Chapter 6
The Situation of Children in Colombia[1]

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↑ Miguel Angel and Isabela Tobón are the youngest of a family of five children in Armenia (Quindío)

6.1. Introduction

→ One of the most important innovations in the Colombian Longitudinal Survey by Universidad de los Andes, (ELCA, acronym for its name in Spanish) is the collection of evaluation instruments for children in a nationally representative sample. In particular, the survey includes anthropometric measurements (weight and height) for children between the ages of 0 and 5, and measures of cognitive ability based on the Peabody Picture Vocabulary Test (PPVT) for children between the ages of 3 and 9. Children who are part of this sample are all children under 10 living in surveyed households, except for children of domestic servants, caretakers and their relatives, and the children of pensioners and their relatives. In total, ELCA has anthropometric data for 4,050 children under the age of 5, and cognitive development measurements for 5,965 children between the ages of 3 and 9.

In addition, the survey includes an extensive chapter regarding childcare arrangements of children below 5 years of age, which inquires about the care provided to children and some characteristics of the primary caregiver. Together, these data allow for a diagnosis of children up to the age of 9 in Colombia. The Natio-

1. We thank Camila Fernández and Carmen Elisa Flórez for their valuable comments.

nal Demographic and Health Survey (ENDS, acronym for its name in Spanish) includes information on the nutritional status of children, though not for a representative sample of households at a national level, but rather for a sample of women of childbearing age. However, until now there has been no nationally representative sample with child development indicators such as the PPVT. The availability of these data allows us to make a diagnosis of early childhood concerning their achievements and the needs for comprehensive childcare in the country, which constitutes valuable information for the design of public policy in Colombia.

In order to evaluate the nutritional status of children between the ages of 0 and 5, height and weight measures were collected. Based on these, we calculated Z-scores for height and weight according to the child's age and sex. The Z-score corresponds to height (weight) of the child *standardized* in accordance with the means and variances of the population, according to age and sex groups. The Z-score for height (weight) results of subtracting from the child's height (weight) the population mean for height (weight) given their age and sex group, and dividing this difference by the standard deviation of height (weight) for their age and sex groups in the population[2]. The result indicates the number of standard deviations that the child is above or below the population mean.

Based on the Z-scores, malnutrition, overweight and obesity levels can be calculated, according to the details presented in Table 6.1. The height for age index allows us to identify chronic malnutrition or stunting in the linear growth resulting from the cumulative effects of nutritional deprivation over time, both generational and in the early development stages of the child. The weight for age and weight for height indicators allow us to identify malnutrition generated from deficiencies (undernourishment) or excesses (overweight and obesity), the indicators are sensitive to eating habits and intake, and the presence of recent illness. The incidence of chronic malnutrition, for example, is measured as the percentage of children whose Z-score of height for age is below -2.

Table 6.1.
Definitions of Malnutrition, Overweight, and Obesity

Malnutrition		
Type	**Z-Score**	**Description**
Chronic (stunting)	Height for age	Less than 2 standard deviations
Underweight	Weight for age	Less than 2 standard deviations
Acute (wasting)	Weight for height	Less than 2 standard deviations
Obesity		
Type	**Z-Score**	**Description**
Height-Age	Height for age	More than 2 standard deviations
Weight-Age	Weight for age	More than 2 standard deviations
Weight-Height	Weight for height	More than 2 standard deviations
Overweight		
Type	**Z-Score**	**Description**
Height-Age	Height for age	Between 1 and 2 standard deviations
Weight-Age	Weight for age	Between 1 and 2 standard deviations
Weight-Height	Weight for height	Between 1 and 2 standard deviations

2. These population standards are calculated based on recent data of the World Health Organization (2006).

The PPVT (Dunn et al., 1986) is a standardized instrument for the individual's receptive (hearing) vocabulary and provides a quick estimate of their verbal ability or scholastic aptitude. The instrument is also highly correlated with individualized intelligence tests (correlation of 0.62 with the Stanford-Binet Intelligence Scale). The PPVT is based on the original Peabody Picture Vocabulary Test - Revised (PPVT-R) and uses 125 items to assess receptive vocabulary in Spanish. It is used as a screening test for verbal ability or verbal intelligence when Spanish is the language of the household and the community where the child was born. The test basically consists of associating the word heard with the corresponding image in the testing materials.

The PPVT has been widely used when studying preschoolers (see, for example, Bernal et al., 2009) because it does not require reading or writing, thus it is easy to administer. The PPVT's standardized scores (by age group) range from 55 to 145 points, with a population mean of 100 and standard deviation of 15. The standardized scores are adjusted according to child's age. The interpretation criteria[3] are summarized in Table 6.2.

Table 6.2.
Interpretation of PPVT Scores

Standardized score	Interpretation
> 130	Extremely high
115-130	Moderately high
105-114	Average high
95-104	Average
85-94	Average low
70-84	Moderately low
55-69	Extremely low

Source: Dunn et al. (1986).

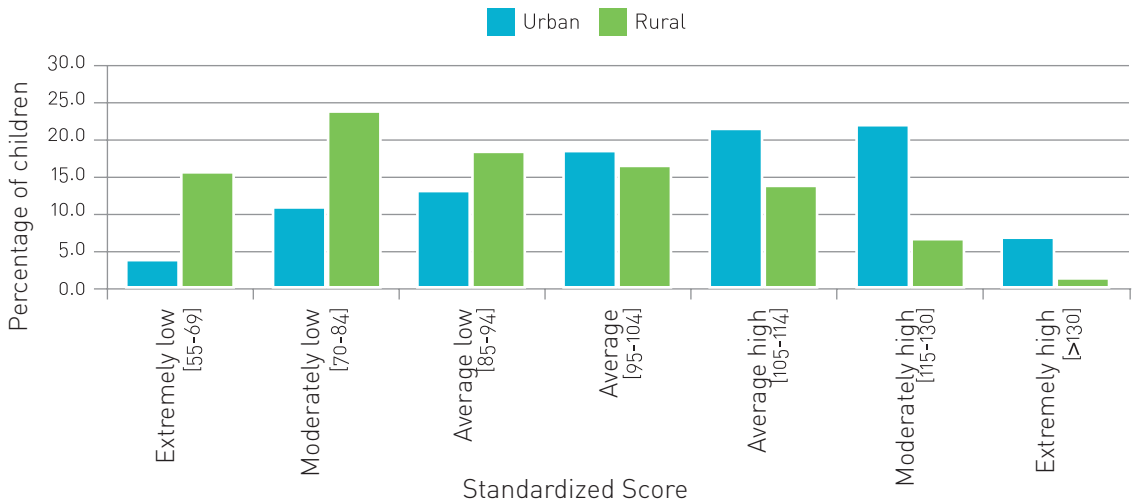
In this chapter we show some general results regarding the situation of children in Colombia according to their nutritional status and their cognitive development. Due to the nature of the ELCA sample, all results are reported separately for urban and rural areas. The socioeconomic status of households in the Survey is summarized by a wealth indicator constructed based on a variety of questions on housing characteristics and the socio-demographic characteristics of household members, based on the methodology of principal components. Based on this wealth index, the households were classified into wealth quintiles.

6.2. Cognitive Development of Children in Colombia

This section includes some results regarding cognitive development of children between the ages of 3 and 9, based on the PPVT test. Graph 6.1 shows the distribution of PPVT standardized scores by area (urban vs. rural). These results indicate large differences by area, with children in rural areas (green bars) at a distinct disadvantage in terms of cognitive development compared with children living in urban areas. In the case of urban areas, the mean score is 104 (average), while the mean score in rural areas is only about 89 (average low).

3. The PPVT scores were standardized according to international scales. In particular, the Mexican norms were used here.

Graph 6.1.
PPVT score by area of residence



Source: Own calculations based on ELCA.

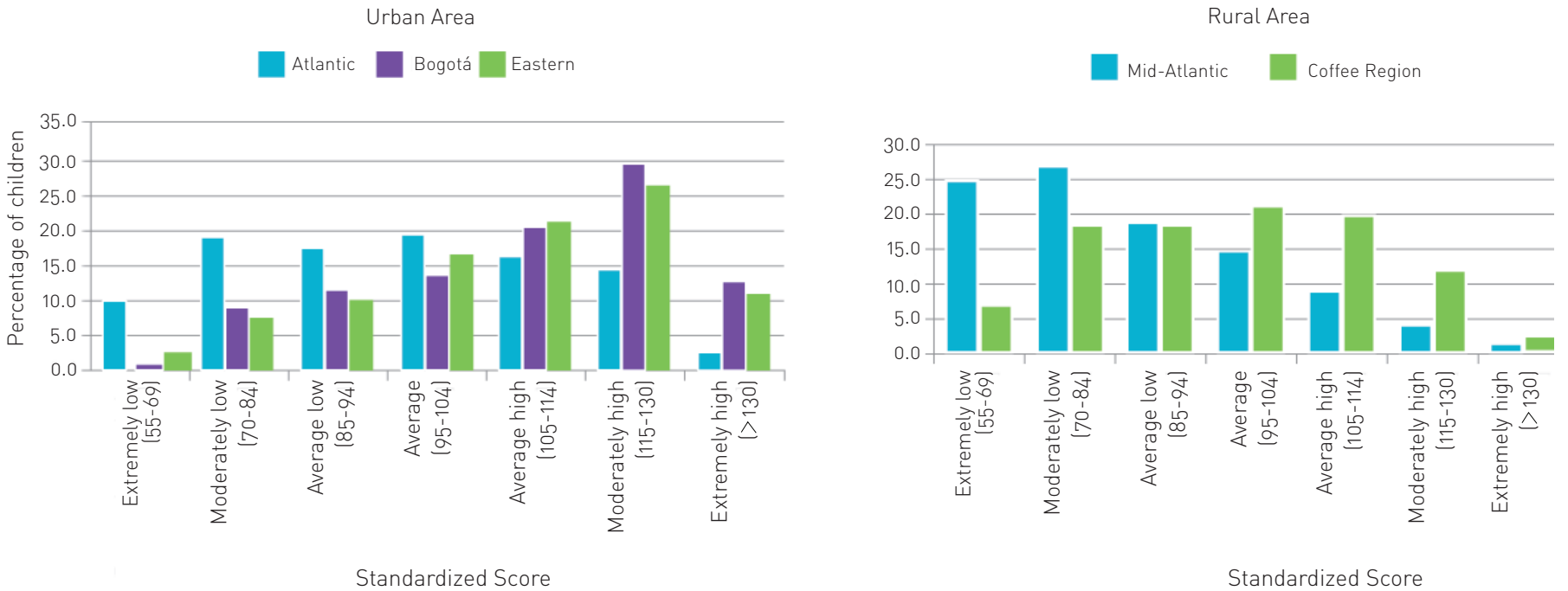
↑ In Santander, the Peña Rodriguez children: Kelly Johana, Andres Felipe Oviedo Peña and Luisa Fernanda.

Furthermore, large gaps between specific regions are evident in each area. In graph 6.2 we show PPVT scores for selected regions by area (urban in the left panel and rural in the right panel). Note that the rural Mid-Atlantic region has a distribution of child cognitive development scores to the left of the distribution of scores in the Coffee Region. That is to say, the scores in the Atlantic region are significantly lower than scores in the Coffee Region. Particularly, the average PPVT score in the first region is 83 (moderately low score), while the average in the second is 97 (average range). Something similar happens in urban areas, for which we show three regions: Atlantic, Bogotá, and Eastern. Note that the distribution of Bogotá is strictly to the right of the distribution of the Atlantic region, indicating much better outcomes for children in the former than in the latter.

In addition, it can be observed that the distribution of scores in the Atlantic region is to the left of the distribution of scores in the Eastern and Bogotá regions. That implies that children in the Atlantic region have significantly lower scores compared to other areas of the country, with an average of 95, compared with 110 in Bogotá and 109 in the Eastern region. In sum, there are significant disparities by area and by regions across the country.

In graph 6.3 we show standardized PPVT scores (Y axis) by child's age in months (X axis), and by area (rural in the left panel and urban in the right panel). In each panel, the three groups are split by household wealth, with the bottom line representing the poorest third and the top line representing the wealthiest third. Looking at the left panel of rural households, we can observe that scores at the age of 3 (36-months-old) for all three groups according to wealth (poorest, medium, and wealthiest) are almost identical at the level of 90, equivalent to an average low score.

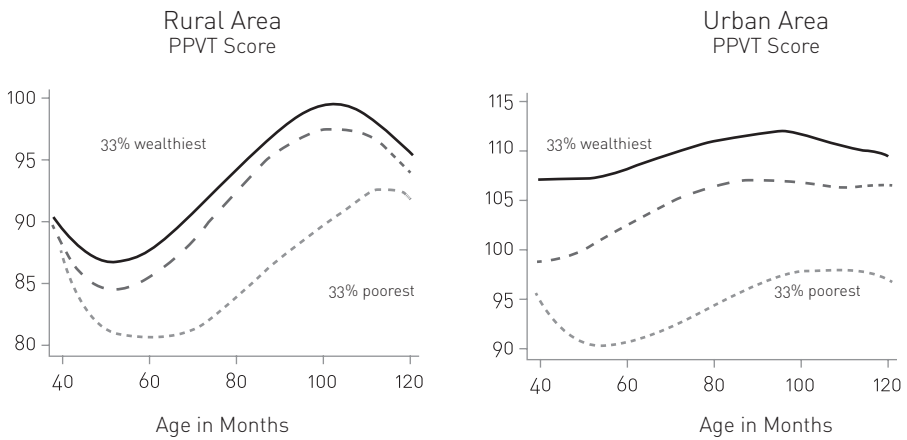
Graph 6.2.
PPVT Scores by Region



Source: Own calculations based on ELCA.

However, at the age of 5 (60-months-old), when children begin their formal primary education, a large dispersion in scores has already emerged between the poorest and the wealthiest. Just two years later, the children coming from the poorest households attain an average score of 80 (moderately low score), while the children in the wealthiest households reach levels close to 88 (average low scores). This implies that what happened in the course of two years between the ages of 3 and 5 was fundamental and generated a dramatic difference between the poorest and the wealthiest, a difference with which they begin their formal education process. As observed in the left panel of Graph 6.3, this gap is not closed during the observation period, even though it is mitigated when comparing the situation of 9-year-old children with 5-year-old children.

Graph 6.3.
PPVT Test by Level of Household Wealth



Source: Own calculations based on ELCA.

The diagnosis is even more critical when analyzing the situation of households in urban areas (right panel in Graph 6.3). In this case, the gap between the poorest and the wealthiest has already emerged as early as three years of age. By this time, children in the poorest third of Colombian households attain, on average, a score of 94 (low average), while the children in the wealthiest third score, on average, close to 108 (high average). Two years later, at the age of 5, this gap has widened, placing the poorest children on average scores of 90 and the wealthiest on average scores of 109. One possible explanation for this result is that formal childcare is more generalized in urban than rural areas. However, the quality of the different modalities of childcare for early childhood (before the age of 5) varies significantly across socioeconomic levels. The quality of childcare available to the lower socioeconomic levels may be significantly inferior than the quality of childcare available to the higher ones.

These results can be compared with the data reported by Schady (2010), which indicates that at the age of 5 the average PPVT score for the poorest quarter in Ecuador is 73.3, and the wealthiest is 94. Similarly, in Nicaragua, these scores correspond to 60 and 65, and in Peru to 66 and 105, respectively. Finally, in Mexico, the data for 4-year-old children indicates that the poorest third is placed at scores of 84, and the wealthiest at 93. Although not all country samples are nationally representative, and thus are not perfectly comparable, we observe worse performance of children in Nicaragua, while Colombia is similar to Ecuador and Peru. In addition, all countries show the same gradient with respect to the distribution of wealth.

In Colombia there is no other nationally representative survey with children's cognitive ability measures. Nevertheless, the results of ELCA can be compared with similar data available in the survey for the evaluation of early childhood program Hogares Comunitarios de Bienestar Familiar (see Bernal et al., 2009). This survey contains data representative of Hogares Comunitarios at the national level. In the same neighborhoods in the sample, information was collected for eligible children who were not beneficiaries of the Hogares Comunitiarios program. This means that the sample is not representative of any particular population (because it is representative of Hogares Comunitarios and not of children or households), but includes only children from SISBEN 1 and 2 households (SISBEN is the Spanish acronym for System for the Identification of Potential Beneficiaries of Social Programs, a system used to target social program in Colombia to the poorest households), because these are the neighborhoods where Hogares Comunitarios is located. Therefore, they are comparable only to households in the poorest quintile of ELCA.

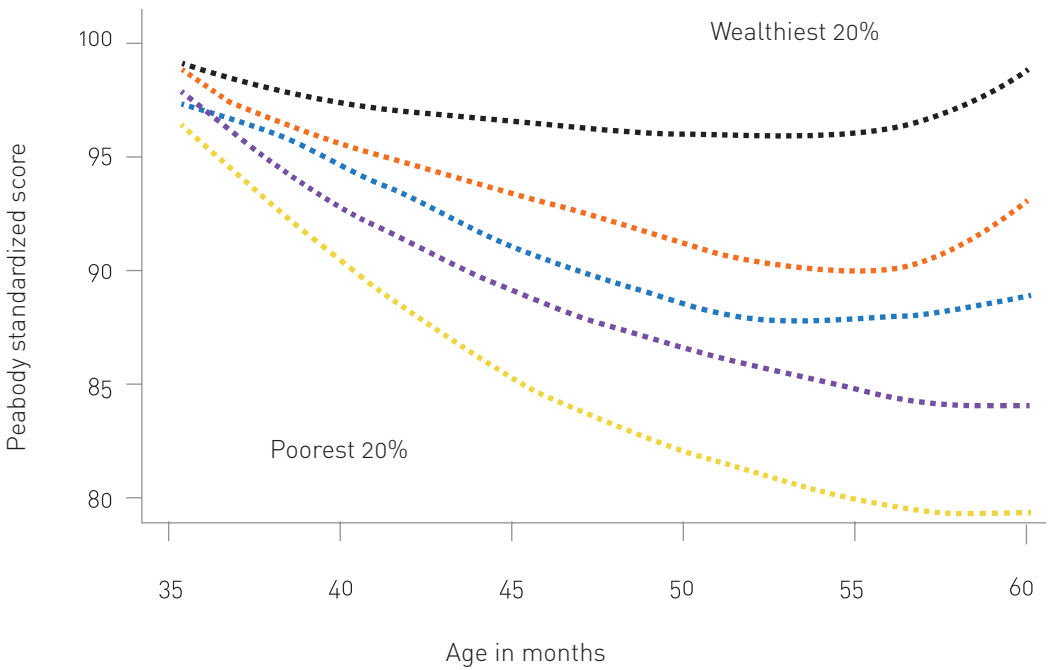
Table 6.3 and Graph 6.4 show this comparison. When contrasting standardized scores from both surveys (in the table), it becomes apparent that, on average, results are similar for the children in the evaluation of Hogares Comunitarios survey and children in the poorest quintile of ELCA. In addition, Graph 6.4 clearly replicates the observation that 3-year-old children preform equally, regardless of their income level, but the gap increases between the ages of 3 to 5.

Finally, Graph 6.5 shows the distributions of PPVT scores, by area, given mothers' educational level, which we classified as "High" if mother's schooling attainment is equal or greater than 9 years (sample mean), and "Low" if maternal schooling attainment is below this threshold. The left panel displays urban areas, while the right panel displays rural areas.

Table 6.3.
Comparison of Scores

	Hogares Comunitarios Sample	ELCA Poorest Quintile
PPVT Score	90,56	
Standard deviation	(15.56)	
Rural	88.27	83.73
Urban	91.37	92.18
Atlantic	87.61	87,32
Eastern	90.72	99,02
Bogotá	91.35	94,75
Central	89.62	94,24
Pacific	96.18	96,91

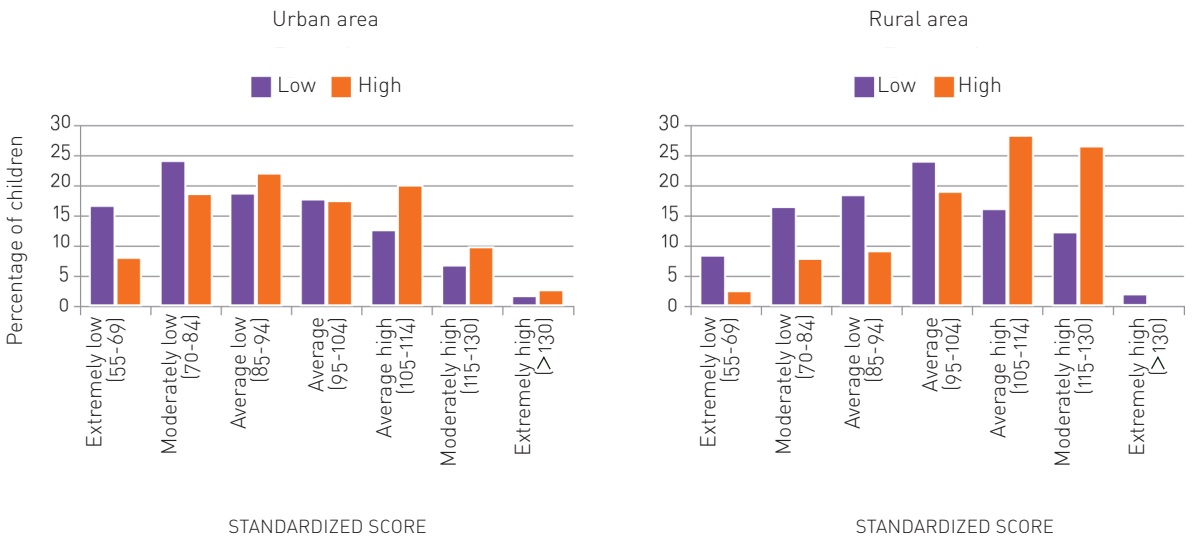
Graph 6.4.
PPVT Score in the Survey for the Evaluation of Hogares Comunitarios



Source: Own calculations based on ELCA and evaluation survey of Hogares Comunitarios early childhood program.

As expected, the mothers' educational attainment is highly correlated with the children's cognitive outcomes. In urban areas (left panel) the distribution of PPVT scores for children whose mothers have high schooling attainment is clearly to the right of the distribution of scores for children whose mothers have low education levels. In particular, the average score for children of more educated mothers is 107 (high average), compared to 96 (average) in the case of children with less educated mothers. In rural areas (right panel) the difference is less dramatic, but in the same direction, with scores of 95 (average) and 88 (low average), respectively. It is important to highlight that there are no observable differences between girls and boys in either of the areas.

Graph 6.5.
PPVT Score according by Maternal Schooling Attainment

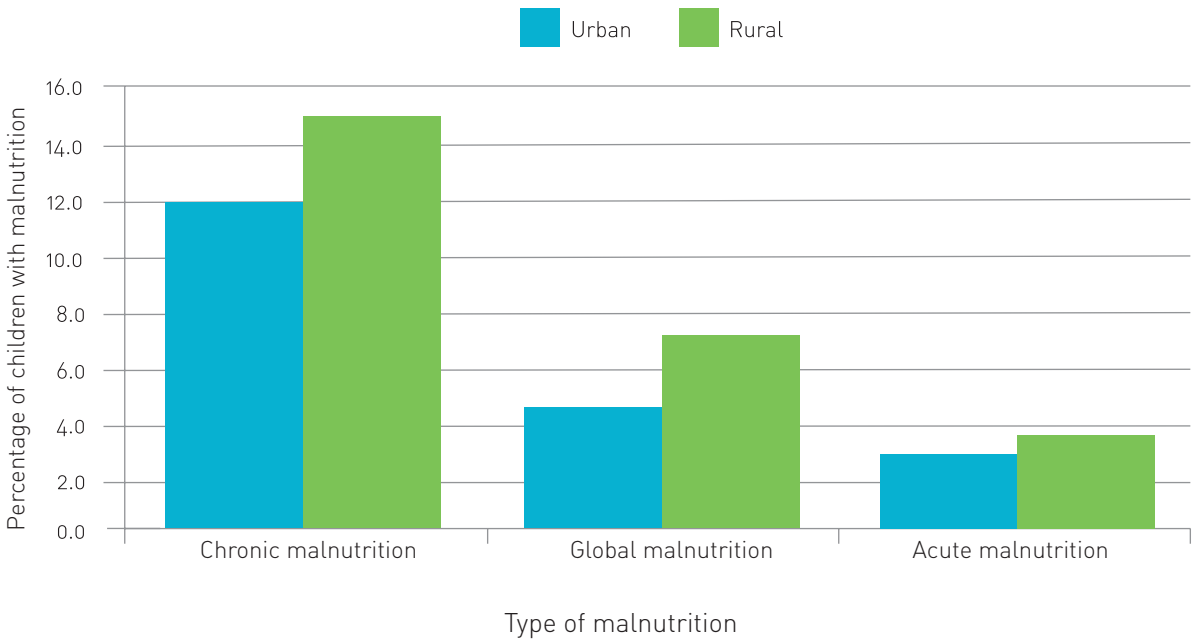


Source: Own calculations based on ELCA.

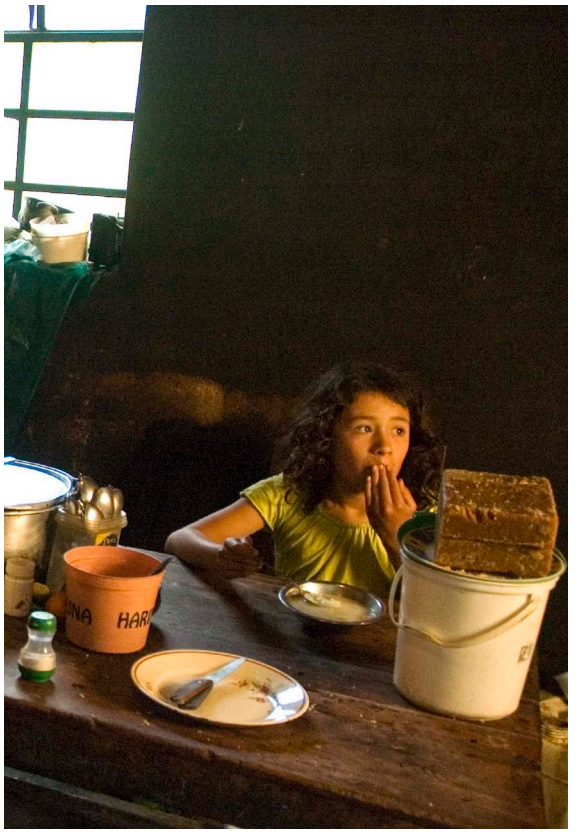
6.3 Children's Nutritional Status

Graph 6.6 displays malnutrition (chronic, global, and acute) levels for the group of children between the ages of 0 and 5 by area, according to the definitions presented in Table 6.1. The results indicate that the levels of malnutrition are higher in rural areas than in urban areas. In particular, urban areas show levels of chronic malnutrition of 12%, global malnutrition of 4.6%, and acute malnutrition of 3.2%, while in rural area these figures are 15%, 7.5% and 3.6 %, respectively.

Graph 6.6.
Malnutrition by Type and Area



Source: Own calculations based on ELCA.



Large differences are also observed by regions within each area. For example, the prevalence of chronic malnutrition in urban areas is 13% in the Atlantic region and 9.6% in the Pacific. It is interesting that Bogotá has the highest rates by region, with 15.3% incidence. As for acute malnutrition, the Central region exhibits the highest levels, close to 5.4%. In this case, Bogotá and the Eastern region have the lowest rates, close to 2%. In rural areas, the highest levels of prevalence of chronic malnutrition are found in the Cundiboyacense (20%) region, and the lowest in the Coffee and the Mid-Atlantic regions (13%). Something similar happens in the case of acute malnutrition.

For comparative purposes, Table 6.4 includes the levels of malnutrition by type, both rural and urban according to ELCA, in the left panel, and the national total[4], according to the National Demographic and Health Survey (DHS) in the right panel.

4. It is worth remembering that the ENDS (2005) is not representative of the Colombian households on a national level, but rather of the women of fertile age on a national level. This can explain some of the differences observed between the results of the two samples.

Table 6.4.
Comparison by source of the level of malnutrition

	ELCA		ENDS 2005
Malnutrition	Urban	Rural	Total
Chronic	12,1%	15,2%	12%
Global	4,6%	7,5%	5%
Acute	3,2%	3,6%	1%

Source: Own calculations based on ELCA and DHS (2005).

The results indicate that the prevalence of chronic and global malnutrition is similar in both data sources. The first is close to 12% and the second is around 5% (national total). However, the incidence of acute malnutrition is lower in the DHS (2005) compared to ELCA. Events with such low frequency are difficult to measure with precision: note, for example, that in urban areas the average of acute malnutrition, according to the ELCA, is 0.032 (children between the ages of 0 and 5) with a very high standard deviation of 0.17. This implies that data reported by ELCA and DHS (2005) are identical in statistical terms.

According to the data from the World Development Indicators (WDI), the average prevalence of chronic malnutrition in children between the ages of 0 and 5 in Latin America and the Caribbean was 15.94% in 2008. Meanwhile, the average prevalence of global malnutrition in the same year was 4.5%. This means that Colombia is below the regional average in terms of the measurements of height for age, but only below in rural areas, if malnutrition is considered in terms of weight for age. Furthermore, the same WDI data indicates that the prevalence of chronic malnutrition in children in the same age range in 2008 was only about 4%.

In Graph 6.7 we show the prevalence of chronic malnutrition (left panel) and acute (right panel), by area and household wealth quintile. In urban areas, the prevalence of chronic malnutrition is significantly higher among households in the lowest quintile of income, 16.3%, compared with 9.7% in the fourth quintile and 11% in the richest quintile. An interesting result suggested by this graph is that the prevalence of chronic malnutrition does not necessarily decrease monotonically along the income distribution. Note for example, that the levels for chronic malnutrition are higher in the richest quintile households than in households in the fourth quintile.

Acute malnutrition (right panel), does not monotonically decrease with household wealth in urban areas (for example, the third quintile exhibits high prevalence levels of acute malnutrition close to 4.2 %), but it is clear that the poorest quintile exhibits much higher levels (of 3.9%) than the wealthiest quintile (1.4%).

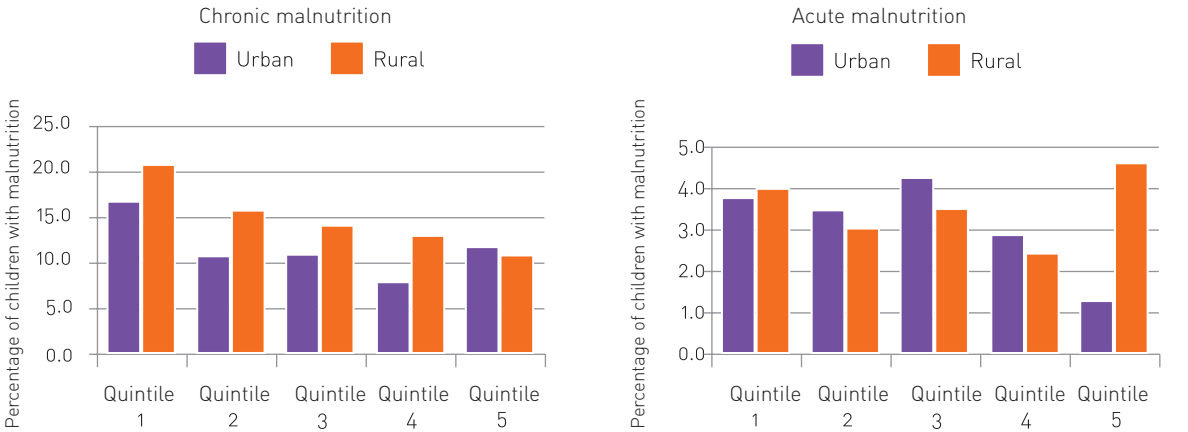
In rural areas, we can observe a downward trend in the prevalence of chronic malnutrition throughout the income distribution. While in the poorest quintile the fraction of children with chronic malnutrition exceeds 21%, in the wealthiest quintile it reaches 11.5%. The right panel shows that the trend for global malnutrition throughout the income distribution does not follow the expected decreasing pattern. In this case, households in the highest income quintile exhibit the highest prevalence levels of acute malnutrition, reaching 4.6% (again, it is important to remember that, since it is an event of very low prevalence in the population, it is difficult to detect levels accurately, being the standard deviation in this case close to 0.18). Finally, it is worth mentioning that similar patterns are observed regarding global malnutrition both in urban and rural areas.

↑ María del Rosario Causil with Santiago Franco, her grandson at her home in Ciénaga de Oro (Córdoba).

Graph 6.8 illustrates chronic (left) and acute (right) malnutrition by age groups. Children are divided into three age groups: children under the age of 1, children between the ages of 1 and 2, and finally, children between the ages of 2 and 5. The results indicate that the prevalence of chronic malnutrition in both urban and rural areas increases with the age of the child. In urban areas stunting reaches 10% in the case of children under the age of 1 and 12.4% in the case of children over the age of 2. Something similar happens in the case of rural areas. This is not surprising, given that height-for-age identifies lags in linear growth resulting from the cumulative effects of nutritional deprivation over time.

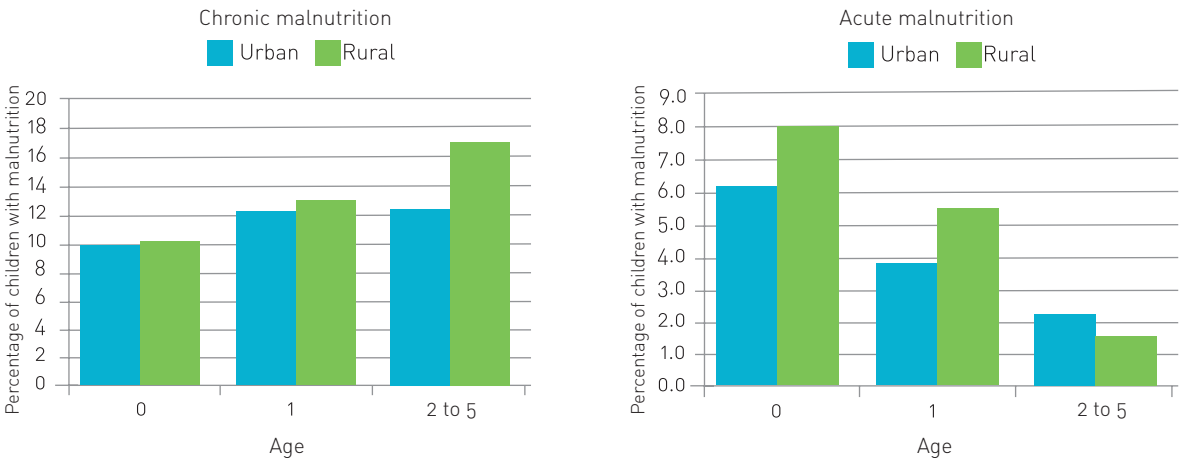
The inverse happens in the case of acute malnutrition. Weight-for-height identifies malnutrition due to deficiencies and is a significantly more sensitive indicator of habits, food intake, and recent illnesses. This reduction with child's age occurs in urban areas as well as in rural areas. The prevalence of acute malnutrition is close to 6% in urban areas among children under the age of 1, and decreases to 2.2% in the group of children between the ages of 2 and 5. In rural areas, this decline is of 8% in the first group, to 1.7% in the second. Something similar happens with the prevalence of global malnutrition, which decreases with the age of the child.

Graph 6.7.
Chronic Malnutrition and Acute Malnutrition by Area and Wealth Quintile



Source: Own calculations based on ELCA.

Graph 6.8.
Chronic and Acute Malnutrition by Area and Age

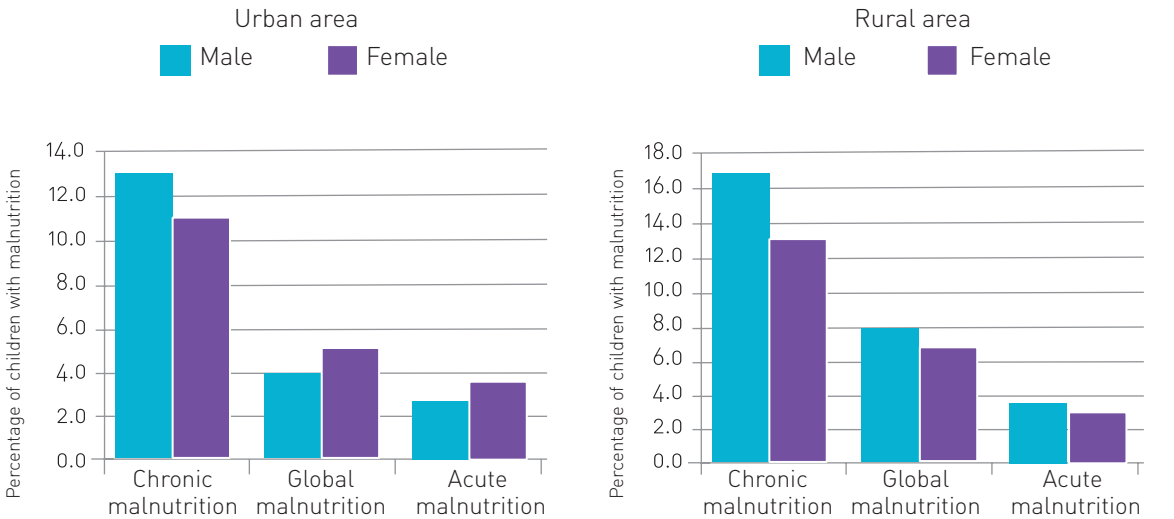


Source: Own calculations based on ELCA.

Finally, in Graph 6.9 we show the prevalence of the three types of malnutrition, according to child's sex and area of residence (urban to the left and rural to the right). In rural areas, the prevalence of the three types of malnutrition is higher among boys than girls. For example, the prevalence of chronic malnutrition is 17% for boys, while it is 13% for girls. Furthermore, in urban areas, the prevalence of chronic malnutrition is also higher among boys than girls (13% vs. 11%), but the reverse is true in the case of global malnutrition and acute malnutrition. Nevertheless, the differences in both indicators are quantitatively small.

↑ On this visit in Suba (Bogotá), psychologist Melina Santaella takes the measurements of Juan Pablo Restrepo (2 years, 8 months) in March 2010

Graph 6.9.
Malnutrition by area and gender of the child



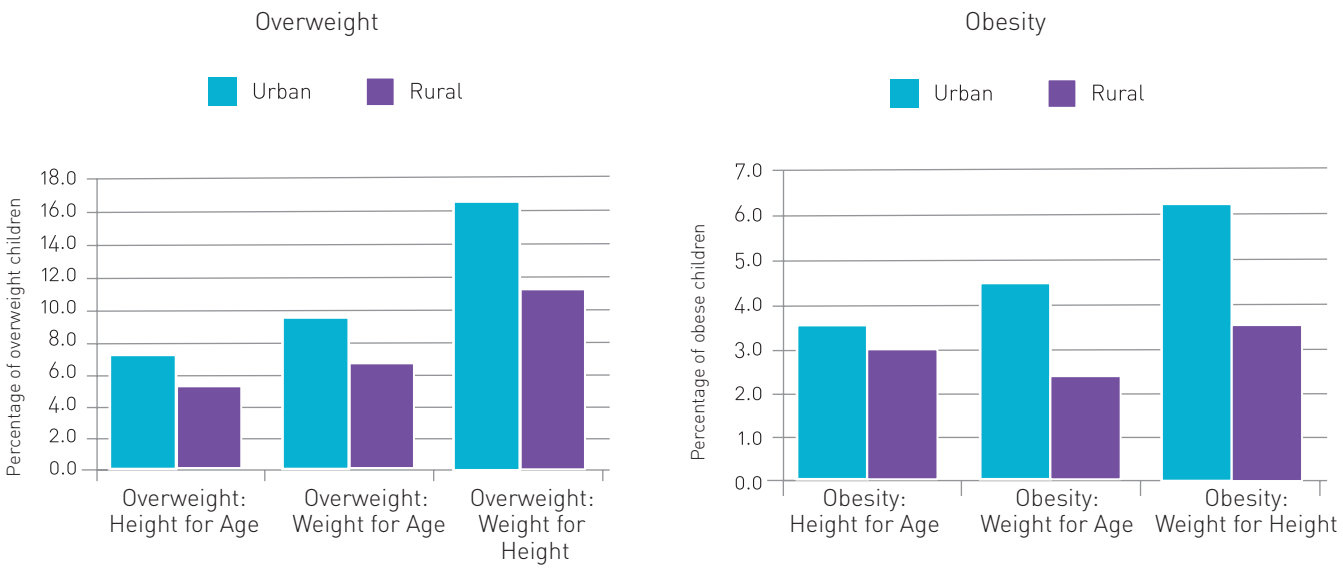
Source: Own calculations based on ELCA.

Overall there is a wide disparity between urban areas and rural areas in terms of children's nutritional status, with the prevalence rates of malnutrition being much higher in the latter. There is also a wide variation by region and an important correlation with socioeconomic status of households.

Graph 6.10 depicts overweight and obesity results according to different indicators of weight and height available in ELCA. The rates of overweight children under the age 5[5] in urban areas is between 6.7% and 15.5%, according to the height for age, weight for age, or weight for height indicator. In rural areas, the incidence of obesity is lower, being 11% the highest level according to the weight for height indicator.

5. Includes children up till 4-years and 11-months of age because this is the age range for which WHO standards exist.

Graph 6.10.
Overweight and obesity by area

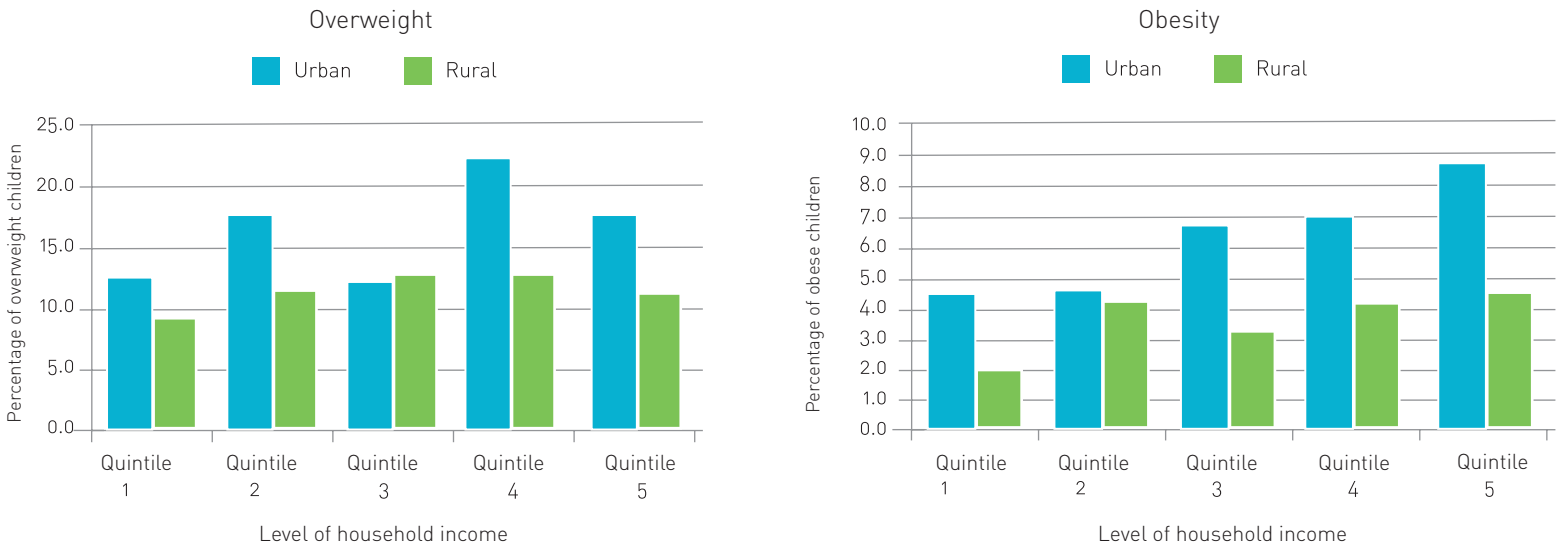


Source: Own calculations based on ELCA.

The prevalence levels of obesity are displayed in the right panel. The results indicate that obesity is more prevalent in urban than in rural areas. Obesity does not exceed 3.5% in the latter, while it reaches 6% in the former.

An interesting result shown in Graph 6.11 is the prevalence of overweight and obesity by household wealth. The prevalence of overweight is presented in the left panel, and in the right panel, the prevalence of obesity. In both cases the indicator of weight for height is used. Note that the fraction of obese children tends to increase with household wealth in urban areas. In particular, in urban areas the prevalence of obesity among the wealthiest is 8.6% and 4.5% in the case of the poorest households. That is, practically twice as much among the wealthiest. In rural areas something similar happens, although the pattern is less clear, it is also observed that the prevalence of obesity among the richest quintile is greater (4.2%) than among the poorest quintile (2.1%). In the case of the prevalence of overweight, the relation with the level of household wealth is less clear. However, it is observed that in urban areas the prevalence of overweight according to weight for height is higher in the top two quintiles of the wealth distribution, with respect to households in the three lowest wealth quintiles. For example, the incidence of overweight in the lowest quintile is 13%, whereas it is 21% in the fourth quintile and 19% in the highest quintile.

Graph 6.11.
Overweight and Obesity by Level of Household Wealth



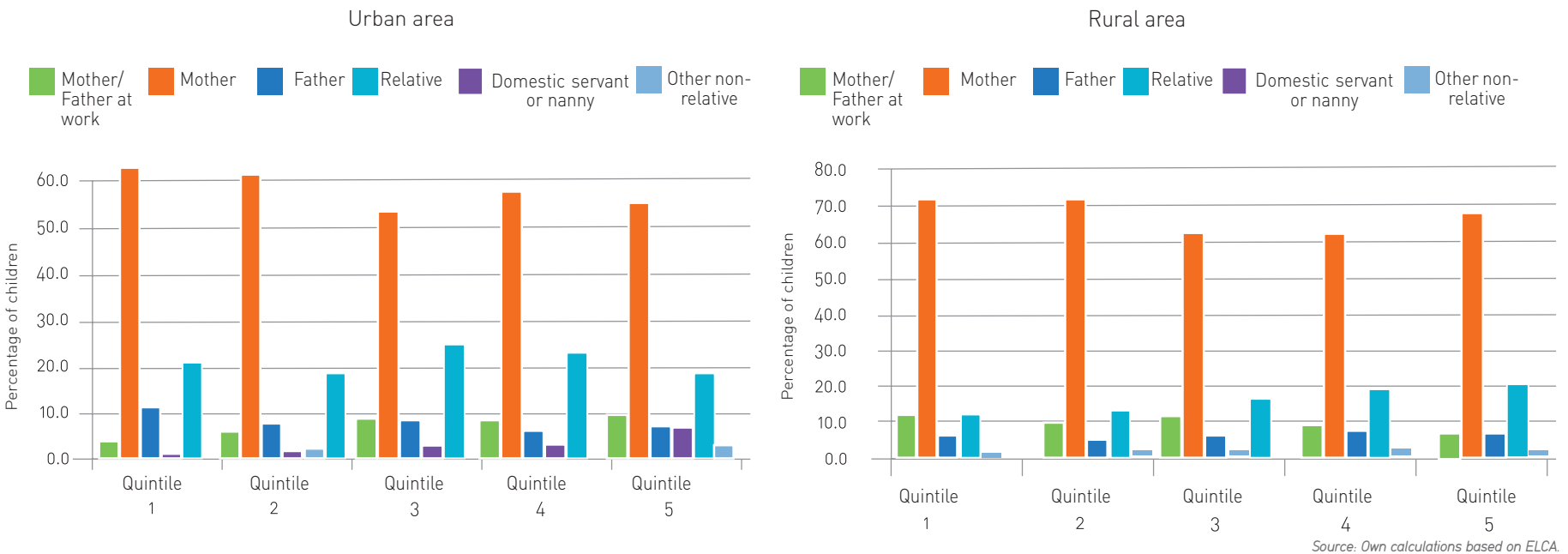
Source: Own calculations based on ELCA.

This might be attributed to children's diets being less balanced in households that have more resources for sweets, chocolates, snacks, and other foods that are not as nutritious, and that many children from the wealthiest households have working mothers and, consequently, other people who do not necessarily have the same education level as the mother or the same concern for the child's nutritional status are in the charge of their diets.

6.4. Childcare in Colombia

In Graph 6.12 we show the distribution of children under the age of 5, according to their primary caregiver, by household wealth. The left panel shows urban areas and the right panel shows rural areas. Possible caregivers included in the question are: mother, aunt/uncle, grandmother/grandfather, another non-relative, and a domestic employee (which in urban areas includes a nanny).

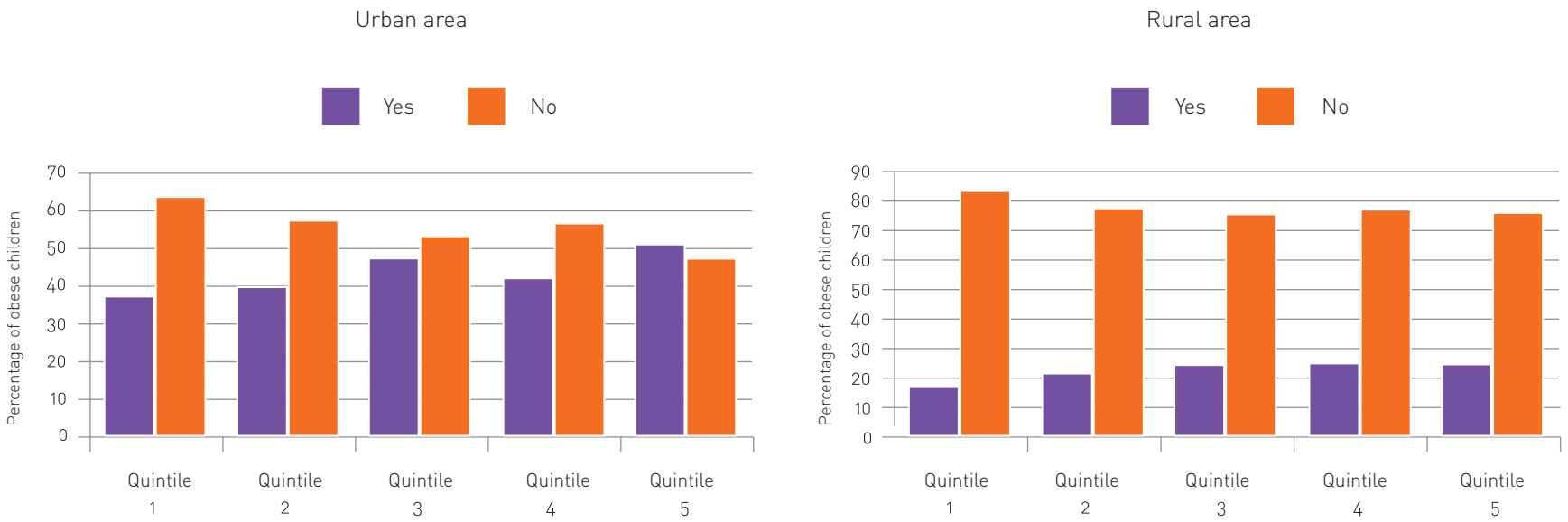
Graph 6.12.
Childcare during Early Childhood by Wealth Quintile



Source: Own calculations based on ELCA.

The first aspect that is important to highlight is that mothers appear to be the most frequent primary caregiver in both urban and rural areas. However, this fraction decreases with household income, and this is probably due to the fact that women with higher schooling attainment are more likely to work in the labor market. In addition, as household wealth increases, we observe an increase in the fraction of children being taken care of by other relatives. In the case of the wealthiest quintile, other relatives are a smaller proportion of caregivers and there is a significantly higher fraction of domestic employees and nannies taking care of children with respect to poorer households. For example, 1% of children in the second wealth quintile are taken care of by nannies or domestic employees, while 7% are among the wealthiest households.

Graph 6.13.
Attendance to Childcare Facility by Area



Source: Own calculations based on ELCA..

Finally, in Graph 6.13 we show the fraction of children under the age of 5 that attend a childcare center during weekdays. (Included options are: Hogares Comunitarios de Bienestar, daycare, or preschool)

We observe that in urban areas child care use is significantly more prevalent in urban areas than in rural areas (43% vs. 21%). This could, in turn, explain the differences in cognitive development according to income level observed at the age of 3 in urban areas (see Graph 6.3). Most children who report attending some childcare center are taken care of by a family member in their own home after school.

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