Exclusive breastfeeding duration and cardiorespiratory fitness in children and adolescents

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Benefits of breast feeding

- Otitis media
- GI infections
- Respiratory infections
- Atopy
- Atopic dermatitis
- Asthma
- Type 1 diabetes
- Type 2 diabetes
- Cardiovascular disease
- High blood pressure
- Cholesterol
- Intelligence
- Motor development
- Etc.

Institutions

- WHO
- ESPGHAN
- FISPGHAN
- ENeA
- Early Nutrition Academy
- US Agency for Healthcare Research and Quality
- Dutch State Institute for Nutrition and Health
PEDIATRIC REVIEW

Physical fitness in childhood and adolescence: a powerful marker of health

FB Ortega¹,², JR Ruiz¹,², MJ Castillo¹ and M Sjöström²
To examine the association of exclusive breastfeeding duration with fitness in children and adolescents and to test the role of body composition and sociodemographic factors in this relation.
Participants
1025 children (9-10 years) and 971 adolescents (15-16 years) from Sweden and Estonia (EYHS)

Exposures
Breast feeding

• Was your child fed completely on breast milk for any length of time—that is, without complementary formula feeds? (Categories provided for response were yes or no)

• For how long was your child breastfled? (Categories provided for response were <1 month, 1–3 months, >3–6 months, and >6 months)
Participants
1025 children (9-10 years) and 971 adolescents (15-16 years) from Sweden and Estonia (EYHS)

Exposures
Breast feeding

Main outcome
Cardiorespiratory fitness

Confounding factors
Anthropometry, birth weight, smoking, physical activity, maternal education, and mother’s BMI
Cardiorespiratory fitness and never vs. ever breastfed

Model 1: adjusted for country, age, sex, and pubertal status
Model 2: model 1 plus BMI
Model 3: model 1 plus fat mass, and fat-free mass
Model 4: model 1 plus birth weight and maternal BMI and educational level

Labayen et al. AJCN 2012
Cardiorespiratory fitness and duration of breast feeding

![Graph showing fitness (L/min) adjusted for Model 1 and the significance levels (*, **).](image)

**RESULTS**

Model 1: adjusted for country, age, sex, and pubertal status
Model 2: model 1 plus BMI
Model 3: model 1 plus fat mass, and fat-free mass
Model 4: model 1 plus birth weight and maternal BMI and educational level

Labayen et al. AJCN 2012
RESULTS

Cardiorespiratory fitness and duration of breast feeding by weight status

Normal weight/overweight+obesity according to the International Obesity Task Force recommendations
Confounders: country, sex, age, pubertal status, and body mass

Labayen et al. AJCN 2012
Cardiorespiratory fitness and duration of breast feeding by SES

RESULTS

Low/ high-SES: less than university education and university education, respectively
Confounders: country, sex, age, pubertal status, and body mass

Labayen et al. AJCN 2012
Cardiorespiratory fitness and duration of breast feeding by mother’s weight

Confounders: country, sex, age, pubertal status, and body mass
Cardiorespiratory fitness and duration of breast feeding by BW

Confounders: country, sex, age, pubertal status, and body mass

Labayen et al. AJCN 2012
Conclusions

Longer exclusive breastfeeding has a beneficial effect on cardiorespiratory fitness in children and adolescents

*Because early infant-feeding patterns are potentially modifiable, a better understanding of the possible programming effect of exclusive breastfeeding on cardiorespiratory fitness is of public health interest*
Thanks for your attention
Cardiorespiratory fitness and duration of breast feeding by FFM

Low/high FFM: below or above the sex- and age group–specific median

Labayen et al. AJCN 2012
Cardiorespiratory fitness

METHODS

Test protocol

<table>
<thead>
<tr>
<th>Gender</th>
<th>Age (years)</th>
<th>Weight (kg)</th>
<th>Initial work rate (W)</th>
<th>Δ Work rate (W)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Girls &amp; boys</td>
<td>9-10</td>
<td>&lt; 30</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Girls &amp; boys</td>
<td>9-10</td>
<td>&gt; 30</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Girls</td>
<td>15-16</td>
<td>-</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>Boys</td>
<td>15-16</td>
<td>-</td>
<td>50</td>
<td>50</td>
</tr>
</tbody>
</table>

Variables

- Watt: \( W_{1+} (W_2 \cdot t/180) \)
- \( VO_2\text{max} \) (L/min): \( 12 \times W + 5 \times \text{body weight (kg)} \)
Anthropometry

**Weight**

**Height**

**Skinfold thickness**

**Variables**

- BMI
- % Overweight/Obese
- % Body fat (Slaughter et al.)
- FFM
Physical Activity (PA)

Test protocol

- 4 consecutive days
- 10 hrs/day

Variables

- Total PA (counts/min)
- Moderate + Vigorous PA >3 METs (min/day)
Cardiorespiratory fitness: marker of health

Blair et al. JAMA 1989

Adults
10,224 men and 3120 women