Metabolic Challenges in the Obese Patient

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Society for Acute Medicine, 7th International Scientific Conference, SECC
GLASGOW, 3-4 OCTOBER 2013
Obesity

Obesity association & consequences
Mental
Mechanical
Metabolic
Monetary
Obesity

- Type 2 diabetes
- Dyslipidaemia
- Hypertension
- IHD
- Gut
- NAFLD
- NASH
- Cancer
Obesity – Introduction
(Lancet Aug 27, 2011)

United Kingdom trebled since 1980’s
United States 12 states over 30%
no state under 20%

Likely underestimate because self reported

Fuelling the development of diabetes,
heart disease
stroke and
cancer

Huge cost - 2 billion per year extra in UK

Government approach dis-coordinated and inadequate
The medical profession too needs to show leadership
Paradoxes of starvation in e.g., Ethiopia (1 billion worldwide)
socio economic groups affected by obesity (2 billion)
Obesity also affects developed nations
Obesity – future challenges
(David King Aug 2011)

Passive obesity - biology out of kilter with society since 1970s

By 2050 - 60% men & 50% women could be clinically obese in UK

Nowhere has the epidemic been reversed by public health means
- unlike tobacco
- cardiovascular disease

Locally – some good results e.g., Geelong and France

This because of global food supply systems
  environmental – less energy expenditure

Potential savings – 1% reduction in BMI
  may prevent 2.4 million cases of diabetes
Obesity

Huge and complicated - 66,159 articles in last 10 years

Most health professionals get very little education on the topic

20k cal per day increases weight by 1kg a year
Adult prevalence by BMI status
Health Survey for England 2009-2011

Adult (aged 16+) BMI thresholds:

- Underweight: <18.5kg/m²
- Healthy weight: 18.5 to <25kg/m²
- Overweight: 25 to <30kg/m²
- Obese: ≥30kg/m²

Men:
- Underweight: 1.6%
- Healthy weight: 32.2%
- Overweight: 42.2%
- Obese: 24.0%

Women:
- Underweight: 2.2%
- Healthy weight: 40.2%
- Overweight: 32.3%
- Obese: 25.3%
Prevalence of overweight among children
National Child Measurement Programme 2011/12

One in five children in Reception is overweight or obese (boys 23.5%, girls 21.6%)

One in three children in Year 6 is overweight or obese (boys 35.4%, girls 32.4%)

Child overweight (including obesity)/ excess weight: BMI ≥ 85th centile of the UK90 growth reference
Obesity – genetic factors
(Farooqi, 2010)

Explain < 5% heritability of increased BMI
Heritability equivalent of that of height
Leptin – melanocortin pathway
MC4R deficiency – population prevalence 1: 1000
1:100 in obesity
Fig 6.1 Clinical response to leptin therapy in congenital leptin deficiency.
Fig 1.1 Prevalence of obesity (BMI > 30 kg/m²) in men and women by age (Health Survey for England, 2002; http://www.publications.doh.gov.uk/public/summary.htm).
## Prevalence of obesity (adults over 16) in UK by ethnic groups
(Maryon-Davies 2010)

<table>
<thead>
<tr>
<th></th>
<th>Black/Caribbean</th>
<th>Indian</th>
<th>Chinese</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Men</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>overweight (inc. obese)</td>
<td>67</td>
<td>53</td>
<td>37</td>
</tr>
<tr>
<td>Raised waist circumference</td>
<td>22</td>
<td>20</td>
<td>08</td>
</tr>
<tr>
<td><strong>Women</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>overweight (inc. obese)</td>
<td>65</td>
<td>55</td>
<td>25</td>
</tr>
<tr>
<td>Raised waist circumference</td>
<td>47</td>
<td>38</td>
<td>16</td>
</tr>
</tbody>
</table>
# Obesity – definitions in ethnic groups

*James 2009, Oxford Textbook of Public Health*

<table>
<thead>
<tr>
<th></th>
<th>BMI/kg/m²</th>
<th>Waist circumference (cms)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Europeans</td>
<td>Asians</td>
</tr>
<tr>
<td><strong>Normal</strong></td>
<td>18.5-24.9</td>
<td>18.5-22.9</td>
</tr>
<tr>
<td><strong>Overweight</strong></td>
<td>25-29.9</td>
<td>23-24.9</td>
</tr>
<tr>
<td><strong>Obese (i)</strong></td>
<td>&gt; 30</td>
<td>25-29.9</td>
</tr>
</tbody>
</table>
Socio-cultural patterns and Regional differences in U.K.
(Maryon-Davies 2010, Marmot 2010)

<table>
<thead>
<tr>
<th>Gender</th>
<th>Occupation</th>
<th>Obese</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>Management/Professional</td>
<td>18%</td>
</tr>
<tr>
<td></td>
<td>Factory employee</td>
<td>28%</td>
</tr>
<tr>
<td>Women</td>
<td>Management/Professional</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td>Factory employee</td>
<td>25%</td>
</tr>
</tbody>
</table>
Fig 1.3 Prevalence of overweight Dutch children by the level of parental education.
Endocrine causes of obesity

Almost never a cause

Hypothyroidism
Cushing’s syndrome
GH deficiency
Polycystic ovary syndrome
Obesity – Associated Conditions

Type 2 diabetes  90% BMI > 23 kg/m2
Cardiovascular disease
Hypertensive  -  Obese have 5 x increased risk
-  60% cases overweight
Metabolic syndrome
Dyslipidemia
Cancer
Gall bladder
Non alcohol fatty liver
Reproduction
  Primary infertility in women obesity 6%
  Impotency in men
Osteoarthritis
Sleep apnoea
**Fig 17.1** Relative risk of developing diabetes according to body mass BMI. (a) Data for men from Colditz *et al.* (1995). (b) Data for women from Chan *et al.* (1994).
Obesity Epidemic - Approaches

Motivating behavioural changes
Health promotion
Society marketing
Education

Policy intervention
enforceable actions
laws
regulation

Nudging not effective
Obesity Epidemic - Approaches

Banning unhealthy food marketing to children

Healthy public sector food policies

Food industry policies, e.g., healthier compositions
Obesity and Cancer
(Wang et al, Lancet 2011, 378, 815)

Every additional $5\text{kg/m}^2$ increases:

- oesophageal cancer risk by 52%
- colon cancer risk by 24%

Women

- endometrial cancer 59%
- post menopausal breast cancer 12%
## Cost-effectiveness of obesity interventions in Australia


<table>
<thead>
<tr>
<th>Intervention</th>
<th>Target</th>
<th>Evidence</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unhealthy food &amp; beverage tax</td>
<td>Adults</td>
<td>4</td>
<td>Cost saving</td>
</tr>
<tr>
<td>Front of pack traffic light nutritional labelling</td>
<td>Adults</td>
<td>5</td>
<td>Cost saving</td>
</tr>
<tr>
<td>Reduction of advertising junk food</td>
<td>Children 0-14</td>
<td>2</td>
<td>Cost saving</td>
</tr>
<tr>
<td>School based programme to reduce television viewing</td>
<td>Children 8-10</td>
<td>3</td>
<td>Cost saving</td>
</tr>
<tr>
<td>School based nutrition/exercise</td>
<td>Primary school</td>
<td></td>
<td></td>
</tr>
<tr>
<td>School based reduce sugar drink consumption</td>
<td>Children 7-11</td>
<td>3</td>
<td>Cost saving</td>
</tr>
</tbody>
</table>
A multipronged approach significantly reduced childhood obesity.

## Cost-effectiveness of obesity interventions in Australia


<table>
<thead>
<tr>
<th>Target</th>
<th>Evidence</th>
<th>Net Cost (A $ million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gastric banding Adolescents</td>
<td>1</td>
<td>4,400</td>
</tr>
<tr>
<td>Gastric banding Adults BMI &gt; 35kg/m²</td>
<td>1</td>
<td>5,800</td>
</tr>
</tbody>
</table>
Calorie Labelling
(Jebb August 2011, 343, 267)

20-25% calories away from home

New York City - policy
- mandatory provision of calorie information on menus

No overall difference in calories purchased

15% customers used information and purchased about 106 kcal less

Voluntary system in UK 5,000 high street outlets
14% meals served outside home
Association with hours spent viewing television between the ages of 5 and 15 and the prevalence of overweight at age 26.
Fig 31.11 Number of food advertisements per hour on television in selected countries. (Source: Dibb and Castwell, 1995.)
NICE – Bariatric Surgery

Recommended for patients with BMI > 40 kg/m²
or > 35kg/m² co-morbidity

Between 11,000 and 140,000 patients qualify in UK

No of bariatric procedures in the UK - 2,607 in 2010, but rising

No of procedures per PCT 1-194

Only 40% Primary care trusts in UK implement NICE guidelines
Obesity & Diabetes

The impact of Bariatric Surgery on Type 2 Diabetes

Bariatric Surgery
sustained weight loss
remission of type 2 diabetes 50-85%
(less likely in older subjects)
reduces mortality in Type 2 diabetes
RCP Obesity Report

Patient Charter

Provision of local services for overweight & obese

Provision of multidisciplinary services in regions for severely obese

Follow NICE guidelines

Appropriate equipment for diagnosis and cure
RCP

1. Improving health and weight of hospital care workers
2. Provision of adequate education for all medical and related professionals
3. Bariatric medicine as a specialty.
4. Setting up of an ongoing group to monitor the above/to provide scientifically sound information to Government
Obesity – a global problem - and complex

International organisations
Governments
Private sector
Communities
Individual
Monitoring - essential

Individual BMI

Development of services for obese patients

Food labelling

Education

Policy changes
Decreasing/preventing obesity

Advertising  – less – not to children, e.g., TV

Food industry  – voluntary codes of best practice
  – probably not enough
  - decease volume of sold sugar drinks
  - decrease fat in foods
  - healthy eating, e.g., vegetables & fruit
  - link with private sector responsible marketing
Government departments involved in a coordinated obesity strategy

Health
Culture, media, sport, physical activity
Transport – physical activity
Agriculture
Environment
Education – e.g. prevention and breast feeding
Treasury

Needs government leadership
One minister/group to coordinate
CONCLUSIONS

Everyone should know their BMI and what it means

Government leaderships essential

Medical involvement and leadership nationally/locally

Targets for attainment in the future

No country has a long-term comprehensive strategy