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STUNTED CHILD-OVERWEIGHT MOTHER PAIRS: AN EMERGING POLICY CONCERN?

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Abstract

Objective: This paper explores the global prevalence of an emerging phenomenon—the coexistence of a stunted child and an overweight mother in the same household. It also tests whether this phenomenon is associated with a country's level of economic development and urbanization. Policy directions for public nutrition are highlighted.

Design: Data from 36 Demographic and Health Surveys (DHS) were used (23 in Africa, 8 in Latin America, and 5 in Asia). Stunting was defined as height-for-age < - 2 SD of the reference population and maternal overweight as a body mass index (BMI) of > 25 kg/m^2. World Bank and United Nations figures were used for GNP per capita (our indicator of economic development) and for level of urbanization, respectively. Descriptive statistics were derived, and regression analysis was used to model the association between economic development, urbanization, and the prevalence of stunted children and overweight women (SCOWT).

Results and conclusions: The prevalence of SCOWT is generally below 10 percent, except in four countries, of which three are in Latin America. Among our sample of countries, SCOWT is generally more prevalent in Latin America than in Africa, and is below 5 percent in all five Asian countries. Contrary to our expectations, SCOWT is not necessarily more prevalent in urban than rural areas. In fact, when economic development is controlled for, SCOWT is associated with urbanization only in Latin America. In Africa and Asia, SCOWT is associated with economic development, but not urbanization, which suggests that SCOWT may emerge only at levels of economic development *and* urbanization higher than currently seen in most of the Asian and African countries studied. The concrete recognition of the SCOWT phenomenon is an important step to delineating more effective and integrated strategies to address problems of over- and undernutrition and dietary quality within countries, regions, and households. This gives special importance to designing programs and policies that will

address the food and nutrition needs of each individual, rather than assuming that those needs are addressed by targeting programs or policies to the household as a whole.

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1. Introduction

In cruel and ironic contrast to the deprivation associated with poverty, diseases more often associated with excess, such as diabetes, obesity, and heart disease, have also emerged as serious concerns in many developing countries (Popkin 2002a; PAHO 2000). These countries now face the worst of two worlds: millions of infants and young children suffer from undernutrition and poor growth while adults contend with overnutrition.

With increased economic development and urbanization, populations in many developing countries are consuming more processed foods, including more refined grains and foods with higher content of saturated fat, sugar, and salt. Changes in physical activity may accompany these dietary changes, as rural-dwellers move to the city to take on more sedentary jobs and firms and households adopt labor-saving technologies (Doak et al. 2000; Popkin 1994).

Dietary excess and poor diet quality are undoubtedly contributing to a rise in nutrition-related chronic diseases (NRCDs) among these populations. The problem appears especially acute in the middle-income nations of Latin America and the Near and Middle East. Although economic development and urbanization can generate positive outcomes, such as decreasing malnutrition and food insecurity, they can also apparently produce negative results like increases in NRCDs.

This nutrition transition is often conceived of as a national phenomenon, a wave of change in dietary, activity, and body composition patterns that a country goes through on the road to higher levels of economic development (Popkin 1994). During this transition, symptoms of under- and overnutrition logically coexist at the population level, with wealthier households exhibiting "diseases of affluence" including obesity, and poorer households exhibiting food insecurity and malnutrition. But recent work indicates under- and overnutrition can coexist in the same household (Doak et al. 2000, 2002; Monteiro et al. 1997). The challenge to public finances and to a public health system that

must simultaneously address both the causes of under- and overnutrition in the population is difficult enough, but the presence of both inside the household complicates matters.

The coexistence of under- and overnutrition in the same household also presents a conceptual conundrum. Generally these conditions are thought to result from environmental conditions that affect the entire household, with undernutrition particularly reflecting a lack of income and poor diets. But intrahousehold differences in nutritional status suggest that the nutrition transition is not simply a societal phenomenon; it is an individual one as well. The coexistence of under- and overnutrition among members of the same household raises the question of whether under certain conditions intrahousehold factors become more important than the environmental factors affecting the entire household.

The transition in the locus of constraints on food insecurity and malnutrition thus may accompany the nutrition transition. As economic development and urbanization occur, severe poverty may lessen, removing household income levels and food availability as the main causes of poor nutrition, and increasing the importance of intrahousehold resource allocation, food choices, and caring behaviors.

To explore this paradox further and look particularly at its relation to global changes in economic development and urbanization, this paper examines the particular occurrence of a stunted (undernourished) child in the same household as an overweight (overnourished) mother. We term this pairing of a stunted child and overweight mother SCOWT.

Objectives

The three main objectives of this paper are to

- Quantify the global prevalence of SCOWT,
- Explore SCOWT's association with the global factors of economic development and urbanization, and
- Highlight policy directions for the public nutrition community.

Some studies have examined broad national trends of increasing levels of obesity or overweight in regions where child undernutrition continues to be a serious problem (PAHO 2000). Others have looked at the coexistence of overweight and underweight among any member of the same household in countries generally considered to be undergoing a nutrition transition (Doak et al. 2000; Monteiro et al.1997). But to our knowledge no one has presented data on the global prevalence of this phenomenon and compared countries that are arguably farther along in the nutrition transition with those who have only barely started along this path.

Our study is also the first to document the coexistence within a household of childhood stunting (a reflection of cumulative linear growth retardation), as opposed to underweight (a nonspecific indicator of overall malnutrition) (WHO 1995) and maternal overweight. The rationale for our focus on stunting rather than underweight or wasting as an indicator of child undernutrition is that it reflects the cumulative effects of the numerous insults experienced by children in developing countries during their intrauterine and preschool years. Stunting is also largely irreversible, especially after 2 years of age, and therefore it is an accurate indicator of long-term, chronic malnutrition in early childhood (Martorell and Scrimshaw 1995). Wasting usually reflects acute illnesses and/or severe food shortages, and its prevalence increases dramatically during the period of high vulnerability to infectious diseases, between 9 and 18 months of age (Ruel 2001). It is thus a less appropriate indicator than stunting of overall childhood malnutrition. Underweight does not differentiate between stunting and wasting, and therefore it is less informative and should not be used when height information is available and height-for-age and weight-for-height indicators can be derived. As we are most interested in investigating the association of general socioeconomic changes like urbanization and economic development that take place over time on nutritional relations, stunting is the more appropriate indicator.

In this study, we hypothesize that a higher prevalence of SCOWT is associated with higher levels of urbanization and economic development. That is, as diet, activity, and childcare patterns shift with urban living and with higher incomes, we expect to see

higher levels of adult obesity, which, if not accompanied by similar rates of decline in stunting, will see the emergence of these SCOWT pairs.

2. Methods

Data

To conduct this analysis, we used publicly available data sets from the Demographic and Health Surveys (DHS) for 36 countries (23 in Africa, 8 in Latin America, and 5 in Asia). For each country we took the most recent year available at the time of analysis (July 2001), though each data set fell within the 1991–1998 period. The DHS are funded by the U.S. Agency for International Development and coordinated by ORC Macro International. Data collection is usually carried out in collaboration with country governments using population sampling frames. All data are nationally representative. These data sets are available from the DHS website (www.measuredhs.com).

We chose data sets that had anthropometric data for mothers and their children. Children 6–60 months old and their nonpregnant mothers aged 18 years or older were included in the analysis. If a mother had more than one child in this age group, we selected one of the children randomly for analysis.

For children's nutritional status, we used height-for-age Z-scores (HAZ). Stunting was defined as HAZ below –2 SD of the WHO/NCHS/CDC reference standards (WHO 1979). Using the WHO guidelines, we considered mothers with a body mass index (BMI) of > 25 kg/m^2 as overweight (WHO 1995).

We used World Bank figures for GNP per capita (in constant 1995 US dollars) for the same years as the nutritional status data (World Bank 2000). GNP per capita serves as a proxy for a country's level of economic development. United Nations sources provide estimates of the percentage of the population in urban areas in five-year intervals. We selected the data for the year closest to the year of the DHS data (United Nations 1998).

Statistical Analysis

From these data we calculated the prevalence of stunted children, overweight mothers, and of SCOWT pairs (as a percentage of total child-mother pairs) in each country. We used SPSS for descriptive statistics.

Using STATA, we estimated a regression model to explore the independent association of the level of urbanization and economic development with SCOWT. This model provides a simple control to determine the association of urbanization or economic development (holding the other factor constant) with SCOWT. These variables, however, may not capture regional- and urban-specific factors, so we developed and tested models that included interaction terms to see if these global factors exhibit any difference in their effect on SCOWT in urban and rural areas or across regions. With 36 countries, using both rural and urban observations, we had a total of 72 observations.

3. Results

Prevalence

Overweight mothers are widespread in the countries studied (Table 1; Figures 1-3), as documented by others (Doak et al. 2000; PAHO 2000). The range of overweight mothers across African and Asian countries is particularly large. Among African countries in our sample, the percentage of overweight mothers ranges from a low of 4 percent in Madagascar to a high of 55 percent in Egypt. In Asia, we had data from only five countries, three of which were countries of the former Soviet Union (FSU). The percentages of overweight mothers in FSU countries, all of which are more than 15 percent, are markedly different from the figures for Bangladesh (4 percent) and Nepal (2 percent), where overweight mothers are practically nonexistent. In contrast, overweight mothers are quite prevalent in Latin America. With the exception of Haiti, where 12 percent of mothers are overweight, all other countries have high prevalences, ranging from about 30 to 50 percent.

Table 1 Descriptive statistics

Country	Year of survey	Percent of children stunted	Percent of mothers overweight	Percent of children in stunted child-overweight mother pairs	Percent urbanized	GNP per capita (1995 US dollars)
Africa						
Benin	96	27.1	10.8	2.0	38.4	371
Burkina Faso	92	35.2	8.3	1.9	13.6	241
Cameroon	97	35.1	21.3	5.4	44.7	588
Central African Republic	94	38.8	7.0	2.5	39.1	317
Chad	96	45.3	5.2	3.1	22.2	212
Comoros	96	36.3	20.3	5.5	30.4	424
Côte d'Ivoire	94	27.4	14.2	2.7	43.4	641
Egypt	95	28.3	55.2	14.0	44.6	1,027
Ghana	93	27.8	13.4	2.2	33.9	372
Kenya	98	35.1	12.4	1.4	28.6	330
Madagascar	97	57.6	3.7	2.1	26.4	229
Malawi	92	54.6	9.6	5.2	11.8	158
Mali	95	34.5	10.4	2.5	26.8	249
Morocco	92	21.3	34.4	3.7	48.2	1,247
Mozambique	97	39.5	12.3	0.6	33.8	162
Namibia	92	30.6	21.1	8.2	31.0	2,186
Niger	98	43.4	14.0	2.2	18.2	212
Senegal	92	24.2	19.6	1.8	40.4	541
Tanzania	96	47.8	13.8	2.0	24.2	171
Togo	98	25.1	12.4	5.5	30.7	327
Uganda	95	43.1	8.9	4.3	12.5	297
Zambia	96	46.1	13.1	2.6	43.0	377
Zimbabwe	94	24.6	23.8	4.2	31.8	632
Asia						
Bangladesh	96	54.7	4.2	1.3	18.3	334
Kazakhstan	95	16.8	24.1	2.6	59.6	1,237
Kyrgyz Republic	97	29.4	18.5	4.6	38.8	817
Nepal	96	53.2	1.8	3.3	10.3	215
Uzbekistan	96	33.2	15.2	4.3	41.1	969
Latin America						
Bolivia	98	26.0	46.7	11.0	60.5	937
Brazil	96	9.6	35.4	2.7	78.4	4,428
Colombia	95	14.0	40.7	5.0	72.6	2,321
Dominican Republic	91	9.3	37.8	2.2	58.3	1,293
Guatemala	95	51.3	34.3	13.4	38.9	1,452
Haiti	95	33.7	11.8	2.0	31.8	366
Nicaragua	96	24.6	40.2	9.8	62.1	364
Peru	96	25.8	45.2	4.8	70.9	2,445

Figure 1 Percent overweight mothers (DHS, eight Latin American countries)

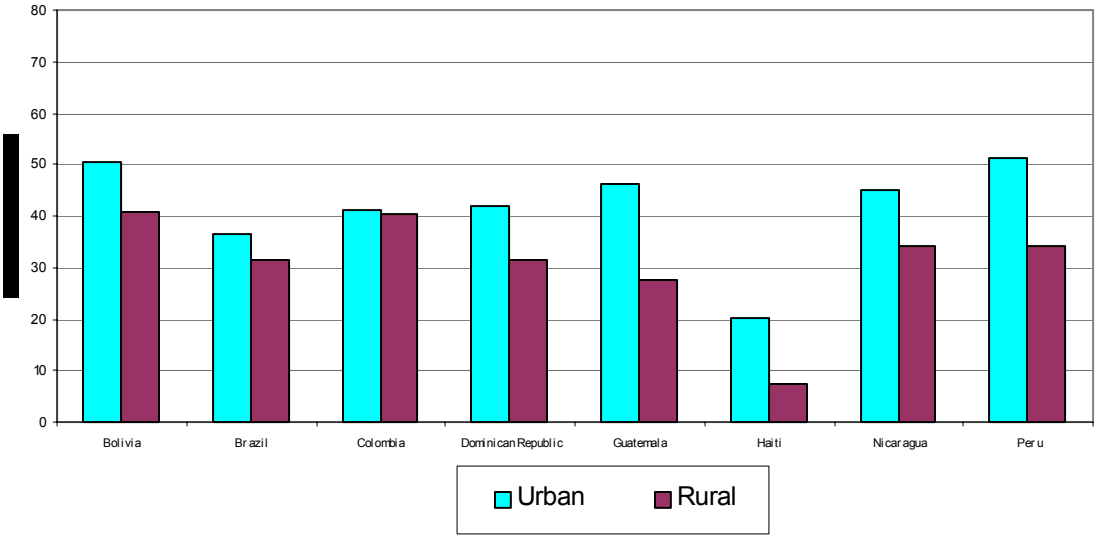


Figure 2 Percent overweight mothers (DHS, five Asian countries)

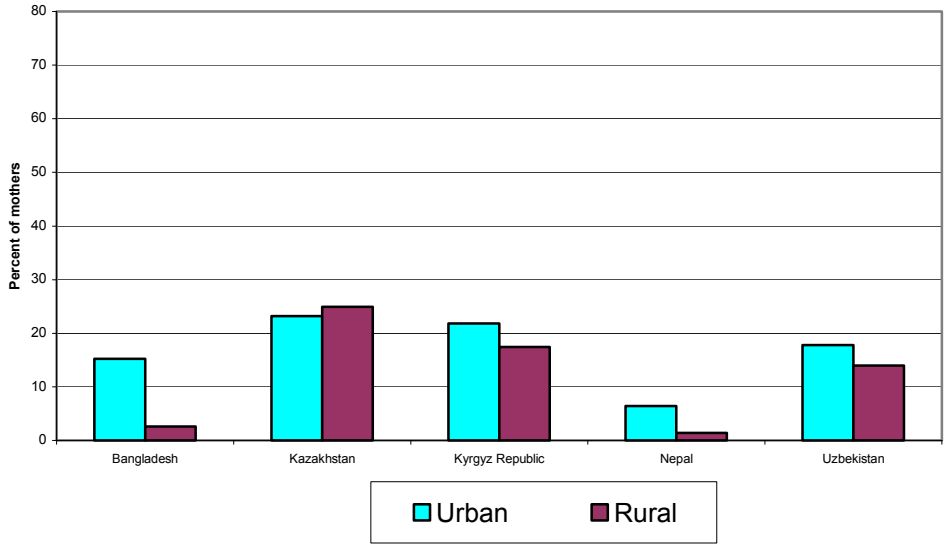
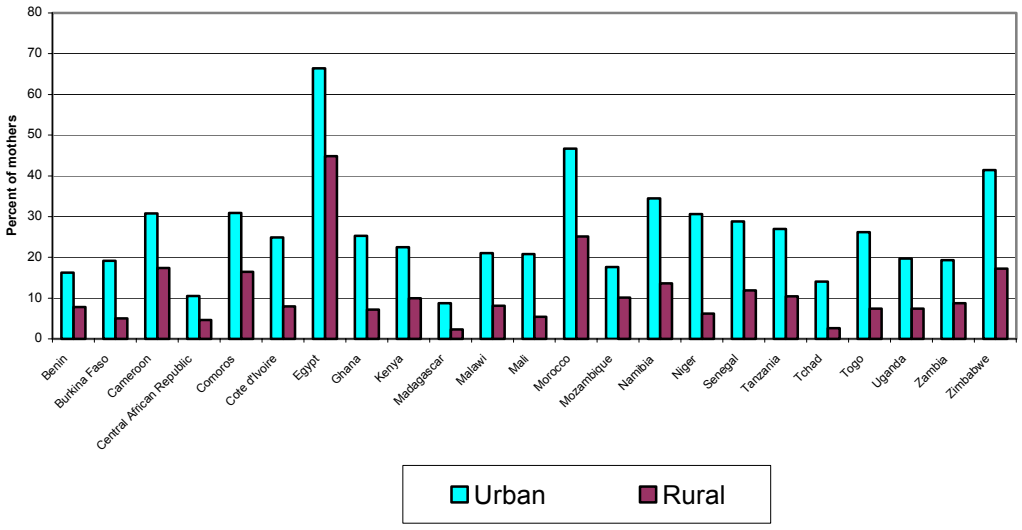
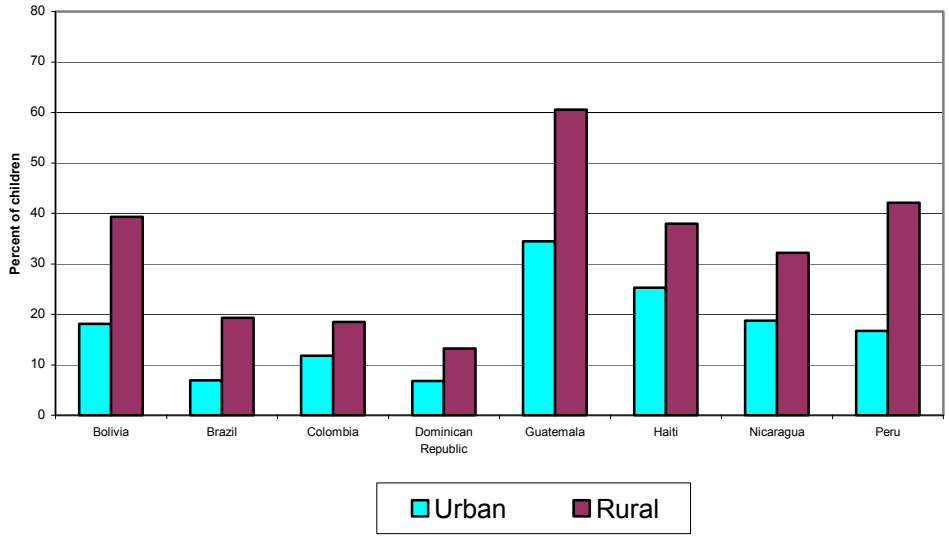


Figure 3 Percent overweight mothers (DHS, 23 African countries)



Clearly, overweight is a serious problem in many developing countries, and prevalence appears to be higher in higher-income and more urbanized countries (Table 1). Yet childhood stunting remains a serious problem in these countries as well, even in urban areas and in countries with a high prevalence of overweight mothers (Table 1; Figures 4–6). For instance, in Egypt and Bolivia, the countries with the highest prevalence of overweight mothers, more than one-quarter of children 6–60 months old—around 27 percent—are stunted. Half or more than half of preschoolers are stunted in many southern African countries and in Nepal and Bangladesh. As documented previously, the prevalence of stunting is consistently higher in rural than in urban areas (Ruel 2001).

Figure 4 Percent stunted children (DHS, eight Latin American countries)



Overweight mothers and stunted children, of course, do not necessarily occur in the same household. Figures 7–9 present the prevalence of stunted child-overweight mother pairs in the sample of countries studied. The prevalence of SCOWT is generally below 10 percent, except for four countries, of which three are in Latin America (Bolivia, Guatemala, and Nicaragua). Egypt is the other country, with a markedly high prevalence

Figure 5 Percent stunted children (DHS, five Asian countries)

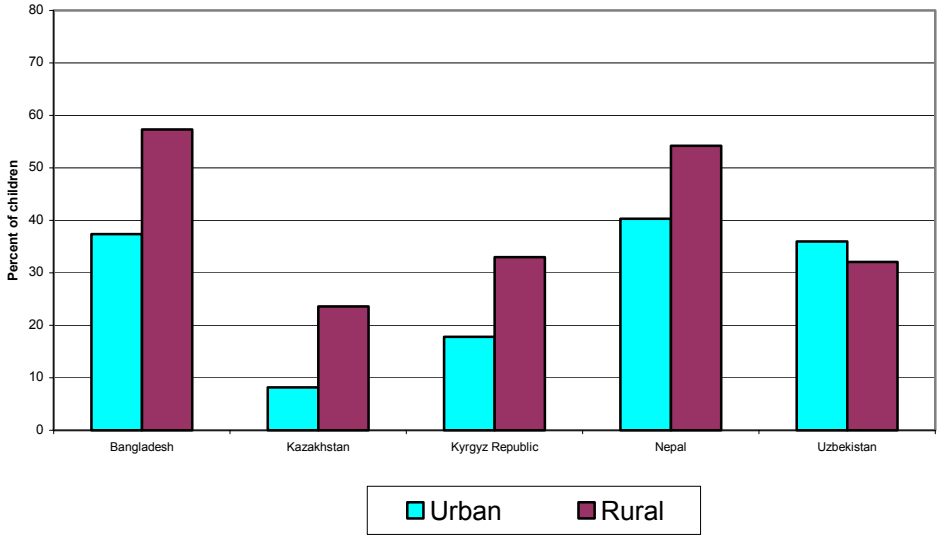
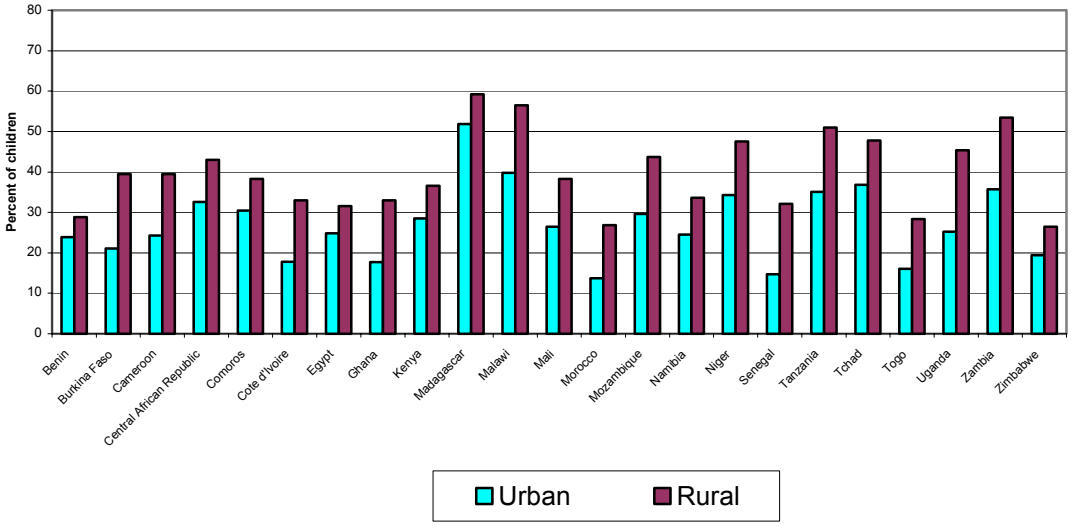


Figure 6 Percent stunted children (DHS, 23 African countries)



of SCOWT (14 percent), especially when compared to most other African countries. The levels of SCOWT vary across countries. In Latin America, for example, Bolivia has the highest rate of overweight mothers in the region, at 47 percent, and Guatemala has the highest level of stunting, at 51 percent. These two countries have the highest prevalence

Figure 7 Percent of mother-child pairs with stunted child-overweight mother (DHS, eight Latin American countries)

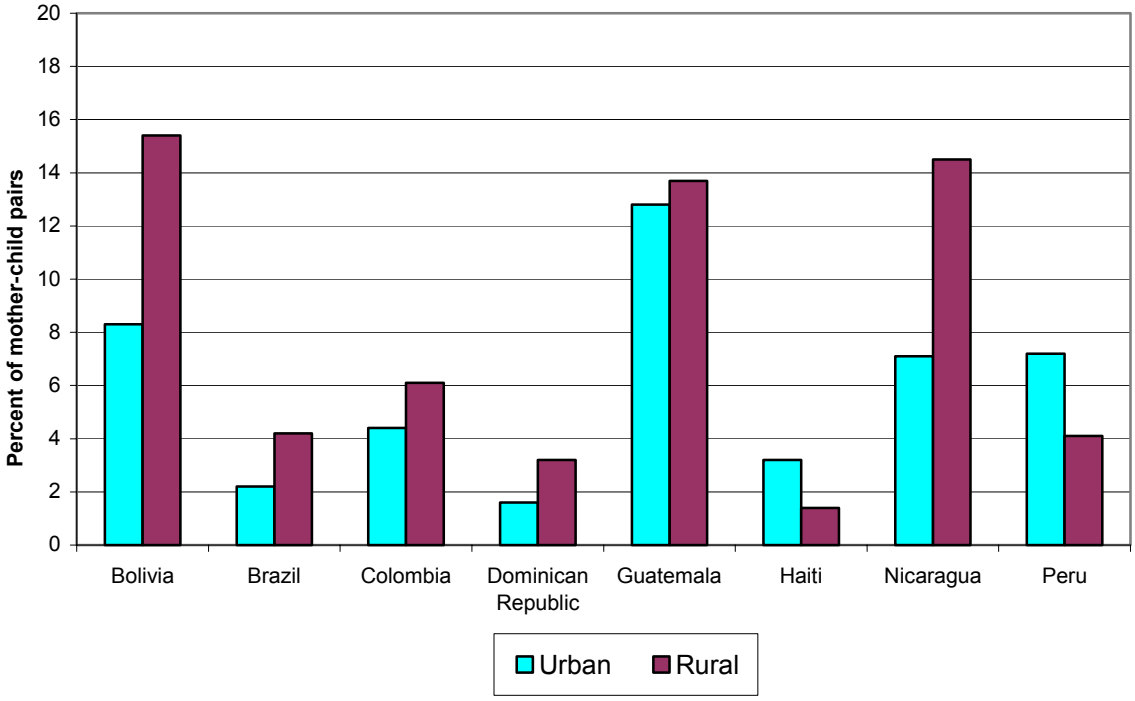


Figure 8 Percent of mother-child pairs with stunted child-overweight mother (DHS, five Asian countries)

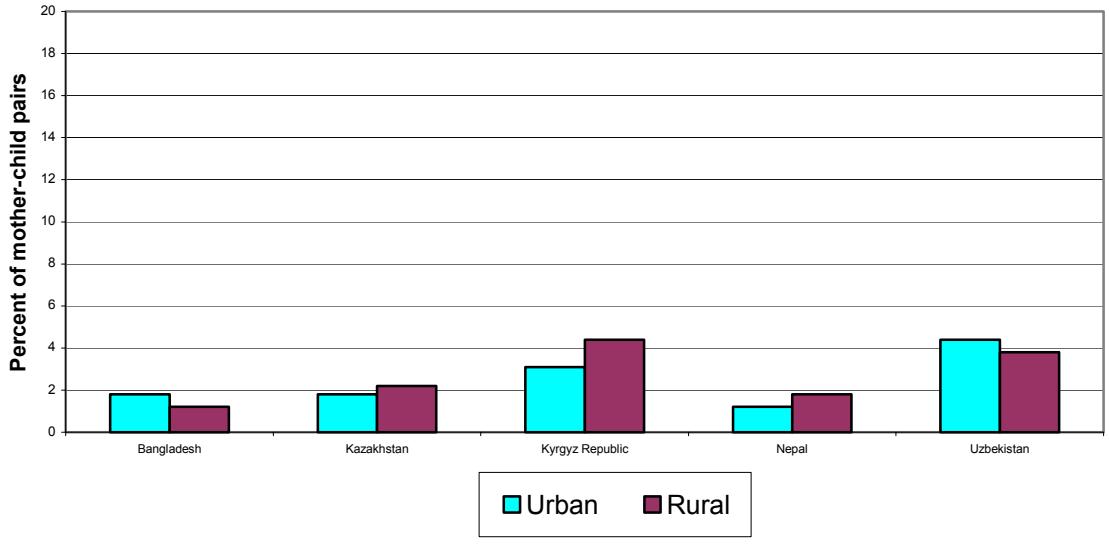
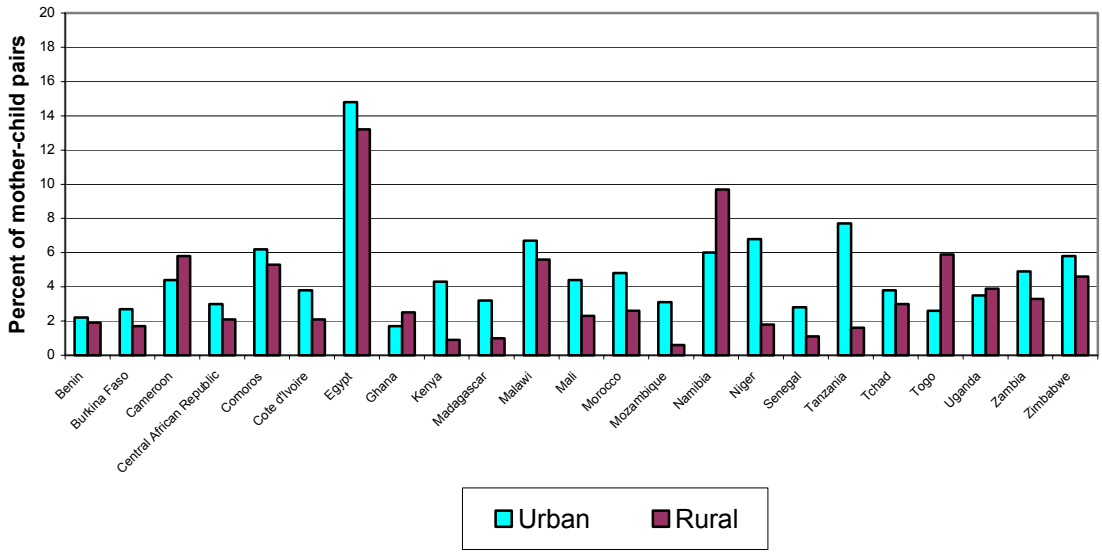


Figure 9 Percent of mother-child pairs with stunted child-overweight mother (DHS, 23 African countries)



of SCOWT in the region and rank second and third after Egypt among our sample of 36 countries.

Surprisingly, SCOWT is not always more prevalent in urban than in rural areas (Figures 7–9). In Latin America, except in Haiti and Peru, SCOWT is actually higher in rural areas. The explanation for this appears to be that in these countries, the prevalence of overweight mothers is high in both urban and rural areas, while stunting continues to be a significant problem, mostly in rural areas. In Asia, the prevalence of SCOWT is higher in the rural areas of three of five countries, although prevalences are low in general and the urban-rural differences are small. In Africa, SCOWT is higher in urban areas in 18 of 23 countries, but again, urban-rural differences are often of small magnitude. SCOWT primarily occurs in urban areas in Africa because fewer rural women are overweight as compared to urban women (Figure 3), even though stunting levels are generally high in both rural and urban areas (Figure 6).

Association with Economic Development and Urbanization

Because of the relatively small number of observations, it is quite difficult to test simultaneously for any regional and urban-rural differences in the association of SCOWT with economic development and urbanization. Because of this, we first tested for the significance of urban interactions and then developed separately a model to test for the significance of regional differences.

We first used a model that included independent variables for the level of urbanization and economic development and for the African and Latin American regions (Asia was the omitted category). Squaring the urbanization and GNP per capita variables allowed for flexibility to account for a possible nonlinear relationship. To test for differences in the relationship in urban and rural areas, we interacted the independent variables and the intercept with a 0–1 urban dummy variable. These urban interactions were not statistically significant ($P > .99$ for urban interactions with the variables for urbanization and economic development alone; $P > .85$ for interactions with all independent variables, including the urban-rural dummy). This indicates that the association of urbanization and economic development with SCOWT does not differ between urban and rural areas.

To examine the significance of regional differences, we interacted dummy variables for the three different regions with the independent variables. By omitting the African interactions from the model, we found that, jointly, the Asian and Latin American interactions were not significantly different from the African ones ($P > .25$). However, further analysis showed this was driven primarily by the insignificant difference between Asia and Africa. Associations for the Asian countries were not significantly different from those in the African countries ($P > .99$) but were from those in Latin America ($P < .05$).

Based on these results, our final, more parsimonious model, then, does not include interactions with the urban dummy variable, but it does include interactions with the Latin American regional dummy variable. In this model, the Latin American interactions

with the urbanization and economic development variables are significantly different from those of the African and Asian countries ($P < .03$ and $P < .08$, respectively).

The regression results from the final model (Table 2) show that urbanization and economic development are both significantly and positively associated with the prevalence of SCOWT in Latin America. Economic development is also positively associated with SCOWT in Africa and Asia, although urbanization is not. This is perhaps because of relatively low levels of urbanization and the prevalence of factors associated

Table 2 Regression results
Dependent variable: SCOWT

	Coefficient	P – value
Level of urbanization	-0.054	.74
Urbanization squared	-0.0009	.73
GNP per capita	0.012*	.01
GNP per capita squared	-3.99e-06*	.06
Africa dummy	3.05*	.02
Latin America dummy	-26.94*	.10
Interacted with Latin American dummy:		
Level of urbanization	1.475*	.03
Urbanization squared	-0.015*	.06
GNP per capita	.0003*	.03
GNP per capita squared	1.4e-07*	.05
Adjusted R-squared	.28	

Notes: * Significant at the .10 percent level. Asia is the omitted dummy variable, and values are relative to Asia. Coefficient values for Latin America interaction terms reflect the "full effect" of the interaction, not differences from base model.

with an "urban lifestyle" in those areas. In Latin America, SCOWT increases with economic development at a slightly increasing rate (the combined effect of the squared and unsquared terms). SCOWT also increases with economic development in Africa and Asia, but at a declining rate, although the overall association is larger.

4. Discussion

From previous research on the coexistence of under- and overweight individuals in the same household (Doak et al. 2000, 2002, 2003), we expected SCOWT to emerge as part of a nutrition transition associated with increasing urbanization. We find that

economic development is associated with SCOWT in all three regions, but that urbanization is associated with SCOWT only in Latin America.

The results suggest that some factors specifically related to urbanization do affect SCOWT, as in Latin America, but they may not exhibit a strong association until a country reaches a level of economic development and urbanization higher than those currently seen in most Asian and African countries. We do not identify these urbanization-specific factors, but given the negative coefficient on the squared urbanization term, we know that the rate of increase in these associations declines as urbanization climbs.

The descriptive prevalence data support the finding from regression analysis that the association of SCOWT with urbanization and economic development does not differ between rural and urban areas. In many countries, SCOWT is actually higher in rural than in urban areas: SCOWT is not purely an urban phenomenon. This is because the prevalence of SCOWT is affected by both the rates of childhood stunting, which are consistently higher in rural compared to urban areas, and by the prevalence of maternal overweight, which is currently escalating in rural areas of many countries in transition.

One of the potential explanations for the increases in obesity in rural areas of developing countries is the recent evidence linking fetal and early childhood nutrition to chronic disease risks later in life. The so-called "fetal origin" hypothesis is based on the premise that nutritional insults during critical periods of gestation and early infancy, followed by relative affluence, increase the risks of chronic diseases at adulthood (Forsdal 1977; Barker 1992, 1994). Although most of the evidence to date links early malnutrition to risks of diabetes, high blood pressure, and certain forms of cancers at adulthood, there is some indication of an association between childhood stunting and increased risks of obesity at adolescence and adulthood (Hoffman et al. 2000). Thus the prevalence of SCOWT in rural areas of developing countries, especially in those with historically high rates of childhood stunting, may be due to children continuing to experience stunting, while their stunted mothers are increasingly becoming obese as a result of increased household food and energy availability.

SCOWT may be associated with urbanization, but it is not necessarily associated with living in an urban environment. Griffiths and Bentley (2001) hint at this using data for the Indian state of Andhra Pradesh, where they find that socioeconomic status is a more important determinant of under- or overweight among women than is urban or rural residence. Popkin (1998) also contends that it is not urban residence per se that causes overweight but differences in lifestyle factors associated with an urban environment.

We can comfortably extend these findings to rural areas in more economically developed and urbanized countries. In countries with a higher level of economic development, which is strongly and positively associated with urbanization, both urban *and* rural areas are more integrated with economic markets. These rural areas may share "lifestyle" similarities with urban areas. Many farmers produce not for subsistence or for their own food but for cash. Mechanization of agricultural production reduces the level of physical activity. Rural towns are connected by roads and by telecommunications with the rest of the world, just as are cities. The foods available to urban consumers are advertised and available in rural areas as well. The factors that lead to the nutrition transition and are associated with urbanization and economic development (Popkin 2002b) are apparent in rural as well as urban areas, and so the distinction becomes not urban-rural but more or less developed (or industrialized).

But how do these factors associate with under- and overnourished individuals in the same household? Shouldn't these global factors of urbanization and economic development lead to lower levels of childhood malnutrition and thus to very low or nonexistent levels of SCOWT? Not necessarily.

Monteiro et al. (1997) suggest that in less developed countries, undernutrition is highly dependent on food availability, so a high degree of intrafamiliar association of nutritional status (say, underweight with underweight) should exist. In more developed countries like Brazil, where the problems of low incomes and lack of food are relatively less widespread, undernutrition would be associated with specific diseases or individual characteristics. Little, if any, intrafamiliar association would be present.

In countries in transition, the explanation for undernutrition would likewise be in transition: the intrafamiliar association of nutritional status could depend more on one or the other factor, that is, on processes affecting the household as a whole (market availability, household income) or on individual factors (child or adult feeding patterns, individual diets and illness, and intrahousehold resource allocation).

SCOWT is one expression of this dissociation of intrafamiliar nutritional status, and we see that it emerges at higher levels of economic development and urbanization, that is, as expected, roughly in those countries in the midst of the nutrition transition. Interpreting the SCOWT phenomenon this way, we contend that at low levels of economic development and urbanization, constraints on nutrition of adults and children probably continue to be primarily economic, and manifest themselves at the *household* level as a lack of food and income affecting all members. As incomes rise and countries become increasingly urban, work and dietary patterns change, and prevalence of overweight increases. Generally speaking, household income is no longer the primary constraint to food security, and household caloric availability, a common measure of food security, is no longer the primary constraint to good nutrition.

The hypothesis that in transition countries household income will probably not be the main cause of food insecurity does not contradict Townsend et al.'s (2001) findings that in the United States, food insecurity is positively related to lower household income and overweight in women. First, Townsend et al. (2001) define food insecurity as "eating enough but not always the foods the individual wants," and "sometimes" not getting enough to eat. They do not use the indicator more commonly used in the developing-country context of insufficient calorie intake or availability. In fact, Townsend et al. (2001) exclude from their analysis households that "often" do not get enough to eat, effectively excluding households that probably are calorie insufficient. In fact, among the few (11 of 4,509, or less than 1 percent) "severely food insecure" women in their sample, those who "often" do not get enough to eat, overweight is *less* prevalent, as expected. However, Townsend et al. (2001) do not report total energy intake among these categories, and therefore we cannot determine actual caloric insufficiency.

Taken together as part of a global development continuum, these results suggest that the prevalence of overweight (or obesity) across income levels follows an inverted U–shape. Our own statistics show low prevalences of overweight mothers among the poorest nations. Monteiro, Conde, and Popkin (2002) look at a country in the midst of the transition (Brazil) and find higher levels of obesity among the *higher* income households of the *less* developed regions and among the *lower* income households of the *more* developed regions. Townsend et al. (2001) look at the more developed and urbanized portion of the U (the United States) and also find higher rates of overweight among lower income households. These results are consistent with the hypothesis that at higher levels of economic development—those countries farther along the U in the nutrition transition—individual rather than external pan-household factors are most important in determining food and nutrition security.

We would argue that *intra*household factors, including decisions affecting individual diet and care, rather than factors affecting the entire household, emerge as potentially the most important determinants of SCOWT. With the transition, there may be a shift in the relative importance of household versus individual determinants of food security and nutrition. *Individual* diets, activity, and disease patterns become more important.

The exact causes of the emergence of under- and overnutrition in the same household remain to be determined. Most research on the topic suggests that members of the household are probably not experiencing the changes in physical activity and diet that accompany the nutrition transition uniformly, leading to different individual outcomes (Popkin and Doak 1998; Doak et al. 2002). Indeed, differences in how infants and small children and adults experience the nutrition transition seem quite likely.

On the other hand, recent research suggests greater importance for a single factor, dietary quality, that could provide a common determinant for the coexistence of under- and overnutrition in the same household. Dietary quality—the micronutrient content of the diet and its composition in terms of percentage of energy from saturated fats or refined sugars—may then become the key nutritional constraint. Low dietary quality in

children usually results in inadequate micronutrient intake, which in turn causes micronutrient deficiencies and poor growth, health, and developmental outcomes. In adults, low quality diets may also result in micronutrient deficiencies and increase the risks of obesity because of the excessive amounts of energy, saturated fats, and refined sugars that these diets often contain. Poor dietary quality among energy sufficient households may thus be a determinant of SCOWT.

Along these lines, overweight and obesity may exist among the stunted children included in our SCOWT pairs as a result of affluence and positive energy balance. Recent research highlights the existence of an association between obesity and stunting in children in countries undergoing a nutrition transition (Popkin, Richards, and Monteiro 1996; Florencio et al. 2001; Hoffman et al. 2000).

Further investigation could assess the importance of overweight and obesity in our sample of SCOWT pairs. This would shed more light on different hypotheses. More specifically, an overweight mother in the household indicates that income is apparently enough for her to acquire sufficient calories to be overweight. She may not be eating "well"—that is, her diet may not be of high quality in terms of micronutrient content and percentage of energy from saturated fat or refined sugars—but she is certainly eating "enough" in terms of calories. But, as the discussion above suggests, does undernutrition in her child indicate a deficit in energy or micronutrients for that child? In both cases, broadly speaking, improvements in feeding practices are called for. But in the case of an energy deficit, the most appropriate response would be changes in intrahousehold resource allocations, with more food for the child. In the case of micronutrient deficits, the quality of the diet, with better, and not necessarily more, food should be improved.

5. Policy and Program Challenges

SCOWT poses a challenge for policymakers and programmers in developing and rapidly urbanizing countries. The prevalence of SCOWT and its association with urbanization and economic development highlight the fact that overweight as well as

stunting continue to be problems in many developing countries, in both urban and rural areas. It also shows that SCOWT is already a phenomenon that increases the complexity of nutrition and food-security interventions in Latin America. With increased economic development, SCOWT will probably emerge as a complicating factor in Asia and Africa as well. Policymakers and programmers can no longer assume that those with malnourished children are simply in need of "more food." They must tune their antipoverty and food and nutrition programs to a more complex reality.

In higher-income and more urbanized developing countries, policymakers may need to emphasize changes in *individual* dietary and activity patterns and in caring and feeding behaviors, not only general household access to food. They also need to address issues of dietary quality. In lower income and less urbanized developing countries, however, policymakers may in fact need to continue paying attention to policies and programs that increase *household* food availability and access.

This analysis highlights the individual nature of nutritional status and food insecurity in transition countries. In these countries, policymakers and programmers must tailor policies and programs to deal not only with the conflicting demands of dietary excess and deprivation in the population, but also in the same household. The analysis reinforces Uauy and Kain's (2002) concern that programmers must be careful when implementing feeding programs for children in countries in the "advanced stages of the transition," because lack of food may not be the primary constraint to good nutrition. It also casts doubt on the widespread use of child nutritional status as an indicator of household-level food insecurity, especially in countries in transition.

To deal with the challenges of the nutrition transition, experiences in Brazil, China, and Finland suggest a number of elements of successful programs to improve diets and activity levels (Coitinho, Monteiro, and Popkin 2002; Zhai et al. 2002). Lessons from these programs suggest that interventions must

- involve a wide range of community actors, including health services and schools, homemakers' organizations, and community leaders, and encourage community ownership;
- build capacity among these community organizations;
- convey research-based messages on diet change, supported by health information and nutrition counseling;
- include the food industry as allies, and enact appropriate regulations, especially regarding labeling; and
- support appropriate amounts of physical exercise.

Although these programs encourage healthier eating, and so are applicable to both undernourished (food-insecure) and overweight individuals, we have few examples of successful public nutrition programs that directly address the other part of the problem—undernutrition—at the same time. China's development of a diet-quality index and food guide pagoda is one of the few examples to provide a conceptual basis for policymaking that takes both deficiency and overconsumption into account (Stookey et al. 2000).

We have few instances, however, of policies or programs that fully embrace the fact that they must simultaneously address over- and undernutrition. In general, it seems that even in transition countries, policymakers will still have to pursue policies to improve income and health and hygiene behaviors. They must still ensure access to good health care, sanitation, and water for all. At the same time, they must develop strategies that respond to the differential needs of individuals within the household, and not affect just the household as a whole. The concrete recognition of this paradox could be an important step to delineating more effective and integrated strategies to do exactly that.

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