9 Alternatives to Consumer-Oriented Food Subsidies for Achieving Nutritional Objectives

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Direct Nutrition Interventions versus Food Price Subsidies

Malnutrition is a problem associated with poverty. Although all poor people are at risk of having an inadequate food intake, it is usually the maternal and preschooler population that are the most nutritionally vulnerable. As a result, a number of interventions targeted directly on pregnant women and children have been implemented. Examples of approaches aimed at specific individuals include supplementary feeding programs, formulated foods or weaning-food projects, and nutrition education programs.

However, several recent reviews have indicated that the effectiveness of programs focused on mothers and preschoolers has often been less than expected (Kennedy and Pinstrup-Andersen, 1982; Beaton and Ghassemi, 1982). Even where these interventions have had a significant effect, the observed benefit is often achieved at a relatively high cost (Beaton and Ghassemi, 1982).

A more cost-effective alternative to these direct interventions may be a family-oriented program such as a consumer price subsidy. Berg (1981) concludes that, even if policymakers are interested only in reaching the preschooler, it could be more cost effective to reach them through programs affecting malnourished households as a whole. Beaton and Ghassemi (1982), in their review of supplementary feeding programs, come to a similar conclusion. In many countries, malnourished children cannot be reached effectively in any way that does not include the family. It is artificial to look at the individual household member in isolation from the family. By augmenting the food intake of the family, consumption by the child may in turn be increased.

Therefore, although the main purpose of this chapter is to look at alternatives to food subsidies, a useful starting point would be to establish the range of expected effects that subsidies can have on family and pre-

schooler caloric consumption and child growth. In order to do this, cost-effectiveness analyses will be used to compare different types of subsidies and other potential intervention strategies.

Comparison of Two Subsidy Schemes

A comparative approach is difficult because data are limited and studies have been conducted with varying degrees of methodological rigor. Three basic criteria were used to select studies for this comparative analysis. First, the research design had to include some type of comparison or control group. Second, cost data and a description of the intervention had to be included. Lastly, given the specific interest in preschoolers and pregnant and lactating women, information on these target individuals within the family had to be provided.

Because studies were selected on these three criteria, some potentially effective interventions were eliminated. For example, no food-for-work study that is currently available had information below the household level.[1] In fact, it was difficult to identify a food-for-work evaluation where any nutritional parameters were included in the study.

Previous chapters report that subsidy schemes can be effective in transferring income to the poor and can improve consumption. The evidence also suggests that, because broad-based subsidy schemes are expensive and entail large leakages to households where no calorie deficit exists, some form of targeting should be used in subsidy programs. Therefore, only targeted subsidy programs are considered here.

Two subsidy schemes—one in Mexico City and a pilot project in the Philippines—were chosen for this comparison. Both attempt to target benefits to low-income families with preschoolers or pregnant and lactating women. (For a more detailed description of the interventions, see Overholt et al., 1981; Garcia and Pinstrup-Andersen, 1987; chapter 14). Both projects attempt to target geographically. In Mexico, the program is targeted based on income and the presence of children under twelve years old or pregnant women in the household. Distribution centers for subsidized milk are located in the lowest income areas of the city.

The Philippine project targets rice and oil subsidies to villages where malnutrition among preschoolers is prevalent. The Philippine subsidy is an experiment and as such was deliberately targeted to the most nutritionally needy areas of the country. Selection of the sample villages was based on strict screening criteria: only those villages where 25 percent of preschoolers have moderate or severe malnutrition, based on weight for age,

1. Shubh Kumar and Raisuddin Ahmed of IFPRI are currently working with colleagues in Bangladesh on an evaluation of food-for-work projects, which will provide this type of information.

were included. Thus whereas the national average for moderate and severe preschooler malnutrition is 17.0 percent, the prevalence rates for the sample villages is 31.6 percent.

The data in table 9.1 indicate that study families in the two programs are similar in household size and number of preschoolers. Not surprisingly, however, the Philippine households are at higher nutritional risk; more of the households are calorically deficient, and there is a higher prevalence of preschooler malnutrition compared to Mexico City.

Although both subsidy programs are targeted to high-risk families, the household targeting was done with the particular intent of reaching the child. Therefore, a major interest in examining these two programs is to determine the potential of these types of schemes for improving nutritional status in children. Table 9.2 compares the cost-effectiveness of the two programs.[2] The cost per recipient is substantially lower in the Philippine project. However, given that in these programs the preschooler can be reached only through the family, the more appropriate measure is the cost per recipient family. In subsidy programs, it is only by delivering services to the family that the programs will reach the preschooler.

The annual cost per recipient family is higher in the Mexican program. In addition, the effectiveness of the programs in improving preschooler nutritional status is very different. There was no significant decrease in the prevalence of moderate and severe malnutrition in participating children in Mexico. However, based on preliminary findings from the pilot project, preschoolers from the subsidy families in the Philippines showed an 8.47 percent decrease in malnutrition compared to children in a control group who did not receive the subsidy (Garcia and Pinstrup-Andersen, 1987).

These disparate results are not surprising and are primarily due to two factors. First, the children in Mexico City are on average only mildly malnourished. One would not expect to see an average growth response based on weight for age in mildly malnourished children. The growth response of children to supplemental calories will be greatest in those who are the most malnourished; additional calories provided to the mildly malnourished are most likely being utilized for functions other than growth, such as increased activity (Beaton and Ghassemi, 1982). This theory is consistent with earlier work on the Mexican subsidy (Kennedy, 1983), which showed that, although there were increments in the family's caloric intake, a portion of which was captured by the child, this increment did not translate into a significant increase in growth.

Second, the methodological approaches of the two studies differ. The Philippine project was able to collect baseline data on nutritional status for

2. Throughout this chapter, all costs have been converted into 1982 U.S. dollars.

TABLE 9.1 Comparison of food subsidy programs, Mexico and the Philippines

Item	Mexico	Philippines
Average size of family	6.50	6.1
Average number of preschoolers per family	1.95	2.1
Food subsidized	Milk	Rice and oil
Food costs as a percent of total program cost	74.00	86.0
Percent caloric adequacy of family	95.10	66.4
Percent of moderate and severe malnutrition	4.50	31.6

SOURCES: Kennedy, 1983, and Overholt et al., 1981, for Mexico; chapter 14 for the Philippines.

TABLE 9.2 Cost comparison of food subsidy programs, Mexico and the Philippines

Item	Mexico	Philippines
Annual cost per recipient (U.S. $)	38.16	8.90
Annual cost per recipient family (U.S. $)	95.40[a]	54.25[b]
Percent of decrease in prevalence of moderate and severe malnutrition[c]	0.00	8.47
Cost per child removed from moderate or severe malnutrition (U.S. $)	[d]	331.00[e]

SOURCES: For Mexico, Overholt et al., 1981; for the Philippines, chapter 14.

[a]Based on 2.5 recipients per family.

[b]Based on a family size of 6.1 members.

[c]Defined as weight for age less than 75 percent of standard.

[d]Does not appear possible with program as currently operated.

[e]Based on comparison of the reduction in the number of children in control and treatment groups removed from second- and third-degree malnutrition.

both the program participants and comparison children prior to the implementation of the pilot subsidy. Because the Mexican subsidy was an established program, information on participants was available only after they had already received program benefits. The inability to show that the milk subsidy program is improving preschoolers' growth in Mexico may be because the group of children who received the subsidy is not comparable to the group who did not. The preschoolers from subsidy households may have been at greater nutritional risk. The Philippine project was effective in decreasing the prevalence of malnutrition in preschoolers. These data suggest that a subsidy that is properly targeted to nutritionally needy families can be effective in improving preschoolers' nutritional status. The next step is to determine if alternative intervention strategies are more effective in achieving the same end.

Supplementation Schemes and Integrated Health and Nutrition Programs

Supplementary feeding programs for young children and pregnant or lactating women are common and popular in many developing countries. Supplementation programs typically provide rations of 200 to 400 calories through noncommercial channels to pregnant and lactating women and to preschoolers. Cost data from supplementation schemes in five countries were used to assess the potential of these programs as alternatives to targeted subsidies. Table 9.3 compares the five programs. In all five areas, energy intake was low, ranging from 59 to 75 percent of caloric requirements. The requirement used for preschoolers is 1,360 calories per day. The calories provided in the supplement vary widely from 298 to 737 calories, which if totally consumed would fill from 67.0 to 88.2 percent of the estimated calorie gap.

Table 9.4 presents data on the annual cost per child in each of the five programs. The variation in the costs per recipient are in large part a reflection of the size of the food package and the types of food distributed. Costa Rica, with the largest caloric supplement and most expensive foods, has the highest cost per child. The more important indicators are shown in column 2. The cost of delivering services to each malnourished child is very high in Colombia, the Dominican Republic, and Costa Rica. This is because the prevalence of malnourished children is low in the study population.[3] In countries with a high number of malnourished children, like India and Pakistan, cost per malnourished child is not much different from the annual cost per recipient.

In order to compare these data to the subsidy results shown in table 9.2, an attempt was made to determine how much it costs to remove a child from moderate or severe malnutrition. However, the five programs as they now operate do not represent a viable way of making this evaluation, because the programs fail to decrease the prevalence of moderate and severe malnutrition.

Two reasons account for this disappointing result. First, the magnitude of the nutrition problem is low in three of the five countries. Thus the results are similar to those in Mexico City. If the population served is not very malnourished, it is unlikely that a significant growth effect or change in caloric intake will be detected. Indicators of the effects of the program other than growth may be more appropriate. Only in India and Pakistan are major growth deficits apparent. Even in the countries where growth retardation is prevalent, the supplement compensates for only part of

3. In Anderson et al., 1981, below 90 percent of weight for age is used as cutoff point for identifying the malnourished. If the more conservative estimate of less than 75 percent of weight for age were used (as in tables 9.3 and 9.4), prevalence rates would be even lower and cost per malnourished child higher.

TABLE 9.3 Comparison of supplementary feeding programs, selected countries

Country	Program Type	Weight for Age as Percent of Standard	Change Due to Program	Height for Age as Percent of Standard	Change Due to Program
Colombia	Take home	88.8	−1.7	93.4	−0.8
Dominican Republic	Take home	92.2	−0.3	96.1	0.0
Pakistan	Take home	79.4	+0.1	93.1	−0.3
Costa Rica	On site	93.4	−3.6	96.5	0.0
India	On site	72.9	+1.6	89.7	+1.0

SOURCES: Data from Anderson et al., 1981; Beaton and Ghassemi, 1982.

[a]To determine the percent of the calorie gap filled by the supplement, calorie intake was divided by the calorie gap and multiplied by the percentage of months when food supplement was available and by the percentage of participants who ate.

TABLE 9.4 Costs of supplementary feeding programs, selected countries (U.S. dollars)

Country	Annual Cost per Child	Annual Cost per Malnourished Child Served
Colombia	42.08	442.90
Dominican Republic	24.48	119.37
Pakistan	39.97	48.74[a]
Costa Rica	160.72	493.00
India	24.51[b]	40.70

SOURCE: Data from Anderson et al., 1981, updated to 1982 dollars.

NOTE: Cost per child removed from moderate or severe malnutrition cannot be evaluated on the basis of results.

[a]Take home, only.

[b]Average cost of on-site and take-home supplementary feedings.

the energy gap—6.6 percent in Pakistan and 28.2 percent in India. This was due largely to infrequent participation by children in the feeding programs.

Supplementary feeding programs have the potential to improve consumption and nutritional status, but the actual results have been discouraging. The most effective supplementation schemes appear to be ones with a strong tie to health care. Integrated health and nutrition (IHN) interventions are projects that provide a mix of health care, nutrition, family planning, and water and sanitation. Although the nutrition component varies, it most typically includes a combination of food, nutrition education, and

Average Calorie Intake	Average Calorie Gap	Calories in Supplement	Increase in Calorie Intake	Percent of Calorie Gap Filled by Supplement[a]
978	382	305	165	21.6
877	483	337	48	6.0
1,004	356	298	131	6.6
1,033	327	737	462	88.2
811	549	340	160	28.2

growth monitoring. Not every individual receives all services; there is a selective use of program components based on individual need.

The Narangwal and Tamil Nadu projects in India are two examples of programs that provide nutrition services as part of a larger intervention. Although supplemental food is available, not all children participate. Very strict growth velocity criteria are used to identify children under thirty-six months of age needing food. In Tamil Nadu, about one in three of the children weighed actually received food. Similarly, in Narangwal, although food was available for all children, malnourished preschoolers were particularly encouraged to attend the feeding centers. For pregnant participants in Narangwal, only those women who were underweight at time of conception were eligible for the food supplement.

The relevant costs for Tamil Nadu and Narangwal are shown in table 9.5. The costs per recipient in Tamil Nadu are lower than the per-child costs of supplemental feeding. The IHN costs per family are lower than in the subsidy schemes. In addition, the cost of removing a child from malnutrition is substantially less in Tamil Nadu than in the Philippines. This may seem surprising given that one would expect that, as the intensity of services provided increases (as in an IHN project), the cost per recipient would also increase. However, in the Tamil Nadu project, there is a selective distribution of food. Because food is the most expensive component, this decreases dramatically the cost per recipient. The annual cost per child decreased in Tamil Nadu from twelve to eight dollars (U.S.), while the cost per child fed increased from twenty-one to thirty-eight dollars, as fewer children required rehabilitative feeding (World Bank, 1984a).

It would appear that selective use of supplemental feeding in an individually targeted program can be cost effective. However, the relative payoffs of various service components may differ depending on the age of the recipient. Table 9.6 shows data on the cost effectiveness of health and nu-

TABLE 9.5 Costs of two integrated health and nutrition projects: Tamil Nadu and Narangwal, India (U.S. dollars)

Item	Tamil Nadu	Narangwal
Annual cost per recipient	20.76[a]	49.91
Annual cost per family	20.76[b]	49.91
Cost per child removed from moderate or severe malnutrition	51.00	[c]

SOURCES: For Tamil Nadu, World Bank, 1984a; for Narangwal, Kielmann, Taylor, and Parker, 1978.

[a]Cost for each child fed; cost for a child who is only weighed and screened is 12.34.
[b]Assumes an average of one participant per family.
[c]Not possible to determine from the data reported.

TABLE 9.6 Mortality rates of Narangwal children by experimental groups

		Program Types		
Number of Children	Control Villages[a]	Nutrition Supplementation	Medical Care	Nutrition and Medical Care
Births	805	352	343	654
Number of Children 1-3 years old	1,398	634	635	1,285
Mortality Rate				
Perinatal[b]	104	61	81	63
Neonatal[c]	78	46	47	47
Postneonatal[c]	51	43	23	34
Infant	129	89	70	81
1-3 years old[d]	19	10	11	13

SOURCE: Kielmann, Taylor, and Parker, 1978. Reprinted by permission of American Society for Clinical Nutrition.

[a]Includes four villages of a parallel population study.
[b]Per 1,000 live births and stillbirths.
[c]Per 1,000 live births.
[d]Per 1,000 children 1 to 3 years old.

trition components in decreasing mortality.[4] Prenatal supplementation, either alone or in combination with medical care, was the most cost-effective means of decreasing perinatal mortality. Medical care was most effective in reducing infant mortality, and nutrition or health care were equally effective in decreasing mortality in children one to three years old. In all cases, mortality was higher in the control villages.

4. Perinatal mortality is defined in this study as stillbirths and deaths during the first 7 days. Neonatal mortality is death during the first 28 days. Postneonatal mortality is death from 29 to 364 days. Infant mortality is a combination of neonatal and postneonatal mortality.

These Tamil Nadu and Narangwal programs have several features in common. First, there is a strong emphasis on targeting to nutritionally vulnerable individuals. The programs are aimed at pregnant and lactating women and children under three. In Tamil Nadu, India, children under three years old are screened further to identify the malnourished, and only these children receive the food supplement (World Bank, 1984a). Once the children's nutritional status has improved to a certain level, the supplementation is stopped. Critics of this approach have argued that by using the attainment of adequate growth as the exit criterion, mothers will deliberately keep the child undernourished in order to stay in the program. There is no evidence to suggest this has happened in the Tamil Nadu project.

The rationale behind the prudent use of the caloric supplements is that not everyone needs the additional foods. An inadequate energy intake may or may not be the basis of the nutrition problem. Given that the major cost in most interventions is the food, the selective use of supplementation will minimize the cost per recipient without jeopardizing the nutritional effectiveness. The results of both the Tamil Nadu and Narangwal projects demonstrate that this can be done successfully.

The "food-as-medicine" approach works best when there is a need for immediate remediation of moderate and severe malnutrition. Preschoolers with severe weight deficits have a mortality risk approximately seventeen times higher than normal-weight children (Kielmann, Taylor, and Parker, 1978).[5] The distinction sometimes made between short-run versus long-run strategies is a moot point for these children, for whom there is often no long term. In order to alleviate severe preschool malnutrition, the IHN approach usually makes more sense than a subsidy transfer to the household. In addition, IHN projects also can be effective in preventing nutrition-related problems (Kennedy and Pinstrup-Andersen, 1982).

However, what happens to a young child when he or she is terminated from one of these highly targeted interventions? If the precipitating cause of the child's weight deficit was inadequate food within the home, the preschooler's malnutrition is likely to recur. In this situation, subsidy schemes targeted to food-deficit households will complement the IHN program. The therapeutic focus of the IHN program will be balanced by the preventive emphasis of family-targeted subsidies.

However, malnourished children are sometimes found in households where food supplies are adequate. In these cases, subsidies are not the answer. A combined growth-monitoring and nutrition education program may be effective. Growth monitoring in Indonesian children was shown to

5. For moderately malnourished children, the mortality rate is six times higher than for normal-weight children.

significantly improve child growth even when food was not distributed (Rohde, Ismail, and Sutrisno, 1975).

Conclusions

A variety of ways exist to improve consumption and nutritional status. The particular policy instrument chosen should be dictated in large part by the nature of the malnutrition problem. In this section three types of interventions—subsidies, supplementary feeding, and integrated health nutrition programs—are looked at as a means of alleviating preschooler malnutrition. Although the issues that emerged from the comparative analyses should not be taken as hard and fast guidelines, they can be used to draw conclusions about factors that influence program effectiveness.

Geographic targeting as a means to reach malnourished households can work if a program is able to identify an area with a high proportion of calorically deficient households. The two subsidy schemes that have been used as case studies in this chapter are geographically targeted to households. The results, however, differ. Geographical targeting worked well in the Philippines because the treatment villages had a high prevalence of food-deficit families and malnutrition among preschoolers. The targeting to low-income areas in Mexico City was less effective in achieving the same result, mainly because the overall prevalence of growth retardation was low. In the Philippines, one in three children was less than 75 percent of normal weight for age, whereas in Mexico City it was only one in twenty. In order to reach the most nutritionally needy preschoolers in Mexico City, a more extensive selection procedure would be needed. By adopting a more sophisticated certification system, the costs per recipient would increase, but because there would be fewer participants, the total program costs could decrease. The data from Tamil Nadu point this out (World Bank, 1984a). As preschooler malnutrition decreased in the project area, the projected cost per child fed increased from U.S. $20.76 to U.S. $37.82, but total program costs decreased, because significantly fewer children needed food.

In Mexico City in 1977, there were approximately 250,000 subsidy recipients. If 5 percent of these participants are the intended target audience for the program (table 9.1), approximately 12,500 people need to be served. Even if the costs per recipient double because of the additional screening procedures, total costs of the program would still decrease by a factor of ten. Alternatively, the program could serve a greater number of the most nutritionally vulnerable at the same level of expenditure.

One point is worth repeating. In the analyses, growth is used as an indicator of a program's effectiveness, but a growth response is unlikely in mildly malnourished children; this is probably true regardless of what type

of intervention is used. For example, preschool feeding centers in which only 15 percent of the new entrants were malnourished were found to have no effect on growth (Anderson et al., 1981). Other indicators of a program's effectiveness may be more appropriate. As preschoolers approach normal growth, they use a higher proportion of incremental calories to increase activity rather than to increase growth (Beaton, 1982). Activity patterns may be a better yardstick for evaluating program effectiveness for mildly malnourished children.

Targeting also improves the cost effectiveness of direct nutrition interventions. The five supplementation programs examined here were not effective in significantly improving growth because, first, they were not targeted to areas with high rates of malnutrition and, second, the benefits provided may have been too small.

The selective use of supplemental feeding as part of a package of services in the Narangwal and Tamil Nadu programs enhanced the cost effectiveness of the projects. In Tamil Nadu, only about one in every three children was given food. Because food accounts for the major portion of the cost of the intervention, this is one way to minimize overall programs costs without decreasing effectiveness.

The dichotomy between subsidies as a family-oriented intervention and the IHN programs as a child-oriented strategy is an artificial division. Both the Tamil Nadu and Narangwal projects did involve the family. The growth monitoring and surveillance that was a large part of the effort in Narangwal created an awareness within the family of the health and nutritional status of the child. The project was very labor intensive. In the villages with supplementation, preschoolers had a total of fifty-five service contacts in a year (Kielmann, Taylor, and Parker, 1978). Similarly, in Tamil Nadu there was regular contact with the child and the family at the village centers. The requirement that families bring the child to the village center did not appear to affect participation (World Bank, 1984a). However, this might not be true if this type of intervention were replicated in parts of rural Africa where the target population may not be close to a village. The ease with which any type of intervention can be duplicated depends on the existing infrastructure. Modifications will always be necessary to accommodate local constraints (chapter 8).

It is unlikely that the selective distribution of food and the whole concept of food as medicine for the child would work without an intensive campaign within the project area. It is much more difficult to incorporate targeting of specific children into ongoing programs than into new ones.

The Philippine subsidy scheme and the two IHN projects were effective in improving child growth. However, the cost per child removed from moderate or severe malnutrition was lower in Tamil Nadu than in the Philippines. In the Philippines, the program subsidized all family members in

order to get to the preschoolers. In Tamil Nadu, food costs were incurred only for the child. If the only goal of a particular program is to alleviate preschooler malnutrition, the IHN approach is generally more cost effective than family food subsidies. However, policymakers are usually also interested in preventive strategies for addressing malnutrition. It is here that complementarities exist between family food subsidies and individually oriented IHN interventions. Targeting will improve the nutritional effectiveness of programs. Direct delivery of food—as in supplementation schemes and integrated health programs—should be used selectively.