Effects of stunting on body composition, biological age, and muscle strength of Maya and Ladino children in Guatemala [Poster]

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Effects of stunting on body composition, biological age, and muscle strength of Maya and *Ladino* children in Guatemala

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Background

- Stunting is an indicator of chronic malnutrition and its nefarious effects linger for life.
- The Maya people from Guatemala show the shortest average height of any non-pygmy human population. This has not changed in the last 100 years.
- In Guatemala, data from 2010, showed that 50% of infants and children were stunted, some rural Maya regions had 70% children stunted, and 38% of Maya in rural Guatemala were stunted at birth.
- Guatemala went through 36 years of civil war (1960–1996) and its devastating effects are still in place, disproportionately burdening the poorest segments of the population, such as the Maya and some *Ladino* groups.
- The Maya are indigenous inhabitants of what is now the southeastern part of Mexico, Guatemala, Belize, San Salvador and Honduras. In Guatemala, the Maya speak >30 Mayan languages and Spanish, and practice a mixture of pre-Columbian and Christian traditions.
- The *Ladinos* are Spanish descendants, speak Spanish, practice Christianity and typically deny Maya ancestry.

Methods

Sample

N=1520, 436 *Ladino* and 1084 Maya, 838 boys & 682 girls, 6-16 years (Mean ± SD= 11.90±2.72), measured 1979-1999.

Measures

- Height (cm), weight (kg), arm circumference (cm), and triceps skinfold (mm) (Lohman et al 1988).
- Z-scores for anthropometry and upper-arm indexes (Frisancho 2008).
- Bone age (BoneExpert® http://www.boneexpert.com).
- Z-scores handgrip strength (McQuiddy 2015).
- Stunting: height-for-age < 5th percentile (NCHS), by age and gender.

Results I Descriptive Statistics

- Average Z-scores for height-for-age, in both *Ladino* and Maya groups, are significantly lower than the references (p<.000), but the Maya are significantly shorter than the *Ladino* (p<.00) (Fig 1-2).
- The prevalence of stunting is very high in both groups. However, Maya boys and girls show a significantly higher prevalence of stunting than the *Ladino* (Fig 3).

Results I Hypothesis testing

<table>
<thead>
<tr>
<th>predictors</th>
<th>B</th>
<th>S.E.</th>
<th>Sig.</th>
<th>Exp(B)</th>
<th>95% C.I.for EXP(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>0.099</td>
<td>0.104</td>
<td>0.000</td>
<td>1.098</td>
<td>1.000 - 1.000</td>
</tr>
<tr>
<td>Group: Ladino, 1=Maya</td>
<td>-0.042</td>
<td>0.003</td>
<td>0.227</td>
<td>0.958</td>
<td>0.935 - 0.980</td>
</tr>
<tr>
<td>Gender: 0=Boy, 1=Girl</td>
<td>0.010</td>
<td>0.004</td>
<td>0.187</td>
<td>1.010</td>
<td>1.006 - 1.014</td>
</tr>
<tr>
<td>Age (dec years)</td>
<td>0.004</td>
<td>0.008</td>
<td>0.654</td>
<td>1.004</td>
<td>1.000 - 1.008</td>
</tr>
<tr>
<td>Stunting: 0=No, 1=Yes</td>
<td>0.002</td>
<td>0.002</td>
<td>0.753</td>
<td>1.002</td>
<td>1.000 - 1.004</td>
</tr>
</tbody>
</table>

Table 1: Linear regression. Predictors of UMA, Bone Age and Handgrip

- Hypothesis 1 is fully accepted (Table 1).
- Hypothesis 2 is fully accepted (Table 2).
- Hypothesis 3 is fully Accepted (Tables 1 and 2).

Summary of Results

- Stunting is the strongest negative predictor of muscle mass, strength and biological maturation.
- Being Maya (especially male Maya) exacerbates the negative effects of stunting.
- Children born between 1960-70 were almost 2.5 times more likely of being stunted in childhood (adjusted for age and gender), and children born between 1971-1985 were almost 2 times more likely of being stunted when compared to children born after 1985; and
- Being Maya doubled the odds of being stunted, when compared to being *Ladino*.

References