Childhood obesity in a global perspective. Varying time trends in different countries, areas and social groups

«Towards better health and reducing inequalities in health»
Ljubljana, Slovenia - 24th November 2015
By
Anna Biehl, PhD
«Why do time trends vary in different countries, areas and social groups?»
Overview

• What has driven the development of (child)obesity?
• Trends in childhood overweight and obesity
  – By country
  – Geographic areas
  – Socioeconomic groups
• Important periods regarding development of overweight/obesity
• Summing up
Health risks of overweight and obesity among children

• Orthopedic – heavy body in growth
• Cardiovascular disease and diabetes, type II
• Psychosocial challenges
• Etc.....
What has driven the development of (child)obesity?

globalisation
globalisation

Free trade
Economic growth
Urbanisation....

physical activity
changed diet
....etc
• *double burden of disease*
  – malnutrition in the population – at the same time overweight/obesity an increasing challenge

• *nutritional transition*
  – Obesity-promoting shift from traditional diet to "western diet"
Overview

• What has driven the development of (child)obesity?
• Trends in childhood overweight and obesity
  – By country
  – Geographic areas
  – Socioeconomic groups
• Important periods regarding development of overweight/obesity
• Summing up
Trends in childhood overweight and obesity

• For the first time in the history of humanity there is a greater proportion of overweight/obesity than underweight (in total)
  – escalated faster among children than grown up

• Globally approximately 43 million children < 5y with overweight/obesity in 2010
  – 35 of 43 million from developing countries


• Challenging to study trends…
  – … incomplete data
  – … varying criteria and terminology for «overweight and obesity»
Global Burden of Disease (GBD)

Institute for Health Metrics and Evaluation (IHME), University of Washington
Proportion (%) overweight (incl obesity) – children 5-9 y

2013

- Institute for Health Metrics and Evaluation (IHME), University of Washington
Trends in developed vs. developing countries (2-19 year-olds)

Overweight (incl obesity) (%)  Obesity (%)

Developed countries

Developing countries

Globally

- Institute for Health Metrics and Evaluation (IHME), University of Washington
Trends in proportion (%) overweight (incl. obesity)

Europe

- Surprisingly LITTLE comparable data

- WHO’s initiative to collect data of height and weight among school children (COSI).

Proportion (%) overweight (incl obesity), in 2008 - 8-year-olds

- WHO Europe COSI, modified by:
Trends Europe

• **Children 2-5 y:**
  – Only 5 EU countries repeated measurements
  – Increase of obesity only in England 1995-2002

• **Youth:**
  – Increase of obesity in most countries
  – France – reported non significant increase 1998-2007

• Lien N et al. Availability of data assessing the prevalence and trends of overweight and obesity among European adolescents. Public Health Nutr. 2010;13(Special Issue 10A):1680-7
North America

**USA** one of the countries highest proportion:
- Tripling of proportion obesity among children the last 30 y
- 1/3 overweight (incl obesity)
- 1/6 obesity

**Canada:**
- Lower proportion than the USA

---


Trends USA

• 2-19 year-olds:
  – Non-significant increase of obesity 2003 – 2012

• 2-5 year-olds:
  – Significant reduction of obesity 2003 – 2012

Asia

• GREAT variation

• Central Asia
  – High prevalence of overweight/obesity among children

• South Asia
  – “Double burden of disease”
  – Low prevalence of overweight/obesity – large population many individuals

• Increased health risk at lower level of BMI – possible underestimation

Trend in overweight (incl obesity), children 5-9y.
proportion (%)

China 1980-2013

USA 1980-2013

Institute for Health Metrics and Evaluation (IHME), University of Washington
Number (N) of children overweight (incl obesity) children 5-9 years

China, 1980-2013

N (China2013) = >10 mill.

USA, 1980-2013

N (USA 2013) = 2.5 mill.

Institute for Health Metrics and Evaluation (IHME), University of Washington
Overview

- What has driven the development of (child)obesity?
- Trends in childhood overweight and obesity
  - By country
  - Geographic areas
  - Socioeconomic groups
- Important periods regarding development of overweight/obesity
- Summing up
### Urban and rural areas and patterns in overweight/obesity

<table>
<thead>
<tr>
<th>Urban – rural</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developing countries</td>
</tr>
<tr>
<td><strong>URBAN</strong> - <strong>high</strong> prevalence overweight/obesity</td>
</tr>
</tbody>
</table>

### Socioeconomic background and patterns in overweight/obesity

<table>
<thead>
<tr>
<th>Socioeconomic background</th>
<th>Developing countries</th>
<th>Developed countries</th>
</tr>
</thead>
<tbody>
<tr>
<td><em><em>HIGH SEP</em> – HIGH</em>*</td>
<td>prevalence overweight/obesity</td>
<td><em><em>LOW SEP</em> – HIGH</em>*</td>
</tr>
</tbody>
</table>

*) SEP – Parents’ SocioEconomic Position

...and Norway
The development of weight of 8 year-olds, 1920 - 2012

The development of height of 8 year-olds, 1920 – 2012

Btw 3000 - 3500 8 year-olds participated each round
**A total of approximately 14,000 children**

High participation rate - 89 - 90% each round
Two-stage sampling methodology - nationally representative sample

N (schools) = 125
N (children) = 3000/3500
• **General overweight and obesity** - based on BMI
  
  – BMI = weight/height^2 (kg/m^2)

• **Abdominal obesity** – based on waist circumference
  
  – waist circumference (WC)/height

  – Abdominal obesity - WC/height > 0.5
The Norwegian Child Growth study – proportion (%) overweight (incl obesity)
The Norwegian Child Growth study – proportion (%)

**abdominal obesity**

![Graph showing proportion of abdominal obesity in girls and boys from 2008 to 2012. The graph indicates a slight increase in abdominal obesity for both girls and boys over the years.]
Adiposity among children in Norway by urbanity and maternal education: a nationally representative study.

Anna Biehl¹,², Ragnhild Hovengen¹, ELSE-KARIN GRØHOLT¹, JØRAN HJELMESÆTH², BJØRN HEINE STRAND¹ and HAAKON E MEYER¹,³

Relatív risk (RR)

<table>
<thead>
<tr>
<th>Overweight (incl obesity)</th>
<th>Abdominal obesity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>Semiurban</td>
</tr>
<tr>
<td>1</td>
<td>1.2</td>
</tr>
<tr>
<td>**</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1.6</td>
</tr>
</tbody>
</table>

*) p-verdi < 0.05,  **) p-verdi < 0.01
Maternal SEP

*) p-verdi < 0.05, **) p-verdi < 0.01

**

Høy
Mellom
Lav

Overweight (incl. obesity)
Abdominal obesity

Relativ risk (RR)
marriage

cohabitation

divorce

living apart
• The proportion of children with general overweight and obesity was **50 % higher** among children with divorced parents
  ... compared to children with married parents.

• The proportion of children with abdominal obesity was **80 % higher** among children with divorced parents
  ... compared to children with married parents.
Overview

• What has driven the development of (child)obesity?
• Trends in childhood overweight and obesity
  – By country
  – Areas
  – Socioeconomic groups
• Important periods regarding development of overweight/obesity
• Summing up
Weight curves for 8 year olds, overweight/obese vs. normal weight

BMI growth analysed using GEE and Cubic-Splines with 6 knots
Shaded area is 95%CI

Overweight at age 7-9.5
Not overweight at age 7-9.5
Average birth weight for the cohorts

Source: Medical Birth Registry, Norwegian Institute of Public Health
Overweight (incl. obesity) (%) – 2008-2010-2012

Norwegian Institute of Public Health
Average birth weight for the cohorts

Source: Medical Birth Registry, Norwegian Institute of Public Health
Proportion (%) children, birthweight >4500g

Birth year

Source: Medical Birth Registry, Norwegian Institute of Public Health
Summing up

• **Childhood overweight/obesity is increasing, globally**
  – Steeper increase in developing countries
  – Possible levelling off - maybe reduction - in developed countries

• **Urban – rural areas**
  – Different patterns in developed and developing countries

• **Socioecenomy**
  – Different patterns in developed and developing countries
Cont. Summing up

• Different growth patterns appear early
  …which implies that prevention must start VERY early.
Thank you for listening!
Cross sectional – with a follow up?

2008  2010  2012  2015

3. grade  3. grade  3. grade  3. grade

N= 3500  N= 3500  N= 3500  N=3500

Follow up?

8. grade
Height
Waist circumference