Burden of Disease from High BMI in New Zealand

Cliona Ni Mhurchu
Global burden of overweight and obesity

- 300 million obese and 750 million overweight individuals worldwide

- Global burden of disease attributable to excess BMI = 30 million DALYs (mainly IHD and DM)

- Current trends predicted to persist
## 2002 World Health Report - leading 15 risks in developed regions

<table>
<thead>
<tr>
<th>Risk</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tobacco</td>
<td>12.1%</td>
<td>11.0%</td>
</tr>
<tr>
<td>High blood pressure</td>
<td>5.6%</td>
<td>9.0%</td>
</tr>
<tr>
<td>Alcohol</td>
<td>4.3%</td>
<td>1.9%</td>
</tr>
<tr>
<td>Overweight and obesity</td>
<td>3.1%</td>
<td>1.1%</td>
</tr>
<tr>
<td>High cholesterol</td>
<td>2.8%</td>
<td>2.1%</td>
</tr>
<tr>
<td>Physical inactivity</td>
<td>1.8%</td>
<td>1.9%</td>
</tr>
<tr>
<td>Low fruit &amp; vegetables</td>
<td>1.7%</td>
<td>1.5%</td>
</tr>
<tr>
<td>Illicit drugs</td>
<td>1.6%</td>
<td>1.5%</td>
</tr>
<tr>
<td>Unsafe sex</td>
<td>1.4%</td>
<td>1.7%</td>
</tr>
<tr>
<td>Iron deficiency</td>
<td>1.1%</td>
<td>1.0%</td>
</tr>
<tr>
<td>Childhood sexual abuse</td>
<td>1.0%</td>
<td>0.7%</td>
</tr>
<tr>
<td>Selected work-related dusts</td>
<td>0.8%</td>
<td>0.7%</td>
</tr>
<tr>
<td>Selected work injury risks</td>
<td>0.8%</td>
<td>0.7%</td>
</tr>
<tr>
<td>Urban air pollution</td>
<td>0.7%</td>
<td>0.7%</td>
</tr>
<tr>
<td>Work-related noise</td>
<td>0.7%</td>
<td>0.7%</td>
</tr>
</tbody>
</table>

WHR 2002: Rich countries of W. Europe, N. America and W. Pacific
Obesity in New Zealand

- 19-21% adults are obese:
  - 17-19% European/Other
  - 27-32% Maori
  - 34-46% Pacific peoples

- ~55% adults are overweight or obese

- ~31% children are overweight or obese
NZ burden of obesity - study objectives:

• To estimate the burden of mortality in New Zealand in 1997 due to higher than optimal BMI (>21 kg/m²)

• To estimate mortality that could be avoided in 2011 with feasible changes in mean population BMI
• Examined the impact of 4 nutrition-related risk factors on the burden of disease in New Zealand:
  
  – Blood pressure
  – Total blood cholesterol
  – Vegetable and fruit intake
  – Body mass index
Comparative risk assessment

- Risk factor distributions
- Risk factor-disease relationships
- Disease burden

- Attributable burden in 1997
- Avoidable burden by 2011
  (by age sex and ethnic subgroups)
Theoretical minimum

• 21 ± 1 kg/m²

• Used in GBD Study

• Evidence suggested that this BMI distribution would yield the lowest population risk of adverse health outcomes
Rationale for theoretical minimum: BMI and DM

Body mass index (kg/m²)

Hazard ratio and 95% CI

Body mass index (kg/m²)
Mortality outcomes

- Ischaemic heart disease (IHD)
- Ischaemic stroke
- Type II diabetes
- Colorectal cancer
- Post-menopausal breast cancer
Mortality data

• Current burden (1997):
  – The number of deaths by 10-year age group from the New Zealand Health Information Service (NZHIS) mortality database.

• Future burden (2011):
  – Projections based on modelling
Avoidable mortality

• “Business as usual” (BAU) scenario
  – Based on historical trends

• Intervention scenario
  – Deviation from historical trend reflecting policy change
Measure of burden

• Disability-adjusted life year (DALY)
  – A summary of both fatal and non-fatal outcomes (integrated measure of population health)
  – Recognises importance of widely prevalent, disabling conditions

• Mortality
  – Simple, unambiguous, easily understood
  – Widely available
BMI distribution (1997) - males: 26.2 (4.4) kg/m²
BMI distribution (1997) - females: 26.1 (5.6) kg/m²

BMI (kg/m²)

Female

1997
2011 BAU*
2011 Intervention

Theoretical minimum

Age group (years)

15-24 25-34 35-44 45-54 55-64 65-74 75+
Avoidable mortality

• BAU
  – Increase of 1.3 kg/m² by 2011
  – 25% further shift away from theoretical minimum

• Intervention scenario
  – Increase of 1.0 kg/m² by 2011
  – 19% further shift away from theoretical minimum
  – Approx. one quarter reduction in projected rate of increase
## Mortality due to high BMI

<table>
<thead>
<tr>
<th>Disease Outcome</th>
<th>Attributable mortality 1997</th>
<th>Avoidable mortality 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart Disease</td>
<td>1561</td>
<td>85</td>
</tr>
<tr>
<td>Stroke</td>
<td>367</td>
<td>25</td>
</tr>
<tr>
<td>Diabetes</td>
<td>1231</td>
<td>323</td>
</tr>
<tr>
<td>Colorectal cancer</td>
<td>177</td>
<td>13</td>
</tr>
<tr>
<td>Post-menopausal breast cancer</td>
<td>91</td>
<td>8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3154 (11%)</strong></td>
<td><strong>385</strong></td>
</tr>
</tbody>
</table>
Proportion of deaths due to high BMI

- All Cancers
- DM
- Stroke
- IHD

Deaths (Count)

- Non-BMI related deaths
- Deaths due to BMI
Top 20 causes of death, by risk factor, New Zealand, 1997

Number of deaths

- Diet (joint effect)
- Tobacco
- Deprivation
- Cholesterol
- Blood pressure
- BMI
- Insufficient physical activity
- (Pre)diabetes
- Infection
- Inadequate vegetables and fruit
- Adverse in-hospital health care events
- Air pollution
- Alcohol and drugs
- Violence
- Injury (non-traffic)
- Road traffic
- Cancer screening access
- UV radiation
- Occupation
- Unsafe sex
Summary

• High BMI is a major modifiable cause of premature death in New Zealand

• Intervention policies with only modest effects on slowing increase in mean population BMI could prevent hundreds of deaths annually
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