When science and politics listen to each other: good prospects from a new school breakfast program in Peru

Enrique R Jacoby, Santiago Cueto, and Ernesto Pollitt

ABSTRACT This article provides an overview of a school breakfast program implemented in 1993 in the Peruvian Andes. The program, designed by the Instituto de Investigación Nutricional in Lima and supported by the government of Peru, constitutes a clear departure from previous school feeding programs, which were heavily politicized and poorly documented. From the program’s inception, nutritionists, managers, and social scientists have collaborated to produce a sound nutritional design, efficient distribution mechanisms, and effective evaluation methods.

During the program’s first year, controlled evaluations conducted in several Andean regions documented improved dietary intake and a significant decline in the prevalence of anemia. An educational evaluation also found improved verbal skills, higher school attendance, and lower dropout rates among recipients of the school breakfast. The results have prompted the Peruvian government to continue supporting the program, thus setting a new standard for the effective management of social expenditure in the context of economic adjustment.

INTRODUCTION Although school feeding programs—particularly breakfast programs—have enjoyed global popularity for nearly half a century, they have rarely been scrutinized. The scant, largely flawed evaluations on record offer little insight into their nutritional or educational effectiveness (1). Not until recently did the US government begin to prove the benefits of its own school feeding program, the school breakfast. The results have prompted the Peruvian government to continue supporting the program, thus setting a new standard for the effective management of social expenditure in the context of economic adjustment.

CHOOSING THE BENEFICIARIES

In 1993, officers from the Peruvian government and investigators from the Instituto de Investigación Nutricional (IIN) in Lima, Peru, jointly developed an agenda of delivering food aid to school-age children in the poorest provinces of the country. This goal evolved into a detailed plan of action to shift the program’s direction from the traditional recipients of food aid—innhabitants of coastal urban areas—to much needier children in the impoverished highland communities of the Andes. Contrary to conventional wisdom, this region’s chief nutritional problem is not simply a chronic deficit of energy intake, but rather a diet lacking in vital nutrients. The stunted growth observed in 50% of Andean children is a result of their typically monotonous diet of cereals and tubers. Other nutritional consequences of their diet include a high prevalence of iron deficiency anemia, iodine deficits, and borderline concentrations of vitamin A.

A HIGH-QUALITY, READY-TO-EAT BREAKFAST

The planning team concluded that a high-quality breakfast could make an important nutritional difference for Andean
It would serve as an extra energy source for children who routinely walk long distances to school on little fuel, and it would satisfy daily vitamin and mineral requirements. The selected breakfast provides 5–10-y-old schoolchildren with 30% of their daily energy requirements, 100% of their daily iron needs, and 60% of the recommended dietary allowances for most other vitamins and minerals (Table 1).

The ready-to-eat breakfast consists of cake and an instant milk-like beverage, which has the advantages of requiring minimal preparation time and providing the children a fixed amount of nutrients. The investigators first tested the breakfast among potential recipients for palatability and ease of preparation and then, by public bid, selected two private companies to produce and distribute the meal among five preselected Andean communities.

**PARTICIPATION OF GRASSROOTS ORGANIZATIONS**

The IIN, which implemented the program, continues to manage it through local committees organized by parents and teachers in neighboring communities. Each of these committees, or *nucleos ejecutores*, is responsible for distributing and preparing the meals at the schools. The committees also agree to pay the breakfast producer at the monthly delivery point, an arrangement that not only gives the operators tighter control over the private producer but also eliminates the need for a burdensome and costly bureaucracy. By 1996 the SBP had reached six impoverished Andean regions and distributed meals to > 500 000 schoolchildren daily, at a total cost of US$0.22 per ration, including supervisory activities. The entire program’s budget for the past 4 y was funded by local fiscal resources.

**EVALUATIONS**

Unlike in previous programs, the managers of the SBP recognized at the outset the need to address key questions about the effect of the SBP. This commitment was instrumental in meeting the two criteria for a sound evaluation, ie, the establishment of a control group and a baseline assessment of relevant program endpoints.

An IIN research team working in four schools in the Central Andean town of Matahuasi evaluated the program’s dietary and nutritional effect during its first year of operation. This team also conducted a before-and-after evaluation of a group of children in the city of Cajamarca to assess changes in the prevalence of anemia. Meanwhile, from September through December of that year, a team from the University of California at Davis conducted another investigation in 10 rural schools in the province of Huaraz, 400 km north of Lima. Their objective was to assess the short-term effects of the SBP on diet, school attendance, and psychoeducational performance.

Because participating schools were phased into the program throughout the school year, both research teams were able to randomly assign each school to either immediate (program group) or delayed (control group) enrollment. Coincidentally, the evaluations in Matahuasi and Huaraz documented a significant dietary

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**TABLE 1**

<table>
<thead>
<tr>
<th>Nutrients</th>
<th>Beverage</th>
<th>Solid</th>
<th>Total</th>
<th>Percentage of requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy (kJ)</td>
<td>200</td>
<td>400</td>
<td>600</td>
<td>33%</td>
</tr>
<tr>
<td>Protein (g)</td>
<td>6.5</td>
<td>13.0</td>
<td>19.5</td>
<td>70%</td>
</tr>
<tr>
<td>Vitamin A (µg)</td>
<td>240</td>
<td>—</td>
<td>240</td>
<td>60%</td>
</tr>
<tr>
<td>Vitamin B-1 (mg)</td>
<td>0.6</td>
<td>—</td>
<td>0.6</td>
<td>60%</td>
</tr>
<tr>
<td>Vitamin B-6 (mg)</td>
<td>0.72</td>
<td>—</td>
<td>0.72</td>
<td>60%</td>
</tr>
<tr>
<td>Vitamin B-12 (mg)</td>
<td>0.84</td>
<td>—</td>
<td>0.84</td>
<td>60%</td>
</tr>
<tr>
<td>Niacin (mg)</td>
<td>7.8</td>
<td>—</td>
<td>7.8</td>
<td>60%</td>
</tr>
<tr>
<td>Folic acid (µg)</td>
<td>60</td>
<td>—</td>
<td>60</td>
<td>60%</td>
</tr>
<tr>
<td>Iron (mg)</td>
<td>7.2</td>
<td>5.0</td>
<td>12.2</td>
<td>100%</td>
</tr>
<tr>
<td>Calcium (mg)</td>
<td>480</td>
<td>—</td>
<td>480</td>
<td>60%</td>
</tr>
<tr>
<td>Phosphorus (mg)</td>
<td>480</td>
<td>—</td>
<td>480</td>
<td>60%</td>
</tr>
<tr>
<td>Zinc (mg)</td>
<td>6.0</td>
<td>—</td>
<td>6.0</td>
<td>60%</td>
</tr>
</tbody>
</table>

1 From reference 8.
2 From reference 9.
3 From reference 10.
4 From reference 11.

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**TABLE 2**

<table>
<thead>
<tr>
<th></th>
<th>Participants</th>
<th>Nonparticipants</th>
<th>Participants</th>
<th>Nonparticipants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg ± SD</td>
<td>(kJ)</td>
<td>(kJ)</td>
<td>(µg)</td>
<td>(µg)</td>
</tr>
<tr>
<td>Energy (kJ)</td>
<td>1894 ± 521</td>
<td>1871 ± 470</td>
<td>2182 ± 699</td>
<td>1731 ± 497</td>
</tr>
<tr>
<td>Protein (g)</td>
<td>48.3 ± 21</td>
<td>44.8 ± 19</td>
<td>56.1 ± 19</td>
<td>43.6 ± 19</td>
</tr>
<tr>
<td>Iron (mg)</td>
<td>13.5 ± 7</td>
<td>12.9 ± 7.4</td>
<td>21.6 ± 6.6</td>
<td>12.5 ± 6</td>
</tr>
</tbody>
</table>

1 x ± SD; n = 58 per group. From reference 8.
2 Significantly different from nonparticipating group, P < 0.001.
improvement for those receiving the program breakfast, which increased intake not only of energy and protein but also of such essential micronutrients as zinc, iron, vitamin A, and iodine. Moreover, both studies found that the observed dietary improvements were not accompanied by food substitution at home (8).

An especially notable improvement was in iron intake, which had initially been well below the children’s daily requirements but jumped above their RDA at both evaluation points, at 2 mo and 7 mo after the program began. In accordance with that finding, the before-and-after evaluation noted a drop in the incidence of anemia from 66% to 14% within 6 mo. Despite the limitations of this one-group design, the finding is encouraging in its support of the dietary evidence. The reversal of iron deficiency anemia under programmatic conditions would be a significant achievement and may require confirmation through further evaluation. In Huaraz, school attendance rates improved substantially, indicating that keeping a child in school is an important incentive for supporting the SBP. The team from the University of California at Davis also observed that, in the short term, nutritionally at-risk children in the program group improved their performance on a vocabulary test (one of four tests given).

We are witnessing the effect of a well-conceptualized, well-documented program that not only ensures dietary and nutritional benefits (Table 2) for its participants but promises to facilitate the educability of poor Andean children, a group plagued by high rates of school withdrawal and grade repetition. The SBP, now in its fourth year of operation, has successfully persuaded government authorities to maintain its funding, largely because of the high-quality feedback available on its effectiveness. In fact, representatives of the three ministries linked to social policy—health, education, and the presidency—attended the presentation of these findings. This collaboration of science and government has proven invaluable for the Peruvian SBP and should set a new standard for the effective management of a social expenditure in an economy driven by human capital as the centerpiece of national development.

FUTURE DIRECTIONS

Experimental and programmatic data offer complementary evidence that the provision of breakfast is vital to a child’s ability to meet the daily demands of school, particularly among poor and nutritionally at-risk children in developing countries. Observations from a Jamaican study (Grantham-McGregor, personal communication, 1997) also indicate that the extra energy provided by breakfast affects the child’s behavior in the classroom, leading to favorable educational outcomes in well-organized schools but disruptive activities in undisciplined ones. Hence, interaction between behavior and educational inputs opens a new field of scientific scrutiny that deserves further attention.

It is clear that school breakfast programs have long-term educational benefits. Longer and more regular school hours may play an important role in increasing a child’s time-on-task at school, an effect described previously in educational literature (12). Moreover, by improving a child’s nutritional status, eg, increasing iron intake, breakfast consumption at school may enhance cognition and improve the child’s educational outlook.

A hypothetical causal model that summarizes the mechanisms described above and depicts how improved nutrition interacts with school efforts to favor educational efficiency in developing countries is provided in Figure 1. Note that, while the solid lines represent well-documented effects, the dotted lines indicate probable effects that require further study for confirmation.

Finally, it would be advisable to generate cost estimates for these programs and balance them against the invaluable benefits in the nutrition, health, and education of children.

REFERENCES