Socioeconomic Disparities and the Familial Coexistence of Child Stunting and Maternal Overweight in Guatemala

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Introduction

• The familial coexistence of stunted children and overweight mothers is a significant nutritional problem in Guatemala. Studies have shown that the prevalence of stunted children aged 6 months to 5 years and overweight mothers has increased from 13.4% in 1995 to 16.0% in Guatemala in 2000.

• The recent report indicated that Guatemala has the highest prevalence (16.0%), followed by Egypt (12.4%), Bolivia (11.5%) and Peru (8.6%), among 42 countries. Knowing household and individual factors related to the familial coexistence of child under-nutrition and maternal over-nutrition is crucial for tackling this nutrition problem.

• To date, few studies have examined the socioeconomic characteristics of households with a stunted child and an overweight mother (SCOM).

Methods

• We used a cross-sectional, nationally representative dataset from the Guatemalan Living Standard Measurement Study (LSMS) collected in 2000.

• The LSMS survey employed the same cartographic sectors used by the Guatemalan population census of 1994 and followed the methodology developed by the World Bank.

• We selected 2,492 households having a child aged 6 to 60 months and a mother aged 18 to 49 years from 7,276 households in the 2000 Guatemalan Living Standards Measurement Study. Socioeconomic characteristics associated with SCOM pairs were assessed with the Concentration Index.

Relative concentration index (RCI)

• Relative concentration indices provide the relative magnitude of health inequality across economic groups.

• RCI is defined as twice the area between the 45 degree line and the concentration curve.

• The relative concentration curve plots the cumulative proportion of malnutrition against cumulative proportion of population ranked by economic status from the poorest to the richest. Malnutrition, irrespective of economic status concentration curve, lies on the 45 degree line.

$$RCI = \frac{2}{N \cdot \mu} \sum_{i=1}^{x} \left( r_i - 1 \right) \int \left( L(x) dx \right)$$

• N = total number of individuals in the population

• \(\mu\) = the mean level of malnutrition in the population

• \(\bar{x}_i\) = the weighted average level of malnutrition in the \(i^{th}\) income group

• \(r_i\) = the relative rank of the \(i^{th}\) income group

• \(L(\chi) = \int \sum_{i=1}^{n} \frac{\chi^2}{\mu} dx\)

Analytical Sample Selection

Subjects (n=37,771), Households (n=7,276)

Child age 6-60 months old (Children n=5,214)

Exclusion criteria for children
- Living without mother (n=163)
- < 2 pairing childmother (n=385)
- Have anotherr outlier (n=253)

Children (n=4,436)

Randomly select 1 child if > 1 child (child+mother pair, n=3,112)

Exclusion criteria for mothers
- Pregnant mother (n=330)
- < 3mo postpartum (n=156)
- Age <16 or >49y (n=69)
- Have anotherr outlier (n=18)

Underweight mothers (n=67)

Missing information
- No maternal anthrop information (n=53)
- Maternal education (n=3)

Childmother pairs (n=2,492)

Results

Figure. Relative concentration curves of child stunting, maternal overweight and SCOM

Table. Association of socioeconomic characteristics with child stunting, maternal overweight and SCOM

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Child stunting</th>
<th>Maternal overweight</th>
<th>SCOM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Crude OR</td>
<td>Adjusted OR</td>
<td>Crude OR</td>
</tr>
<tr>
<td>Household consumption per capita (Q)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q2 vs. Q1</td>
<td>0.64**</td>
<td>0.69*</td>
<td>1.58**</td>
</tr>
<tr>
<td>Q3 vs. Q1</td>
<td>0.47***</td>
<td>0.70**</td>
<td>2.55**</td>
</tr>
<tr>
<td>Q4 vs. Q1</td>
<td>0.33***</td>
<td>0.55***</td>
<td>3.17***</td>
</tr>
<tr>
<td>Q5 vs. Q1</td>
<td>0.21***</td>
<td>0.37***</td>
<td>3.17***</td>
</tr>
<tr>
<td>Age of residence</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Rural vs. Urban</td>
<td>2.85</td>
<td>1.36</td>
<td>0.54</td>
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<tr>
<td>Material indigence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indigenous vs. Non-indigenous</td>
<td>3.85</td>
<td>2.48**</td>
<td>0.58</td>
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<tr>
<td>Material education</td>
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<td></td>
<td></td>
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<tr>
<td>Middle vs. Low</td>
<td>0.46***</td>
<td>0.77</td>
<td>1.42</td>
</tr>
<tr>
<td>High vs. Low</td>
<td>0.63***</td>
<td>0.70**</td>
<td>2.41**</td>
</tr>
</tbody>
</table>

Bivariate logistic regression and Multivariate logistic regression, Adjusted for child’s age, mother’s age, and 8 regions. *p<0.05, **p<0.01, ***p<0.001

Conclusion

• In Guatemala, there was a higher prevalence of child stunting but a lower prevalence of maternal overweight among the poor compared to the rich households.

• SCOM pairs were more prevalent among the poor due to the very high concentration of child stunting among the poor.

• A multivariate logistic regression model showed that compared with all other types of child and mother pairs, SCOM pairs were 1.5 times more likely to occur in households with indigenous mothers compared to those with non-indigenous mothers (odds ratio=1.50; 95% CI=1.04 to 2.16; p=0.03) adjusted for estimated overall food and non-food consumption, urban/rural residence, maternal education, region, child age and maternal age.

• These novel observations could serve as a guide for the targeting of nutrition programs to reduce this dual form of malnutrition within the same household.

References