Subordination, stress and obesity

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Oxford Obesity
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Obesity - selected countries

Source: International Obesity Taskforce
Cameroon

- Increasing obesity in urban areas (49% of the population lived in urban areas in 2000)

- Decreasing physical activity

- Change from traditional diet to westernized diet

• Social gradient within countries
  – Lower socioeconomic groups in high income countries generally have a greater prevalence of risk factors and obesity
  – A similar pattern is emerging as the obesity epidemic evolves in low and middle income countries
Economic Growth, Female Education & Obesity

Monteiro et al 2004
BMI (AGE ADJUSTED) – RUSSIA, POLAND, CZECH BY EDUCATION

BMI (AGE ADJUSTED) – RUSSIA, POLAND, CZECH BY EDUCATION WOMEN

WHR (AGE ADJUSTED) – RUSSIA, POLAND, CZECH BY EDUCATION

Prevalence of overweight (including obesity) & obesity 1997 - 2007 for boys & girls 5–10 years

Age & sex-adjusted odds overweight & obesity 2000/1-2006/7 (against 1997/98) by SEP score group

Data from Health Survey for England
Causes of the causes
Conceptual Framework

SOCIOECONOMIC & POLITICAL CONTEXT
- Governance
- Policy
  - Macroeconomic
  - Social
  - Health
- Cultural and Societal norms and values

Social Position
- Education
- Occupation
- Income
- Gender
- Ethnicity / Race

Material Circumstances
- Social Cohesion
- Psychosocial Factors
- Behaviours
- Biological Factors

Health Care System

DISTRIBUTION OF HEALTH AND WELL-BEING

SOCIAL DETERMINANTS OF HEALTH AND HEALTH INEQUITIES
Importance of external environment
Nutrition Transition

Undernutrition and obesity by the level of GDP per capita

WHO 2006
Rapid Changes in Diet
Increasing energy density of food supply

FAO 2004
## Importance of external environment

<table>
<thead>
<tr>
<th></th>
<th>Calories</th>
<th>Calories from fat</th>
<th>Cost per calorie</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tall (12 fl oz)</td>
<td>110</td>
<td>50</td>
<td>1.77</td>
</tr>
<tr>
<td>Grande (16 fl oz)</td>
<td>140</td>
<td>60</td>
<td>1.64</td>
</tr>
<tr>
<td>Venti (20 fl oz)</td>
<td>180</td>
<td>80</td>
<td>1.42</td>
</tr>
</tbody>
</table>

Cost per extra calorie (Venti vs Tall) = 0.86 pence
DIET AND GRADE OF EMPLOYMENT
WHITEHALL II WOMEN

Fast food chains more common in deprived areas: England and Scotland

Mean number of fast food outlets* per 100,000 people

Macdonald et al 2007

(*McDonald’s, Burger King, KFC and Pizza Hut)
Psychosocial environment

- Stress and subordination at work
The Iso-strain concept of stress at work

- Socially isolated
  - (no supportive co-workers or supervisors)
- High strain
  - (High demands and low control)
Job strain and subsequent weight change

Odds ratio for weight gain (from Phase 1 to Phase 3)

- High BMI at baseline
- Intermediate BMI
- Low BMI at baseline

P for interaction job strain x baseline BMI < 0.05

Kivimäki et al. the Whitehall II study. Int J Obesity 2006
ODDS RATIO* OF METABOLIC SYNDROME BY EXPOSURE TO ISO-STRAIN: WHITEHALL II

*Adj. for age, employment, grade and health behaviours

Chandola, Brunner & Marmot, BMJ, 2006
Effort-reward imbalance and incident type 2 diabetes in the Whitehall II-Study (odds ratios#; N=8067, mean follow-up: 12.5 years)

* adjusted for age, employment grade, ethnic group, length of follow up, ECG abnormalities, family history of diabetes, BMI, height, SBP, exercise, smoking, life events

Sense of Unfairness in the Whitehall II study

**Measure**

Item question*: “I often have the feeling that I am being treated unfairly”

Participants rated their response on a 6-point scale (1=strongly disagree; 2=moderately disagree; 3=slightly disagree; 4=slightly agree; 5=moderately agree; 6=strongly agree).

Four levels of unfairness:

1 and 2 = “null”
3 = “low”
4 = “medium”
5 and 6 = “high”
Sense of Unfairness by Employment Grade: WII

De Vogli
Unfairness and components of the metabolic syndrome: WII study

95%CI

OR

Unfairness

Serum HDL cholesterol (<1.03 mmol/l in men or <1.29 mmol/l in women)

Serum triglycerides (≥1.69 mmol/l)

Waist circumference (>102 cm in men or >88 cm in women)

Hypertension (≥130/85 mmHg or antihypertensive medications)

Fasting blood glucose (≥6.61 mmol/l or antidiabetic medications)

De Vogli
Sense of Unfairness and Poor Mental Functioning: WII study

95% CI

ORs (Poor Mental Functioning)

adjusted for age, sex, baseline poor mental functioning, and grade

(+ ) traditional CHD risk factors and other psychosocial factors

De Vogli
Psychological distress and subsequent obesity: Whitehall II study

Model A: adjusted for age, sex and BMI at phase 1, Model B: additionally adjusted for ethnicity, marital status, socioeconomic position, smoking, alcohol intake, physical activity, systolic blood pressure, diastolic blood pressure, total cholesterol, diabetes, coronary heart disease, and use of psychotropic drugs at phase 1

Kivimaki et al, BMJ, 2009

Number of times GHQ case (measure of psychological distress) at phases 1, 3, and 5

Kivimaki et al, BMJ, 2009
Duration of childhood poverty and children’s levels of chronic stress

Whole lives in poverty have higher average stress.

No poverty in childhood has lower average stress.

Evans & Schamberg 2009
Duration of childhood poverty and working memory in young adults

Evans & Schamberg 2009

No poverty in childhood average recall 9.4 items
Whole lives in poverty average recall 8.5 items
MECHANISMS

- HYPOTHALAMIC PITUITARY AXIS (HPA) – CORTISOL
- SYMPATHETIC/PARASYMPATHETIC
CORTISOL AWAKENING RESPONSE AND EMPLOYMENT GRADE - WHITEHALL II

(Kunz-Ebrecht et al. Psychoneuroendocrinology, 2004)
Metabolic syndrome %

Quartile 1 (lowest) | Quartile 2 | Quartile 3 | Quartile 4 (highest)

(Hemingway et al. Circulation, 2005)
• Social justice
• Empowerment as a means – material, psychosocial, political
• Creating the conditions for people to take control of their lives

http://www.who.int/social_determinants