Double burden of undernutrition and obesity in Uruguay

Cecilia Severi and Ximena Moratorio

ABSTRACT
Background: Uruguay is at an advanced stage of the epidemiologic transition; like other Latin American countries, it bears a nutritional double burden composed of undernutrition and overweight or obesity.
Objectives: The aim was to estimate whether a double burden of nutritional problems exists in Uruguay and to identify if governmental programs and policies for nutrition take this double burden into account.
Design: Existing studies were reviewed, and other data were processed specifically for the purpose of this article. Several data sources were used to include a broad, comprehensive population range.
Results: The prevalence of stunting in children aged <2 y is 10.9%. There is a high frequency of obesity, which increases with age (9.5% in children <2 y old, 18.8% in those aged 6 y, 20.4% in those aged 11 y, 26.6% in those aged 13–15 y, and 35.3% in adults). In addition, 13.8% of women start pregnancy underweight and the rate of obesity increases during pregnancy from 36.7% at the beginning to 46.5% at the end. Anemia is very frequent in the selected population we examined, as follows: 31% of children <2 y old and 20.9% of pregnant women in their third trimester. An obese mother with a stunted child are present in 6.3% of households; 1.9% of stunted children are obese at age 6 y and 3.1% are obese at the age of 11. Multiple logistic analysis applied to children <2 y showed an association between stunting and obesity (OR: 2.0; 95% CI: 1.2, 3.6).
Conclusions: The data suggest that there is a nutritional double burden in Uruguay. This nutritional burden is similar to that of other countries in the region. This important public issue should be tackled, and the household and intraindividual levels in Uruguay and to determine whether the nutrition programs and policies in the country have incorporated the double burden as part of their approach.

METHODS
A review of existing studies and the processing of other available data were conducted for the specific purpose of this article. Several data sources were used to include a broad range of population:

1) A 2011 national survey on nutritional state, eating habits, and anemia in children <2 y old (Encuesta nacional sobre estado nutricional, prácticas de alimentación y anemia en niños menores de dos años), which included a representative sample of 2994 cases <2 y old. The 2006 WHO growth standards were used to classify anthropometric measures: stunting (height-for-age <2 SDs), wasting (weight-for-lage <2 SDs), and overweight and obesity (weight-for-height <1 SD and <2 SDs, respectively) (4). The anemia cutoff used was that suggested by the WHO: hemoglobin <11 g/dL (5). Risk factors for stunting were analyzed by logistic regression analysis. A detailed description of the sampling and the data collection methods is presented elsewhere (6).

INTRODUCTION
In most developed countries, obesity is a major public nutritional problem. In several Latin American countries, undernutrition is still prevalent but now coexists with excess body weight, which makes the situation much more complex. The coexistence of, for example, undernutrition with stunting or anemia or both stunting and anemia with overweight or obesity is called the double burden of malnutrition. The double burden phenomenon can take place in a same family (in the case of stunted child–overweight mother pairs) or simply coexist in one individual (in the case of an obese child with stunting) (1, 2).

Uruguay is at an advanced stage of the epidemiologic transition, and although in the past the stunting rates decreased from 14.6% to 10.9% in children <2 y old, stunting still remains a public health problem, especially in lower socioeconomic sectors. In addition, Uruguay has an elevated prevalence of obesity at all ages, similar to high-income countries (3).

Some programs have been implemented in Uruguay throughout the past decades, but they seem to be focused on either one or the other side of the problem—undernutrition or overweight—and more particularly on undernutrition; for obesity, it was only recently that some initiatives to tackle the problem were undertaken. It is not clear to what extent the current programs integrate actions to manage the double burden simultaneously.

The objective of this article, therefore, was to assess the existence of a double burden of nutritional problems by age group at the household and intraindividual levels in Uruguay and to determine whether the nutrition programs and policies in the country have incorporated the double burden as part of their approach.


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RESULTS

The national prevalence of weight-for-height $<2$ $z$ scores in children $<2$ y old is 1%, height-for-age $<2$ $z$ scores is 10.9%, and anemia values are high, as shown in Table 1. The frequency of overweight/obesity is high in all ages and increases with age, as shown in Table 2, reaching almost 58% of the adult population (BMI $\geq 25$). In pregnant women, 13.8% are underweight and 36.7% are obese at the beginning of gestation. At the third trimester, the prevalence of obesity is higher (46.5%) and that of anemia is 20.9% (data not shown).

In 6.3% of households there is an obese mother and a stunted child. This percentage of households with a double burden is not different from what was expected, assuming independence of burdens, and the difference was not significant ($P = 0.146$) (Table 3).

With regard to the double burden existing within the same person, 1.9% of school-aged children had a double burden of overweight/obesity and stunting at 6 y old and 3.1% experienced this double burden at 11 y old. These proportions of double burden are different from what was expected assuming independence of the burdens, and the difference was significant ($P < 0.001$ for both calculations; Table 3). A multivariate analysis applied to children $<2$ y old showed an association between stunting and obesity (OR: 2.2; 95% CI: 1.5, 3.6) (Table 4).

DISCUSSION

The strength of this review is that it is based on studies with large representative samples in all age groups; its main limitation is that the data used were collected in different years and with different methodologies.

Uruguay, like some other developed and even developing countries around the world, faces a double burden of malnutrition that includes both undernutrition and overweight. Wasting is almost absent in all age groups, but there exists a moderate prevalence of stunting and a high prevalence of overweight/obesity. Results also show the existence of individuals with the double burden of malnutrition.

The data presented suggest a link between stunting and obesity, through the prevalence of stunted and obese schoolchildren and the association shown between stunting and overweight in $<2$-y-old children. A plausible explanation for this was shown in studies by Barker et al (12, 13) and Jackson (14), which found that to suffer undernutrition in the early stages of life entails a higher probability of being overweight and obese in the short and long term, which may also come along with chronic diseases.

Some programs have been initiated in Uruguay throughout the past decades, but they seem to be focused on undernutrition in the framework of overcoming poverty, such as the program Come-dores (feeding centers), a school meals program, “baskets for nutritional risk,” “fortified milk supply,” and cash transfer programs, among others (15, 16).

The Health System Reform played an important role in infant nutrition by including “a payment for health goals.” One of these

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Total, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undernutrition</td>
<td></td>
</tr>
<tr>
<td>$&lt;2$ $z$ scores weight-for-height</td>
<td>1.0</td>
</tr>
<tr>
<td>$&lt;2$ $z$ scores height-for-age</td>
<td>10.9</td>
</tr>
<tr>
<td>$&lt;2$ $z$ scores weight-for-age</td>
<td>4.0</td>
</tr>
<tr>
<td>Anemia$^2$</td>
<td>31.5$^3$</td>
</tr>
<tr>
<td>Obesity</td>
<td></td>
</tr>
<tr>
<td>BMI $&gt;2$ $z$ scores</td>
<td>9.5</td>
</tr>
</tbody>
</table>

$^1n = 2994$ unless noted otherwise. Source: reference 6.

$^2$Hemoglobin $<11$ g/dL.

$^3n = 756.$
goals was the accreditation of health centers in good nutrition practices. This is reflected in the increase in exclusive breastfeeding rates at 6 mo of age, reaching 65.2% in 2011 (6).

Recently, certain initiatives were undertaken to respond to the obesity problem, such as the “Interagency Commitment for an appropriate diet in the Uruguayan population” and a recently approved law for healthy eating at schools (17).

The aims and interventions proposed in the different programs seem to be focused on one or the other side of the problem, undernutrition or overweight, and especially on undernutrition. It is not clear to what extent the current programs integrate actions to manage the double burden simultaneously.

The problem to be tackled is more complex and difficult to solve. The double burden of malnutrition calls for a new nutritional and welfare policy based on a life-course approach. This demands a radical shift from a food delivery policy aimed at encouraging people to eat more into a policy that facilitates the appropriate conditions and guides people as to how to eat better in terms of quality. This challenge requires a huge effort from different participants and sectors of society; it is easier for a policy to provide assistance than to produce changes in individuals’ and families’ personal practices to lead to a new way of eating and a more active lifestyle (18, 19). Thus, a strong political leadership is imperative to respond to this double burden of malnutrition.

### TABLE 2

Prevalence of malnutrition (obesity and thinness) in school-aged children, adolescents, and adults

<table>
<thead>
<tr>
<th>Prevalence, %</th>
<th>Boys</th>
<th>Girls</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children aged 6 y (BMI-for-age)</td>
<td>BMI &gt;2 z scores</td>
<td>9.2 (7.08, 11.3)</td>
<td>6.6 (4.9, 8.5)</td>
</tr>
<tr>
<td>Children aged 11 y (BMI-for-age)</td>
<td>BMI &gt;2 z scores</td>
<td>10.6 (7.1, 12.9)</td>
<td>7.2 (5.19, 9.4)</td>
</tr>
<tr>
<td>Adolescents aged 13–15 y (BMI-for-age)</td>
<td>BMI &gt;2 z scores</td>
<td>8.1 (6.9, 9.5)</td>
<td>6.0 (4.7, 7.6)</td>
</tr>
<tr>
<td>Adults aged 25–64 y</td>
<td>BMI of 25–30 kg/m²</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>BMI &gt;30 kg/m²</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Thinness in women (&gt;20 y old)</td>
<td>BMI &lt;18.5 kg/m² (%)</td>
<td>—</td>
<td>6.5</td>
</tr>
</tbody>
</table>

1Values are prevalences (95% CIs) unless otherwise indicated. Sources—school-aged children (6–11 y old): 2004–2011 cohort study (n = 4254) (8); adolescents (13–15 y old): the *II Encuesta mundial de salud adolescente*, 2012 (n = 3524) (9); and adults (25–64 y old): First National Survey of Risk Factors Associated with Chronic Noncommunicable Diseases, 2006 (n = 2010) (10). For “Thinness in women,” the authors’ processed data from the Perinatal Informatics System, 2012 (n = 36,693) were used.

### TABLE 3

Assessment of the double burden of stunting and overweight/obesity at the household and individual levels in Uruguayan children and women (2004–2011 school-aged cohort study)

<table>
<thead>
<tr>
<th>Stunting, %</th>
<th>With</th>
<th>Without</th>
<th>Total</th>
</tr>
</thead>
</table>

**Household level**

Children aged 6 y (n = 1532)

- Mother with overweight/obesity: 6.3 (5.2, 7.7) vs. 31.0 (26.7, 33.3) vs. 37.3 (34.9, 39.7)
- Total: 18.8 (17.0, 20.9) vs. 81.2 (79.1, 83.0) vs. 100.0

**Individual level**

Children aged 6 y (n = 1901)

- With overweight/obesity: 1.9 (1.4, 2.7) vs. 21.7 (19.9, 23.6) vs. 23.6 (21.7, 25.6)
- Total: 18.5 (16.8, 20.3) vs. 79.6 (77.7, 81.3) vs. 100.0

**Children aged 11 y (n = 1664)**

- With overweight/obesity: 3.1 (2.4, 4.1) vs. 26.9 (24.8, 29.0) vs. 30.0 (27.8, 32.2)
- Total: 18.6 (16.8, 20.5) vs. 81.4 (79.5, 83.2) vs. 100.0

1Values are prevalences (95% CIs). P values are for comparisons between percentage with double burden and percentage expected if the burdens were independent.

2–4Expected = 7.02%, 4.81%, 5.57%.
TABLE 4
Risk factors associated with stunting in children <2 y old

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low birth weight</td>
<td>11.0 (6.9, 17.2)</td>
</tr>
<tr>
<td>Maternal height &lt;1.52 m (10th percentile)</td>
<td>2.8 (1.8, 4.3)</td>
</tr>
<tr>
<td>Maternal BMI &lt;18.5 kg/m² pregestation</td>
<td>2.4 (1.4, 3.9)</td>
</tr>
<tr>
<td>&lt;6 mo old</td>
<td>2.2 (1.5, 3.29)</td>
</tr>
<tr>
<td>Obese child</td>
<td>2.0 (1.2, 3.6)</td>
</tr>
<tr>
<td>Maternal education &lt;9 y</td>
<td>2.0 (1.3, 2.9)</td>
</tr>
<tr>
<td>State health care centers</td>
<td>1.5 (1.01, 2.2)</td>
</tr>
<tr>
<td>Male sex</td>
<td>1.5 (1.1, 2.1)</td>
</tr>
</tbody>
</table>

\[n = 2994.\] Source: reference 6.

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The authors’ responsibilities were as follows—CS: designed the article, wrote the manuscript, and had primary responsibility for final content; and XM, reviewed the manuscript critically. Neither of the authors had a potential conflict of interest.

REFERENCES