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Cash and In-Kind Transfers in Poor Rural Communities in Mexico Increase Household Fruit, Vegetable, and Micronutrient Consumption but Also Lead to Excess Energy Consumption[1–3]

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Abstract

Conditional transfer programs are increasingly popular, but the impact on household nutrient consumption has not been studied. We evaluated the impact of the *Programa de Apoyo Alimentario* (PAL), a cash and in-kind transfer program, on the energy and nutrient consumption of poor rural households in Mexico. The program has been shown to reduce poverty. Beneficiary households received either a food basket (including micronutrient-fortified milk) or cash. A random sample of 206 rural communities in Southern Mexico was randomly assigned to 1 of 4 groups: a monthly food basket with or without health and nutrition education, a cash transfer with a cost to the government equivalent to the food basket (14 USD/mo) with education, or control. The impact after 14 mo of exposure was estimated in a panel of 5823 households using a double difference regression model with household fixed effects. PAL was associated with increases ($P < 0.01$) in the consumption of total energy (5–9%), energy from fruits and vegetables (24–28%), and energy from animal source foods (24–39%). It also affected iron, zinc, and vitamin A and C consumption ($P < 0.05$). The consumption of energy and all nutrients was greater in the food basket group ($P < 0.05$). Cash and in-kind transfers in populations that are not energy-deficient should be carefully redesigned to ensure that pulling poor families out of poverty leads to improved micronutrient intake but not to increased energy consumption. J. Nutr. 140: 612–617, 2010.

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Introduction

In the past decade, conditional cash transfer programs (CCT)[7] have become an important strategy implemented by developing countries to break the intergenerational transmission of poverty. The objective of these programs is to reduce short-term household vulnerability and to invest in long-term human capital accumulation through interventions in health, nutrition, and education. CCT programs have been shown to have positive impacts on poverty reduction, health, nutrition, and education (1). Approximately 20 countries worldwide currently have CCT programs (2).

The first CCT program, *PROGRESA* (now called *Oportunidades*), started in Mexico's rural areas in 1997 and was expanded to urban areas in 2002. Because of the program's health and education components (3), it is only available in communities with a nearby school and health clinic. As a consequence, a number of poor rural communities without nearby education or health services were excluded from the program. To attend to the needs of these communities, the Mexican government launched a food support program called *Programa de Apoyo Alimentario* (PAL). PAL provides households with a cash or an in-kind transfer. PAL was designed as a conditional program, which means that receiving the benefits would be conditional on attending nutrition and health education sessions, as well as participating in program-related logistic activities.

The impact of CCT programs on household (food) consumption has been studied in Mexico, Honduras, Nicaragua, Colombia, and Brazil (3–8). CCT programs have positive effects on short-term poverty alleviation, total household expenditure, and household food expenditure. They have also been found to have a positive effect on the quality of the household diet, as shown in increased spending on animal-source foods. Studies in Mexico, Nicaragua, and Brazil also found a positive impact

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[3] Supplemental Table 1 is available with the online posting of this paper at jn.nutrition.org.
[7] Abbreviations used: AE, adult equivalent; CCT, conditional cash transfer program; PAL, *Programa de Apoyo Alimentario*.
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on the consumption of fruits and vegetables. The acquisition of energy from animal products was found to increase as a consequence of the program in Mexico, Honduras, and Nicaragua (6,9). A limitation of the available literature is that no study to date, to our knowledge, has documented the impact on household nutrient consumption.

Given the coexistence of a high prevalence of micronutrient deficiencies (e.g. iron deficiency anemia) with a very high prevalence of overweight and obesity in Mexico (10) and many of the countries where CCT programs are implemented, it is important to better understand the nutritional nature of the changes in household food consumption caused by conditional transfer programs. The first objective of this study was to investigate whether the PAL transfer lead to the consumption of healthier household diets. We estimated the program's impact on household energy and macro- and micronutrient consumption. The second objective was to evaluate whether the cash and in-kind transfers had a differential effect on these outcomes.

Participants and Methods

The PAL and its evaluation. The PAL started in 2003 and is targeted to communities that do not receive benefits from other federal food aid programs, have <2500 inhabitants, and have a high level of marginalization. Marginalization is a term used in Mexico for the multidimensional assessment of poverty in a community. It takes into account housing quality (including the percent of households without piped water, sewage, and electricity), income (proportion of household below 2 times the minimum wage), education (including illiteracy), and urbanization (11). Targeting at the community level was not completely as planned, because 37% of the selected communities had a medium rather than a high level of marginalization (12). Households within these communities were eligible if they fell below the "needs" poverty line as defined by the Mexican Ministry of Social Development. This corresponds to an income level sufficient to cover basic needs in food consumption, health, and education (13).

When the program started in 2003, it provided beneficiary households either a cash transfer of 150 Mexican pesos/mo (equivalent to ~14 USD at the time) or a monthly food basket with a cost to the program of 150 pesos. The size of the cash transfer and the amount of food was the same for all households, i.e. no adjustments for family size or composition were made. The value of the food basket at local prices was ~30% higher for consumers than the actual cost to the program (12). The basket contained a number of staple and basic food products and powdered whole milk (*Liconsa*), which was fortified with Zn, Fe, vitamin C, and folate (**Table 1**). The energy and nutrition composition of the fortified milk has been reported elsewhere (14). The composition of the food basket conformed to the Mexican norm for food aid programs (NOM-169-SSA1–1998), which states that food transfers need to provide at least 20% of the recommended daily energy and protein requirements (15). The basket was designed to contribute 450 kcal (1883 kJ)/d per adult in an average-sized household. Households received the transfer once every 2 mo. Beneficiary households were required to attend nutrition and health education sessions and had to participate in program-related logistic activities to receive the benefits. These program conditions, however, were not strictly enforced.

A community, randomized, controlled intervention trial was used to evaluate the impact of the intervention. A random sample of 208 rural communities was drawn from the pool of eligible communities in 8 of the poorest states in the south/eastern region of Mexico (Chiapas, Guerrero, Oaxaca, Quintana Roo, Tabasco, Campeche, Yucatan, and Veracruz). Within each community, a random sample of 33 households was selected (12). The baseline survey was conducted from October 2003 to April 2004. After baseline data collection, the 208 selected communities (6687 households) were randomly assigned to 1 of 4 study groups: food basket without education (52 communities, 1657 households), food basket with education (52 communities, 1680 households), cash transfer with education (53 communities, 1687 communities), or control (51 communities, 1663 households). Treatment allocation was carried out by the Ministry of Social Development. No households had actually begun to receive benefits at the time of the baseline survey. The control communities were put on the waiting list for later incorporation into the program. Of the 208 communities randomly assigned to the 4 study groups after the baseline survey, 2 communities (corresponding to 66 households) refused to participate in the follow-up survey (**Supplemental Table 1**). An additional 802 households were excluded from the analysis because of missing or incomplete data. Full data were thus available for 5823 households (food basket without education: 51 communities, 1447 households; food basket with education: 52 communities, 1500 households; cash transfer with education: 53 communities, 1492 communities; control 50 communities, 1384 households).

The follow-up survey was conducted from October to December 2005 in the same communities and households, thus creating a longitudinal data set. The mean time of exposure to the program was 14 mo (12).

Data collection. Data were collected by experienced fieldworkers who were trained extensively. The training included classroom and field exercises. To avoid potential interviewer bias, fieldworkers were, to the extent possible, unaware of the group assignment. Both at baseline and follow-up, food consumption data were collected as well as socioeconomic data. Household food consumption data were obtained by asking homemakers (generally the mother of the study child) or the person responsible for home food purchases and/or preparations: "In the last 7 d, how many days was …. consumed in this household?" And "In the last 7 d, how much did you consume of ….?" This was asked with respect to 61 most-often–consumed foods in Mexico. Food consumption was defined as the foods used in the household for the preparation of meals irrespective of whether they were purchased, home produced, or received as a gift or as part of the food basket. For foods consumed outside of the house, only expenditure data were collected. Analyses indicated that 90% of the households reported zero expenditure for this item.

In each household, written informed consent for participation was obtained from the mother or the self-identified decision maker. The protocols governing the data collection were approved by the Research, Biosafety and Ethics Commissions of the National Institute of Public Health in Mexico.

Data analysis. Because of their skewed distribution, all dependent variables were log-transformed. The baseline characteristics of the households in the treatment groups were compared.

To assess the impact of PAL on household consumption, we first estimated the program's impact on total energy consumption and energy consumption in 4 food groups: fruits and vegetables, grains and legumes, animal-source foods, and processed foods. The processed foods category included foods such as vegetable oil, alcoholic beverages, soda, chips,

TABLE 1 Composition of the food basket

Food item	Quantity
Powdered fortified (Zn, Fe, vitamin C, folate) milk, *kg*	1.920
Beans, *kg*	2.000
Rice, *kg*	2.000
Corn flour, *kg*	3.000
Soup pasta, *kg*	1.200
Vegetable oil, *L*	1.000
Cookies, *kg*	1.000
Powdered chocolate, *kg*	0.400
Corn starch, *kg*	0.100
Cereal (ready-to-eat), *kg*	0.200
One of these items:	
Sardine/tuna, *kg*	0.240
Dry meat, *kg*	0.100
Lentils, *kg*	0.500

cookies, candy, sugar, coffee, chocolate, and mayonnaise. We also estimated the program's impact on household consumption of protein, fat, a number of micronutrients (heme and nonheme iron, zinc, vitamin C, and retinol equivalents), and fiber. Energy and nutrient consumption was calculated by multiplying the reported quantities for each food item by its respective nutrient composition, which was obtained from food composition tables compiled and adapted for Mexican foods by the National Institute of Public Health, taking into account the edible fraction (16). Energy and nutrient consumption were calculated per day per adult equivalent (AE). AE were used to allow the comparability of households of different sizes and demographic composition. The AE was calculated by dividing each individual's age- and sex-specific recommended energy intake by the average recommended energy intake for an adult (2694 kcal or 11,271 kJ) (17). Body weight was not taken into account, because it was not available for all household members. The number of AE for the household was computed as the sum of all of the individual AE. The AE were calculated based on the household roster data. Additional analyses were conducted by adjusting the analyses for visitors and meals consumed outside the home. Because these results were not noticeably different, the results based on the household roster are reported.

The analyses were restricted to households within sample percentiles 2.5 and 97.5 of each of the outcome variables to minimize the effect of extreme values. To estimate the impact of the program, we used a double difference model, an analytic approach commonly used in impact evaluation studies [e.g. (18–20)]. The following model was estimated:

$$\begin{aligned}\log(consumption)_{(t=0,1)} = {} & \alpha_0 + \alpha_1 \cdot time + \alpha_2 \cdot treatment \\ & + \alpha_3 \cdot time \times treatment + \alpha_4 \cdot household \\ & + \alpha_5 \cdot state \times time + \alpha_6 \cdot month \\ & + \alpha_7 \cdot \log(adult\ equivalent) + \varepsilon\end{aligned}$$

where time is baseline or follow-up, treatment is the type of treatment received, household is a household fixed effect, state x time is the interaction term between state in which the household is located, and time, month is the month in which the data were collected and adult equivalent is the number of AE in the household.

The coefficient α_3 represents the estimated treatment effect of the program as the percent change with respect to the baseline consumption. By using household fixed effects, the model controls for unobserved household characteristics that did not change between baseline and follow-up. Additionally, the fixed effects control for the possibility of differential changes in prices (i.e. inflation) across communities. The state x time interaction was added to control for possible state-specific changes over time that could have affected the results (such as changes in policies, prices, etc.). The month of data collection was included to adjust for the possible effect of seasonality on consumption. We included adult equivalent to control for changes in the number of AE between baseline and follow-up. After estimating the model, the impact coefficient (α_3) was multiplied by the median consumption at baseline to calculate the absolute change in the outcome variables. We conducted intent-to-treat analyses. All models were estimated using Stata (StataCorp, version 9.2).

Based on preliminary analyses and program information, we decided to merge the 2 food basket groups. The education component in the group that was supposed to receive education was delivered irregularly and was in general of low quality (21). Second, a number of communities in the food basket group without education set up education sessions themselves when they found out about the program's education component (22). Finally, the program impact on consumption between both food basket groups did not significantly differ (results not shown).

Results

Full data were available for 5823 households or 87.0% of those surveyed at baseline (Supplemental Table 1). This percentage was slightly lower in the control group (83.1%) than in the treatment groups (88.3%).

At baseline, ~40% of the household heads had completed primary school. Families lived in homes with an average of fewer than 3 rooms. The mean number of AE per household was ~4. The value of mean household per AE consumption at baseline was ~571 pesos/mo, 61% of which was spent on food (**Table 2**). The major sources of energy consumption were cereals and legumes. Only a very small fraction (1%) of total iron consumption was heme iron. Control and treatments groups did not differ at baseline, except for vitamin C, where the food

TABLE 2 Baseline characteristics of households in the control, food basket, and cash groups[1]

Characteristic	Control	Food basket	Cash
n	1384	2947	1492
Per AE household consumption (monetary value, monthly)[2]			
Total, *pesos*	571.3 ± 352.3	541.3 ± 345.4	551.6 ± 336.5
Nonfood consumption, *pesos*	217.9 ± 198.0	206.9 ± 195.5	216.8 ± 196.2
Food consumption, *pesos*	347.7 ± 204.6	329.9 ± 194.5	330.4 ± 190.2
Per AE household nutrient consumption (daily)[2]			
Total energy,[3] *kcal*	2702.0 ± 1140.3	2741.0 ± 1162.4	2776.8 ± 1172.2
Energy from fruits and vegetables	81.8 ± 73.6	72.6 ± 67.9	79.7 ± 70.5
Energy from cereals and legumes	1625.3 ± 838.9	1679.6 ± 900	1723.7 ± 916.5
Energy from animal source food	278.1 ± 229.6	272.4 ± 228.6	261.7 ± 214.0
Energy from processed food	655.9 ± 356.6	658.6 ± 348.7	664.0 ± 344.1
Carbohydrates, *g*	450.3 ± 200.3	461.3 ± 210.3	466.7 ± 215.3
Proteins, *g*	70.4 ± 31.6	70.1 ± 31.4	71.7 ± 32.7
Fat, *g*	73.0 ± 36.7	72.3 ± 35.5	74.7 ± 35.3
Fiber, *g*	44.0 ± 21.3	45.1 ± 22.4	46.2 ± 22.9
Total iron, *mg*	19.5 ± 9.9	20.3 ± 10.3	20.6 ± 10.8
Heme iron, *mg*	0.2 ± 0.2	0.2 ± 0.2	0.2 ± 0.2
Zinc, *mg*	11.0 ± 5.4	11.3 ± 5.6	11.4 ± 5.8
Vitamin A, *retinol equivalents*	410.4 ± 334.4	384.5 ± 326.0	403.5 ± 346.4
Vitamin C, *mg*	85.8 ± 76.4[a]	73.6 ± 68.4[a]	81.5 ± 70.5

[1] Values are means ± SD. [a] Treatment groups differ, $P < 0.05$.
[2] Extreme observations (bottom and top 2.5% tails) excluded.
[3] 1 kcal = 4.184kJ.

basket group had lower consumption than the control group ($P < 0.05$). No significant differences were found between treatment groups.

PAL increased energy consumption ($P < 0.01$; **Table 3**) in both treatment groups. The largest relative changes were found in energy consumption from fruits and vegetables and from animal-source foods. Compared with the cash group, the effect in the food basket group was higher for total energy, energy from animal-source foods, and energy from cereals and legumes ($P < 0.05$).

PAL increased the consumption of all macro- and micronutrients ($P < 0.05$; Table 3) with the exception of heme iron in the cash group. The effect on total iron consumption was almost entirely attributable to the increase in nonheme iron. The largest program impact was found for the consumption of vitamins A and C. Effects were greater in the food basket group than in the cash group ($P < 0.05$) except for fiber, which did not differ.

Discussion

Using a randomized controlled trial, we showed that the impact of the PAL on household diet was not unequivocally healthy. A positive effect was found on fruit and vegetable consumption, which was also reflected in the increased consumption of vitamins A and C and fiber. Fruit and vegetable consumption has been associated with lowered risk of obesity and cardiovascular disease and might lower the risk of diabetes (23). The program also increased the consumption of iron and zinc. The percentage increase in most nutrients was found to be greater than the increase in energy consumption, pointing to an increase in the nutrient density of the household diet. The significant increase in household energy consumption, however, is of concern. With respect to the second study objective, we found that the food basket led to a significantly greater impact on energy and nutrient consumption than the cash transfer. The large difference between groups in the impact on energy consumption from cereals and legumes was most likely due to the fact that the food basket contained relatively large quantities of grains and legumes.

The proportionally greater impact on energy consumption from animal-source foods and fruits and vegetables is consistent with other conditional transfer programs in Mexico, Nicaragua, and Colombia. Overall energy consumption increased by 3.6% in *Oportunidades*, the Mexican program, and greater effects were found for energy from fruits and vegetables (12.3%) and animal-source foods (12.5%) (9). In Nicaragua, the impact on total energy consumption was not significant ($P < 0.10$); the impact on energy from fruits and vegetables and animal foods was 52.5 and 62%, respectively (9). In Colombia, food expenditure increased by 15.7% and expenditure on animal foods by 20%; no significant impact on fruit and vegetable expenditure was found (5).

We are unaware of any randomized trial that has evaluated the impact of cash and in-kind transfers on household energy and nutrient consumption. A potential source of selection bias are the households excluded from the analyses due to missing values or because they did not participate in the follow-up (13% of the original sample). Households excluded from the analyses tended to live in smaller houses than those included (2.48 vs. 2.77 rooms; $P < 0.05$). Nutrient consumption at baseline was higher in excluded households, but differed ($P < 0.05$) for <5% of the variables. We believe that is unlikely that our results suffer from selection bias.

Another potential limitation of the study is the use of a household consumption module for our nutrition analyses (24). An obvious disadvantage of the consumption module is that it relies on a longer recall period (7 d) than dietary assessment techniques such as a 24-h recall. To help the respondents, however, they were first asked about the number of days each food was consumed. We also used an extensive list of foods to assist the respondents' memory. No detailed data were collected for foods consumed outside the household, but only 10% of households reported expenditures in this category. It is thus unlikely that this omission would have biased our results. Notwithstanding these caveats, baseline per AE consumption was in the expected range for all nutrients. Additionally, it must be noted that the double difference approach

TABLE 3 Impact of the PAL on household per daily energy and nutrition consumption

Outcome	All foods	
	Food baket[1]	Cash[1]
Energy		
Total, *kcal*[2]	0.091 ± 0.017**[a] [226.7]	0.050 ± 0.019*[a] [126.9]
From fruits and vegetables	0.278 ± 0.041** [14.2]	0.236 ± 0.048** [13.8]
From cereals and legumes	0.101 ± 0.021**[a] [146.7]	0.042 ± 0.025[a] [63.6]
From animal source food	0.387 ± 0.039**[a] [79.9]	0.240 ± 0.045**[a] [50.0]
From processed food	0.067 ± 0.021** [39.8]	0.052 ± 0.024* [31.5]
Nutrients		
Carbohydrates, *g*	0.087 ± 0.018** [36.1]	0.057 ± 0.021** [23.9]
Proteins, *g*	0.134 ± 0.018**[a] [8.6]	0.076 ± 0.021**[a] [4.8]
Total fat, *g*	0.152 ± 0.019**[a] [9.9]	0.074 ± 0.022**[a] [5.0]
Total fiber, *g*	0.082 ± 0.019** [3.3]	0.054 ± 0.023* [2.2]
Total iron, *mg*	0.187 ± 0.020**[a] [3.3]	0.055 ± 0.023*[a] [1.0]
Heme iron	0.217 ± 0.053**[a] [0.0]	0.084 ± 0.062[a] [0.0]
Zinc, *mg*	0.221 ± 0.02**[a] [2.2]	0.092 ± 0.023**[a] [0.9]
Vitamin A, *retinol equivalents*	0.418 ± 0.032**[a] [120.9]	0.217 ± 0.038**[a] [64.0]
Vitamin C, *mg*	0.528 ± 0.037**[a] [27.5]	0.309 ± 0.043**[a] [18.9]

[1] Values are regression coefficients ± SE [absolute change per day per AE], n = 5412 to 5790. The impact was estimated using a double difference household fixed effect model, controlling for state × time interaction, survey month, and the number of AE in the household. Asterisks indicate different from control households: *$P < 0.05$, **$P < 0.01$. [a] Treatment groups differ, $P < 0.05$.

[2] 1 kcal = 4.184 kJ.

cancelled out any measurement error that was constant over time (25).

The use of household consumption, which does not provide information on how the additional nutrients were distributed within the household, could be considered a limitation of this study. Analysis of the 24-h recall data collected in children 1–4 y of age and mothers of under-fives showed that the proportional increase in the consumption of iron and Zn was similar to the increase found at the household level (12). There is thus no evidence of intra-household discrimination. The anthropometric data collected in the context of this program showed no indication of energy deficiency in these communities. The mean weight-for-height Z-score in children <5 y of age was 0.40 SD; the prevalence of overweight and obesity (BMI >25 kg/m^2) in adult women was 63.2%. The large increase in household energy consumption should thus be considered as negative for both groups. Studies are currently underway to explore to what extent the PAL led to excess energy intake of individuals.

The randomized design and the use of longitudinal data are important strengths of this study. The difference-in-difference approach we used controls for the effects of unobserved time-invariant differences between households in the different groups. The household fixed effects in the model provided a control for differential inflation (and other changes) between communities and treatment groups over time.

The food basket led to a significantly greater impact on energy and nutrient consumption than the cash transfer. One possible reason is that the local value of the food basket was an estimated 30% higher than the cost to the program and thus to the value of the cash transfer. Additionally, the larger impact in the cash group is consistent with a large body of empirical evidence that in-kind transfers increase food consumption by more than receiving the equivalent amount in cash. Both nonexperimental [e.g. (26)] and experimental studies [e.g. (27)] have shown that the marginal propensity to purchase food out of cash income is significantly lower than out of food.

A key question raised by our findings is why households increased energy consumption when the diet at baseline was not deficient in energy. This finding is unlikely to be due to reporting bias, because there is no reason to think that households in the treatment group would have systematically overreported consumption compared with the control group. Based on economic theory, one would expect households who have covered their energy needs to substitute quality and variety for quantity and energy (28). A number of nutrition studies conducted in developed countries, however, have shown that larger portions served or large food quantities available increase nonvoluntary consumption (29), even if the served food did not taste good (30). Food consumption is not regulated solely by physiological needs; food availability, as well as environmental and social cues, have a powerful influence on the amount of food consumed (29,31,32). It has been postulated that eating is an automatic behavior more influenced by environmental cues, such as food availability and visibility or the ease of obtaining foods, than by self-regulation of intake (33). These findings have important implications for (food) transfer programs that are built on the assumption that beneficiaries will consume the food they need and use the leftover resources for nonfood consumption or savings. Given the popularity of (conditional) transfer programs, our results call for further exploration of the mechanism underlying the preference for energy. Future studies should explore the psychological, physiological, and cultural determinants of households' choice for quantity vs. quality.

Skoufias et al. (34) showed that the PAL program reduced poverty. We found that this program increased the consumption of fruits and vegetables and animal-source foods, the nutrient density of the household diet, and the consumption of fiber, zinc, iron, and vitamins A and C. While having these positive effects, it also significantly increased household energy consumption. This is an alarming finding given that 60% of adult women were overweight or obese at baseline; the estimated national prevalence is 72% of women and 67% of men (10). Although programs aimed at alleviating poverty are necessary in Mexico, our findings indicate the need to use extreme caution when providing households with cash or food transfers. These programs should not be implemented without an effective behavior change communication component. This component would help households understand the importance of healthy micronutrient-dense diets and should finally result in changed household consumption. Specific attention would need to be paid to the risk of increasing the consumption of energy-dense foods as a result of the intervention.

In designing the food basket, the PAL program complied with the Mexican norm for food aid (15). Our results would support a call for revision of this Mexican norm. It should be based on micronutrient rather macronutrient requirements. In redesigning the intervention, the program should also evaluate the appropriateness of the use of the *Liconsa* milk. In additional analyses, we removed the milk from the household food consumption data. Even though a formal test of the impact of *Liconsa* would require a study comparing households receiving a food basket with and without the fortified milk, these analyses provide some interesting results. We found that most of the differences between groups disappeared when *Liconsa* was removed from the analyses. This suggests that *Liconsa* may contribute significantly to the impact on both energy and micronutrient consumption. The impact on the consumption of iron and Zn in the food basket group appeared to be almost entirely attributable to the consumption of *Liconsa*. Fortified whole milk may thus not be the best vehicle to improve micronutrient intake in this population. The use of low-fat milk (which was started in 2008 by the *Liconsa* program) or the use of micronutrient supplements not containing energy, such as micronutrient sprinkles, should be considered as alternatives in this program. The decision about the use of *Liconsa* also needs to take into account the nutritional benefits of the high quality protein in the milk and the well-documented positive effect on child linear growth (35).

The presented findings are important for the PAL program but are also relevant for other transfer programs given that many of these are implemented in countries with nutrition problems similar to those in Mexico. These programs should be carefully reviewed to make sure that raising people out of poverty is not at the expense of increasing their energy consumption and hence leading to overweight and obesity. The available evidence from CCT programs suggests that these programs have a positive impact on household diet. Our analyses indicate that the effect is not unequivocally healthy. This highlights the importance of not only evaluating these programs with respect to the monetary or energy value of consumption but also in terms of nutrient composition.

Acknowledgments

T.G. designed the research; T.G. and S.R. conducted the research; J.L. and P.G. analyzed the data and wrote the paper. J.L. had primary responsibility for final content. All authors read and approved the final manuscript.

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