mouth, headache, dizziness, diarrhoea</td>
</tr>
</tbody>
</table>
| Dietary counselling | • Low fat diet  
• Consider multivitamin OD (2 hours before/after medication) | • Nausea / diarrhoea: meal pattern; portion size; low fat foods  
• Constipation: fibre & fluid; consider a laxative | • Nausea: meal pattern; portion size; low fat foods  
• Constipation: fibre & fluid; consider a laxative  
• Dry mouth / dizziness: hydration |
Nutrition Advice in obesity: individualised approach

Reduced energy | Low / very low energy | Obesity pharmacotherapy | Bariatric surgery

Individualising macronutrient composition / eating patterns | Partial / total meal replacements | Modify patterns, portions, fat, fibre | Protein, micronutrients

- Individualised to patients needs + medical complications
- Multicomponent behavioural interventions delivered by trained clinicians
Agreeing nutrition goals / ALL TREATMENT PLANS in obesity OR ANY CHRONIC DISEASE!

- Assessment + exchanged information about treatment options → agreeing a plan
- Behavioural strategies
  - Agreeing realistic collaborative goals
    - Unrealistic goals can set an individual up for failure and may cause them to blame themselves (‘I have no willpower’) when it is treatment itself that is at fault
  - Developing confidence in overcoming barriers (self-efficacy) and intrinsic motivation (personal, meaningful reasons to change)
  - Developing problem-solving and adaptive thinking /cognitive reframing (avoiding all or nothing thinking e.g. ‘on / off’ the plan)
    - Identify antecedent events (triggers) to behaviours & try new responses to them
  - Self monitoring: eating behaviours, health outcomes
  - Stimulus control: shopping lists, meal planning

Assisting patients with nutrition care plans in obesity

- Provide or signpost to education and resources
  - Credible & evidence based
- Arrange follow up / provide support
- Address barriers to implementing plans / escalate treatment
  - What’s going well with the plan?
  - What’s not going so well?
  - What would help with implementation?
    - Environmental; socioecomic; emotional; medical
  - Do we need to change the plan / consider other options?
    - Investigations / Interventions
- Refer onwards
  - Specialist obesity centre; local dietetic / psychology / physiotherapy services, bariatric surgery
  - Guide expectations on waiting times

# Health indicators for evaluating nutrition interventions

<table>
<thead>
<tr>
<th>Health Improvement</th>
<th>Health indicator</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive improvements</td>
<td>Memory, concentration, attention, problem solving, sleep hygiene</td>
<td>Rate each of these health outcomes using a 0–10 scale, where 0 is low/poor and 10 is high/great:</td>
</tr>
<tr>
<td>Functional improvements</td>
<td>Strength, flexibility, mobility, coordination, physical activity capacity, endurance, pain</td>
<td>– Energy levels</td>
</tr>
<tr>
<td>Medical improvements</td>
<td>Cardiometabolic, endocrine, gastrointestinal, wound care, nutrient deficiencies, changes to medications</td>
<td>– Stress</td>
</tr>
<tr>
<td>Body composition improvements</td>
<td>Body fat, muscle mass, bone health, waist circumference</td>
<td>– Sleep hygiene</td>
</tr>
<tr>
<td>Appetite-related improvements</td>
<td>Hunger, satiety, cravings, drive to eat, palatability of foods</td>
<td>– Mobility</td>
</tr>
<tr>
<td>Mental health</td>
<td>Disordered eating behaviours, self-esteem, self-efficacy, emotional regulation, mood/anxiety, addiction</td>
<td>– Strength</td>
</tr>
<tr>
<td></td>
<td></td>
<td>– Pain</td>
</tr>
<tr>
<td></td>
<td></td>
<td>– Bowel health</td>
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<td></td>
<td></td>
<td>– Mood</td>
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<tr>
<td></td>
<td></td>
<td>– Relationship with food</td>
</tr>
<tr>
<td></td>
<td></td>
<td>– Hunger</td>
</tr>
<tr>
<td></td>
<td></td>
<td>– Cravings</td>
</tr>
<tr>
<td></td>
<td></td>
<td>– Overall health</td>
</tr>
</tbody>
</table>

Browne (2020) Canadian Adult Obesity Clinical Practice Guidelines: Medical Nutrition Therapy in Obesity. Available from: [https://obesitycanada.ca/guidelines/nutrition](https://obesitycanada.ca/guidelines/nutrition)
Questions?

Case studies
  – Practical application
Come to Dublin!

30th European Congress on Obesity
17-20 May 2023 | The Convention Centre Dublin | Dublin, Ireland