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## “The lessons of Chile’s nutrition transition”

### **Introduction**

Global nutrition used to be simple: the rich were fat, the poor were skinny, and hunger was the only serious nutritional problem. Today, the situation is much more complex. The world’s very poorest countries still “only” struggle with the seemingly intractable problem of hunger. Less poor developing countries, however, now struggle with both the old problem of hunger and the new scourge of obesity.

The current confusing situation in low- and middle-income countries manifests itself in strange ways. Perhaps the strangest is household coexistence of hunger and obesity. Researchers have identified such coexistence – the underweight and the overweight in the same family, living under the same roof – in Brazil, China, Russia, South Africa, Egypt, Indonesia, and the Kyrgyz Republic (Doak, et al; Schmidhuber). Household coexistence perfectly exemplifies the nutritional challenges facing developing countries. As they grow economically, diets change and lifestyles become more sedentary, increasing obesity. Yet the problem of hunger, though reduced by development, persists.

The dual burden of hunger and obesity is a new phenomenon. Before the 1960s, developing countries were almost uniformly hungry. Since then, the Green Revolution and other agricultural innovations have increased productivity and lowered food prices. At the same time, economic development has raised incomes. The result is higher overall energy intake. From the mid 60s to the late 90s, developing countries’ daily per capita energy intake increased by more than 600 kilocalories. By the late 90s, undernourishment levels in most developing countries (with the exception of sub-Saharan Africa and a few countries in southeast Asia) had fallen below ten percent (Schmidhuber).

As hunger has decreased, obesity levels have soared. In countries as diverse as Egypt, Argentina, Nigeria, Uzbekistan, Peru, Qatar, South Africa, and Jamaica, the percentage of overweight children is higher than in the US (Deckelbaum). Obesity’s emergence is not a sign of success in the fight against hunger. Rather, obesity presents an entirely new set of public health problems. Obesity is a major risk factor for a variety of serious (and expensive to treat) non-communicable diseases, or NCDs. Like obesity, NCDs are no longer a rich country problem: today, 80 percent of deaths from cardiovascular disease, a diet-related NCD, occur in low- and middle-income nations (Hawkes, et al.). Obesity’s NCDs are straining developing countries’ health systems – sometimes to the point of collapse.

Developing countries around the world are in the middle of national nutrition transitions. Economic development has finally made eliminating hunger a real possibility. Yet economic growth brings growth of another, less desirable kind: obesity is beginning to replace hunger as the primary nutritional problem in developing countries. For now, developing countries must struggle with both an old, waning nutritional problem and a new, emerging one. Their situation begs a difficult question. Is it possible to eradicate hunger without increasing obesity?

### **The Chilean Example**

Chile once asked the same question. In the 60s and 70s, the country struggled with hunger prevalence of about 15 percent (Vío). As Chile’s economy grew strongly during the late 80s and early 90s, hunger rates plummeted, to below five percent by 1995. At the same time, however, obesity levels rose rapidly. In 1988, six percent of men and 14 percent of women were obese. Just four years later, those

levels had increased to 11 percent in men and 24 percent in women. As in many developing countries today, Chile's nutrition transition caused high rates of hunger-obesity household coexistence. In 1986, 40 percent of mothers of undernourished children attending nutrition recovery daycare centers were obese (Kain, et al.).

Today, Chile's transition from hunger to obesity is complete. Hunger in Chile "has virtually been eradicated" (Kain, et al.). Less than one percent of children, the group most at risk of hunger, are undernourished ("Chile at a Glance"). The problem of obesity continues to grow. The Chilean Health Ministry estimates that almost one third of adults are obese. More tellingly, Chile's levels of childhood obesity, a key predictor of adult obesity, are the highest in Latin America: about 7.5 percent of children under six and 14 percent of teenagers are obese (Espinosa).

If current trends continue, six in ten Chileans will be overweight or obese by the time the country celebrates the 200<sup>th</sup> anniversary of its independence in 2010 (Espinosa). The National Institute of Food Technology has called obesity "the epidemic of the bicentennial."

That prediction is frightening for Chile – and its public health system. Thanks to increasing obesity, NCDs have already replaced infectious diseases as Chile's main health problem. Though they are among the best in Latin America, Chilean public hospitals are struggling to deal with the increases in cardiovascular disease (now the country's main cause of death), type 2 diabetes, gallbladder disease, hypertension, and high cholesterol. More obesity, and more of its accompanying NCDs, will only further strain the public health system's budget and infrastructure.

Economically, Chile is a success story. Over the last 15 years, it has enjoyed strong and generally (aside from a major recession in 1999) consistent economic growth. GDP per capita has risen sharply, and by 2000, poverty, extreme poverty, and indigence headcounts had fallen to half their 1990 levels ("Country Brief"). Yet Chile's struggle with obesity reveals the difficulties of developing well. Economic development has reduced hunger, but Chile has made no real nutritional progress. Rather, it has simply exchanged an old problem for a new one. The victims are the same. Once a rare sign of affluence, obesity has become, as hunger once was, an all-too-common problem of the poor.

Did Chile have to turn out this way? Was it really impossible to reduce hunger without increasing obesity? These questions have serious implications for developing countries currently going through nutrition transitions of their own. To answer them, we must examine how Chile evolved from a hungry nation to an obese one.

## **Urbanization and Diet**

Economic development, the fundamental cause of Chile's nutrition transition, is closely linked to urbanization. Most economic growth occurs in urban areas, and in Chile, as in most countries, labor opportunities and access to social services are better in urban areas than in rural ones. Unsurprisingly, over the last few decades, urbanization in Chile has steadily increased from its 1970 level of 75 percent ("Chile"). Today, 85.8 percent of Chileans live in urban areas, with a full 40 percent of Chileans living in Santiago, the capital (Vío). Chile is one of the most urbanized countries in Latin America, the most urbanized developing region in the world. Chile's high level of urbanization has heavily influenced its nutrition transition.

The Chilean diet has changed dramatically since the early 1980s. The most pronounced change has been increased energy intake. From 1979 to 1999, daily per capita energy intake rose 7.4 percent, from 2,260 to 2,858 kilocalories per day. Much of the additional energy came from fat. As energy intake rose, daily intake of animal and vegetable fat increased 55.4 and 33.2 percent, respectively (Kain, et al.).

As overall energy intake increased, consumption of animal products (especially meat and milk) rose steadily, at the expense of fruit, vegetables, and grains. From 1980 to 1995, annual per capita meat consumption increased 74.5 percent and milk consumption increased 21.7 percent. Consumption of beans, a staple of the traditional Latin American diet, decreased 55.5 percent (Vío).

Urbanization is associated with these significant dietary changes. Throughout Latin America, people living in rural areas typically eat a traditional diet based on grains, fruits, and vegetables. Urban dwellers, who are generally slightly better off, tend to eat diets high in fats, refined sugars, and animal food products. They also eat more processed, fast, precooked, and convenience food and fewer fruits and vegetables. Urban residents have a higher overall energy intake and are more likely to diversify their diets into meat and milk. When rural migrants arrive in cities, they tend to quickly abandon their staple diets and adopt the typical urban diet.

## **Supermarkets**

Urbanization changes people's diets because it changes their food sources. In rural areas, people produce much of their own food. Urban dwellers, however, rely on external food sources. When people migrate from a rural area to an urban one, they stop depending on the land for food and start depending on supermarkets.

Since 1990, supermarkets have dramatically increased their share of Chile's food retail sector. Large increases in car and refrigerator ownership allowed more shoppers to buy in bulk and so avoid the once-requisite daily trip to the plaza market or corner store. Additionally, supermarkets took advantage of untapped markets in smaller urban areas by expanding from Santiago and other large cities into medium and small towns. They also expanded from upper income areas into middle and working class neighborhoods. Today, supermarkets sell over half of Chileans' food (Reardon).

Supermarkets are vehicles for diet diversification. This became clear in the 1990s, when they played an integral role in Chile's milk consumption increases. In the late 80s, the introduction of UHT-Tetrapak milk (ultra-high temperature, vacuum packed milk) solved the storage and transport problems of selling milk. Unlike small stores, supermarkets were able to buy UHT-Tetrapak milk in large enough quantities to keep prices low. Milk became affordable and accessible for more Chileans of all income levels (Reardon).

Supermarkets also encourage less healthful diet diversification. They sell salty, sugary, and fatty foods that appeal to consumers' natural cravings for those once-scarce resources. In traditional food markets, processed food is more expensive and less available than natural food. In supermarkets, however, large quantities of cheap, convenient, and unhealthy processed food are readily available. In rural areas, people craving a fat-filled treat must make it themselves. In urban areas, they must simply turn right at Aisle 3.

## **Sedentarism**

Though diet is the primary determinant of obesity, physical activity is also a factor. Like dietary changes, changes in activity levels are linked to urbanization. Levels of physical activity are generally higher in rural areas than in urban ones. Globally, the labor force has shifted toward occupations in industry and service, which require less energy expenditure. Technological innovations have also made domestic activities less energy intensive. These changes have primarily affected urban residents. The typical rural lifestyle is still based on continuous, physical labor. When rural migrants arrive in cities and

switch to sedentary work as day laborers or factory workers (the typical occupations of recent urban arrivals), their risk of obesity increases significantly.

More broadly, Chile's economic development has increased car and TV ownership, which encourages sedentarism. From 1970 to 1988, Chile's car ownership increased 250 percent; TV ownership increased more than 160 percent. In this context, it is not surprising that in 2001, less than a tenth of adults performed the recommended 30 minutes of regular physical activity three times a week. Low activity levels were most pronounced among the poor (Kain, et al.).

### **Supplementary Feeding Programs**

Though they affect only a very specific segment of the population, supplementary feeding programs have been an important factor in Chile's transition. The government administers two large programs, the Chilean Supplementary Feeding Program (PNAC) and the National Nursery Schools Council Program (JUNJI). The main beneficiaries are the urban poor.

Since the 1920s, PNAC has provided food supplements to pregnant women and children under six years old. In 1983, PNAC introduced a new "enhanced" program to identify and assist mothers and children at high risk for hunger. Beneficiaries of the enhanced program receive larger quantities of the basic food supplements, as well as rice to benefit all family members and prevent the redirection of food meant for infants.

JUNJI, created in 1971, provides childcare and supplementary food to low-income toddlers and preschoolers. All children who attend JUNJI are given food to meet 58–75 percent (depending on whether they attend for a half or full day) of their daily energy needs. Children identified as nutritionally deficient are given an additional 150 kilocalories daily (Uauy and Kain).

With their high coverage rates and well-established monitoring systems, PNAC and JUNJI played integral roles in the Chile's hunger reduction. Yet they did not adapt to the new nutritional climate they helped create. Even in the 1990s, after hunger had mostly disappeared as a public health issue, PNAC and JUNJI continued distributing the same food supplements to the same large number of beneficiaries.

The programs also inadvertently promoted excess energy intake. JUNJI underestimated children's energy intake at home and overestimated their energy expenditure, and as a result, provided children with more food than they needed (Uauy and Kain). PNAC didn't recognize the possibility of hunger-obesity household coexistence, and provided food to the families of undernourished women and children without assessing the household nutritional condition. In addition, the programs overestimated the number of beneficiaries at high risk of hunger. Hunger in children was determined using weight-for-age, which, unlike weight-for-length, does not account for the prevalence of stunting. Stunted children who were not malnourished in terms of weight-for-length still received extra food, which increased their risk of obesity. Overall, supplementary feeding programs have compounded the dietary changes already associated with urbanization.

### **Policy Recommendations**

Now that hunger has virtually disappeared in Chile, its nutrition policies must focus on its population's growing girth. The task of preventing an obesity epidemic is difficult, but not impossible. There are no successful, reliable treatment strategies for obesity, so prevention is key. Because childhood obesity usually tracks into adulthood, energy and resources should be directed toward preventing obesity in the youngest Chileans.

To be truly successful, childhood obesity prevention efforts must begin before the child is even born. Obesity in pregnant women, in addition to its links to long-term maternal weight retention, is associated with an increased risk of childhood obesity. Disturbingly, obesity among Chile's pregnant women increased from 12 percent in 1987 to 32.7 percent in 2000 (Kain, et al). To prevent excessive weight gain during pregnancy, Chile's public health care system should monitor weight gain in pregnant women and offer them nutrition education. After birth, doctors and nurses should encourage mothers to, if possible, breast feed their children for at least six months. Breast feeding is an effective protection against childhood obesity, though its efficacy is reduced if the mother is obese (Labbok).

Chile's supplementary feeding programs must help address the problem they helped create. JUNJI, for example, can do more to encourage physical activity among its students, who expend less energy daily than they should (Uauy and Kain). Many researchers argue that PNAC and JUNJI should also stop giving food supplements to pregnant women and children who don't need them. Now that hunger is no longer a widespread problem, they say, the programs should select beneficiaries based on nutritional need, not on socioeconomic status alone.

That argument misses the point entirely. The problem is not that too many Chileans receive supplementary food. It's that they receive the wrong kind of food. Though poor children and pregnant women, especially those living in urban areas, are eating much more food today, the overall quality of their diet is still low. Yet food supplements provide them with lots of what they don't need (more protein and energy) and little of what they do (namely, fruits, vegetables, and micronutrients).

Rather than cutting supplementary feeding programs (which is not only ill-advised, but politically impossible), the government should modify them. JUNJI has already begun to offer food lower in sugar and saturated fat, and it is adding skim milk and additional fruits and vegetables to its menus. PNAC should follow suit.

## **Conclusion**

Just fifty years ago, developing countries were almost uniformly hungry. Since then, agricultural innovations, rising incomes, and falling food prices have reduced hunger dramatically. The same factors have caused obesity levels to soar. Today, low- and middle-income countries are struggling to fully eradicate hunger without increasing obesity. They should learn from Chile's example.

Chile has virtually eliminated hunger. The price of that success, however, has been rapidly increasing obesity. We instinctively assign responsibility for such dramatic changes in public health and nutrition to national governments or international health organizations. Yet in Chile, as in most countries, the nutrition transition was primarily a factor of economic development. Development, because it reduced poverty, reduced hunger. By encouraging urbanization, the "westernization" of diets, and more sedentary lifestyles, development also increased obesity. This progression was natural, even inevitable, and largely out of anyone's control.

Yet, though they weren't its main determinants, Chile's national nutrition policies did influence its nutrition transition. Chile's supplementary feeding programs were created to fight hunger, and they did so successfully. However, the programs kept fighting hunger even after it was gone. Though supplementary feeding programs did not create Chile's obesity problem, they inadvertently encouraged it.

The most actionable lesson of Chile's transition is that supplementary feeding programs designed to fight hunger must be aware of their power to encourage obesity. Maternal and child health feeding programs like those in Chile are common around the world. As in Chile, many of them are no longer targeted efforts to fight hunger in high-risk populations. Rather, they have evolved into creaking and

unresponsive bureaucratic behemoths. A recent Food and Agriculture Organization study of 19 Latin American countries, for example, found that a full fifth of the population receives some food assistance benefits. However, only 12 percent of beneficiaries are actually malnourished (Uauy, et al.). Simply slashing benefits is not the solution. To adequately address the dual problems of hunger and obesity, these programs must evolve to respond to their target populations' new nutritional needs.

Flexible, responsive feeding programs can reduce hunger without increasing obesity. When feeding programs complement childhood obesity prevention efforts and address the nutritional needs of the obese, they may even reduce obesity. They will never, however, eradicate it.

Better-tasting food, and more of it, is the most tangible benefit of the economic development low- and middle-income countries strive for. Ever larger quantities of meat, milk, and processed foods are the trappings of prosperity and the rewards of growth. In moderation, they decrease hunger. Yet humans are creatures of excess. As development expands and diversifies the food supply, we are not content to simply not be hungry. Rather, we want to enjoy the relative prosperity we've worked so hard to achieve. Increased obesity is the price of development. We must accept that, and recognize that the best we can do is work toward smaller increases in obesity levels. Though we cannot stop obesity's emergence, we *can* manage it.

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