

## CHAPTER 2

# EARLY MOTHERHOOD: AN APPROACH THAT TAKES INTO CONSIDERATION THE EFFECT OF FACTORS THROUGHOUT LIFE

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→ The Álvarez Tapias family children are not allowed to play pool, but they have invented their own game and play marbles at home in Chinú (Córdoba).

.....→

1. We would like to thank Catherine Rodríguez for her comments.

### 2.1. INTRODUCTION

Early motherhood has been a considerable public health problem both in terms of its level of impact and the negative effects it has in both the short and long-term: not only for the child but also for the young mother (Flórez & Soto, 2006). Colombia, as well as a large number of Latin American countries, saw a growing trend in the adolescent fertility rate during the 1990s and the beginning of the 2000s: it increased from 70 to 90 per thousand births for adolescents between 15-19 years old (Flórez, 2011). However, since 2005, there has been a decreasing trend, nonetheless after ten years levels had not decreased to those observed in 1990, in 2015 there was an adolescent fertility rate of 75 per thousand (MinSalud - Profamilia, 2017). The same trend was also observed in the prevalence of adolescent motherhood, which can be measured by the percentage of adolescents between 15-19 who are either mothers or pregnant with their first child: this increased from 12.8% in 1990 to 20.5% in 2005, but the figure then dropped to 17.3% in 2015 (Flórez, 2011; MinSalud-Profamilia, 2017).

There are several studies that analyze the social and economic determinants of adolescent motherhood

in Colombia (Barrera & Higuera, 2003; Flórez et al., 2004; Flórez & Soto, 2006; Flórez, & Soto, 2013; Gaviria, 2000; Ordoñez & Murad, 2000; Vargas, Henao, & González, 2004). In general, the results indicate that adolescent fertility is a complex phenomenon; there are sociocultural determiners that have different levels of influence: there are individual, interpersonal, and contextual factors. The following factors are important on the individual level: level of education, access to Sexual and Reproductive Health (SRH) and family planning, and perceptions on maternity and on the opportunities for social mobility. The following factors are important on the interpersonal level: the household's socio-economic level, the family structure and domestic violence, the amount of communication with parents, parental supervision, and social and parental rules. Important macro contextual factors include the supply of quality SRH services, the SRH education policy, social rules on maternity and on when to begin sexual relations, and characteristics of the community of residence. Some studies emphasize the effect social and cultural factors have on both an interpersonal and contextual level; these have possibly been underestimated due to the large number of studies that have focused on individual factors (Flórez, 2011).

Despite the importance of the results from studies available, the majority are based on cross-sectional information, and, as such, are subject to intertemporal problems as social and cultural variables are observed when the survey is carried out; however, the maternity itself occurred in the past. The ideal



→ Sixteen year-old Camila (left) and fourteen year-old Karina Ramírez help their grandmother Inés María Álvarez with the cleaning at the La Esperanza pool hall. Karina helps her mother Yomaira Tapias to look after Isabela.

situation would be for the variables to refer to the moment that the event itself occurs, which is only possible if there is longitudinal information (follow-up or historical).<sup>2</sup> In terms of follow-up longitudinal information, the Colombian Longitudinal Survey by the Universidad de los Andes -ELCA is an information source that allows a first approximation of the factors associated with early motherhood. This chapter endeavors to advance understanding of adolescent pregnancy by taking a life course approach. It is our objective to analyze the effect that sociocultural factors on an individual, interpersonal, and contextual level, which change throughout life, have on the probability of being a mother between 12 and 19 years old, for a group of females who were between 15-24 years old in 2016. This was the third ELCA's follow-up round.<sup>3</sup>

The chapter has five sections including this introduction. The second section describes the methodology: from the conceptual framework to the selection of variables for the model that is used in the analysis. The

2. There is only one study in Colombia that has used historical information to analyze adolescent fertility: this was undertaken in 2003 by the Research Center for Economic Development (CEDE for its acronym in Spanish) at the Universidad de los Andes.

3. This chapter will not include girls aged between 12 and 14 as the incidence of teenage pregnancy within the sample in this range is very low: almost non-existent.



third section focuses on describing the characteristics of the population being analyzed. The fourth section presents the results of the model for the factors associated with early pregnancy. Lastly, the fifth section summarizes the conclusions.

## 2.2. METODOLOGY

### 2.2.1. CONCEPTUAL FRAMEWORK

The concept of adolescence depends on the era and culture; however, this chapter will use the definition that is commonly used, which refers to the period between 10 and 19 years old during which there are a series of biological and psychosocial changes that are associated with the transition between childhood and adulthood (Vargas, 2017).

Fertility can be expressed using the specific fertility rate<sup>4</sup> or the prevalence of motherhood. Based on the type of information that was gathered in the ELCA, the prevalence of motherhood was used, or, in other words, the prevalence of adolescents who are already mothers or are pregnant with their first child.

According to the literature on the subject, we recognize that fertility, based on the analysis of associated factors, is determined by distal and proximal factors. For early pregnancy, the proximal factors are mainly limited to the beginning/ frequency of sexual relations and the efficient use of birth control (Flórez & Soto, 2013). Distal factors affect

fertility both directly and indirectly through the proximal determinants. To analyze the distal factors, we used a social determinants of health approach, according to which the determinants are not confined to individual characteristics; they instead include factors that are associated with the physical, sociocultural, political, and economic environment within which the individual lives and develops (Braveman, Egerter, & Williams, 2011). Based on an ecological approach, the distal factors are organized into levels of influence: intrapersonal or individual factors (socioeconomic, demographic, and psychological variables), interpersonal factors (variables belonging to the primary groups such as family, peers, and social support networks), and contextual factors (community, institutional, and political variables).



→ Twelve year-old Sara Ballesteros comes home from school in Buenavista (Boyacá). She likes to accompany and help her father Rodrigo to harvest courgettes, blackberries, gulupa, avocado, and other crops that they have on their farm.

4. The fertility rate measures the ratio between the number of births from females who are a particular age or who belong to an age group, that occurs over a period of time (either a year or several years), per 1000 females who are this particular age or belong to this age group.

## 2.2.2. THE MODEL OF ANALYSIS

We use the discrete-time risk model with which we estimate the probability that a female will have her first child before she is 20 years of age. There are two advantages of this approach. First, it allows independent variables to be included that vary over time (such as age, school attendance, etc.); and secondly, it allows for the problem of censored observations on the right to be addressed: those females who, to date, are not yet twenty and we have no way of knowing if they will have their first child before they reach this age.

We use a logistic regression model in which the dependent variable is yes/no in terms of whether the female has had her first child at every age from 12 until completing 19 years or until the moment she is surveyed, if she is under 20. When the female has her first child, she is removed from the model. For example, an adolescent who was 17 years old when the survey was being carried out, who had her first child at 15, provided four observations: three that indicated she did not have her first child at 12, 13, or 14, and an observation indicating that the event took place when she was 15 years old. In the case that a 17 year-old has not had her first child at the time of the survey, the observation is censored and provides five observations, which indicate that the birth of her first child did not take place when she was 12, 13, 14, 15, or 16 years old (17 is not included because the year has not yet finished). According to the logistic model, the expected cumulative

probability that an adolescent  $i$  will have her first child at age  $t$  can be estimated in the following way:

$$h_{it} = \exp(a_i + X_i' \beta + u) / 1 + \exp(a_i + X_i' \beta + u) \quad (1)$$

Where  $h_{it}$  is the conditional probability that the female  $i$  will give birth to her first child at time  $t$ , given this has not happened previously;  $a_i$  is a function of age (a variable that changes over time),  $X_i$  is the vector of covariates (including those that change over time); and  $\beta$  is the corresponding parameter vector.

## 2.2.3. THE POPULATION AND VARIABLES OF ANALYSIS

The data for the analysis was taken from the baseline (2010) and the two ELCA follow-up rounds (2013 and 2016). We identified the females who were in the age bracket between 15 and 24 in 2016; this included all the females in the study (both follow-up and context), who were surveyed all three times. In total, there were 967 females from urban areas and 987 females from the rural micro-regions: 60% of the females from urban areas and 69% females from rural micro-regions were under twenty: in other words, they are adolescents, and the rest are between 20 and 24 (Graph 2.1).<sup>5</sup>

Females were observed for six years from 2010 to 2016. The age at which they began to be observed



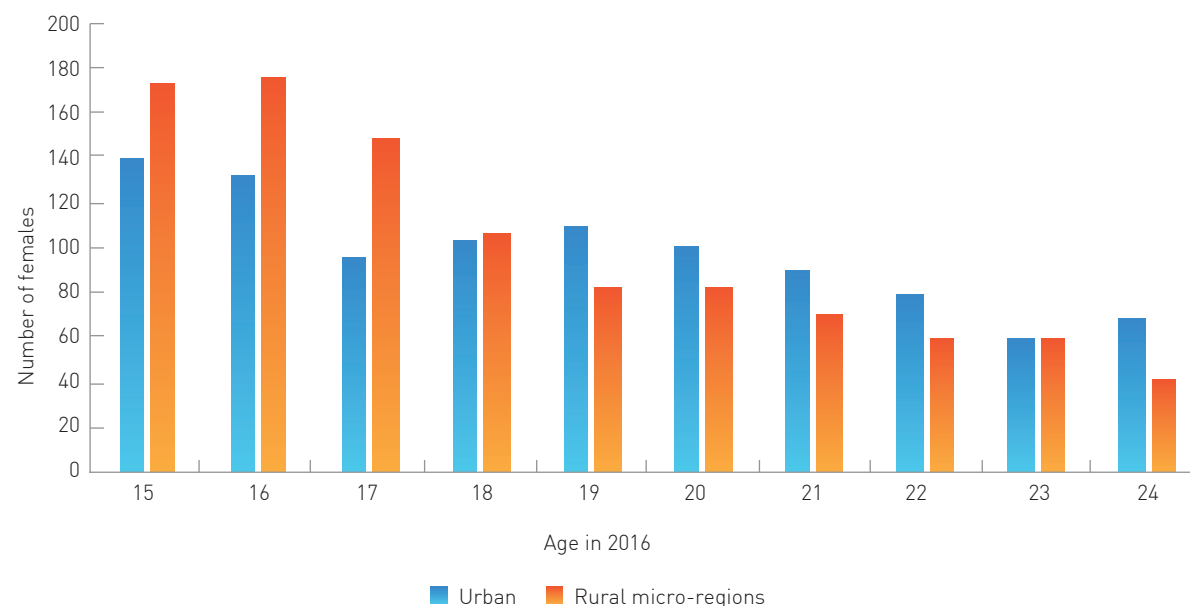
→ Alba Robayo left her job as salesperson in an agricultural inputs shop and now works in what she always dreamed of doing: teaching children. She set up a nursery school for comprehensive care in early childhood at her house in Buenavista (Boyacá).

changed depending on their actual age. The youngest age at which they were observed was 12 years-old, and the oldest was 18. Each age cohort contributed by providing different observations. Table 2.1 shows the distribution of females according to the age at which they began to be observed for each current age or the time at which the second follow-up started (2016). As expected, the survey began to observe the older females later, but they were observed for a longer period of time. Conversely, the younger females who were either 15 or 16 were only

5. For the analysis in this chapter, the zone where people live (urban/ rural) is set according to what was observed in the baseline (2010).



**GRAPH 2.1.**  
NUMBER OF WOMEN BY AGE IN 2016 BY ZONE



Source: ELCA 2010, 2013, and 2016. Authors' own calculations

observed for 3 or 4 years. Females under the age of 20 who had not yet had their first child in 2016 are censored observations on the right because we do not know if they will have their first child before they turn 20. Table 2.1 also shows the percentage of censored observations by age. As expected, the percentage of censored observations reduces with age: by 19, 90.3% of females from urban areas and

75.7% of those from rural micro-regions have not had their first child.

The dependent variable (yes/ no first child) is constructed from the age at which the woman had her first child or the age at the last available round of the survey if she still has not had a child. Due to the information available in the ELCA, in terms of proximate

determinants, it is only possible to know the woman's marital status over time; it is not possible to identify other factors relating to the proximate determinants of fertility (sexual relations and use of contraceptives). This limitation jointly captures the direct and indirect effects on distal factors and most probably generates the model's lack of explanatory power.

In terms of distal factors, the information available in the ELCA allows us to construct the following variables by level, which have been identified in other studies as determinant factors of early pregnancy:

- Factors on the individual level: Marital status, relationship with the head of the household, and level of education. These are all variables that change over time.
- Factors on an interpersonal level: Type of home, size of home, if the home has suffered a family shock (death of the head of the household or their spouse, loss of a job, or something similar), and if the household has suffered a shock due to displacement (due to disaster or violence),<sup>6</sup> which are variables that change over time. Also, we include the level of education that the mother of the female has and the household wealth tertile in 2010 (baseline), which are variables that are fixed over time.
- Factors on a contextual level: Size of the municipality, if there is a community health center, and if there is a secondary school in the community. These are all variables that change over time.

6. The shocks are calculated based on the value of the said variable in the round immediately after the reference year: for 2011 and 2012 the value is taken from the year 2013, and for the 2014 and 2015 the value is taken from 2016. This implies that this variable is not accumulative and that the persistence of shocks is a three-year period.

**TABLE 2.1.**

DISTRIBUTION OF FEMALES BY AGE AT WHICH THEY STARTED TO BE OBSERVED ACCORDING TO CURRENT AGE AND ZONE

Age from which they were observed (in 2010)	Current age (in 2016)									
	15 years	16 years	17 years	18 years	19 years	20 years	21 years	22 years	23 years	24 years
Urban										
12 years	100.0%	100.0%	100.0%	94.4%	2.9%					
13 years				5.6%	96.8%	12.6%				
14 years					0.3%	85.4%	14.0%			
15 years						2.0%	84.4%	6.9%		
16 years							1.6%	92.1%	3.5%	
17 years								1.0%	94.9%	7.0%
18 years									1.6%	76.8%
19 years										16.3%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
N	139	131	94	102	108	99	89	78	59	68
% females with teenage pregnancy	0.0%	4.4%	7.7%	9.2%	9.7%	7.1%	18.1%	14.1%	10.7%	7.1%
% censored	100.0%	95.6%	92.3%	90.9%	90.3%					
Rural Micro-regions										
12 years	100.0%	100.0%	100.0%	98.9%	6.9%					
13 years				1.1%	91.9%	7.5%				
14 years					1.3%	90.8%	9.4%			
15 years						1.6%	88.7%	5.7%		
16 years							1.9%	91.1%	4.6%	
17 years								3.2%	95.4%	11.1%
18 years										88.9%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
N	172	174	148	105	81	81	69	59	58	40
% females with teenage pregnancy	3.2%	7.2%	8.8%	21.3%	24.3%	19.8%	23.0%	27.4%	25.2%	19.6%
% censored	96.8%	92.8%	91.2%	78.7%	75.7%					

Source.: ELCA 2010, 2013, and 2016. Authors' own calculations



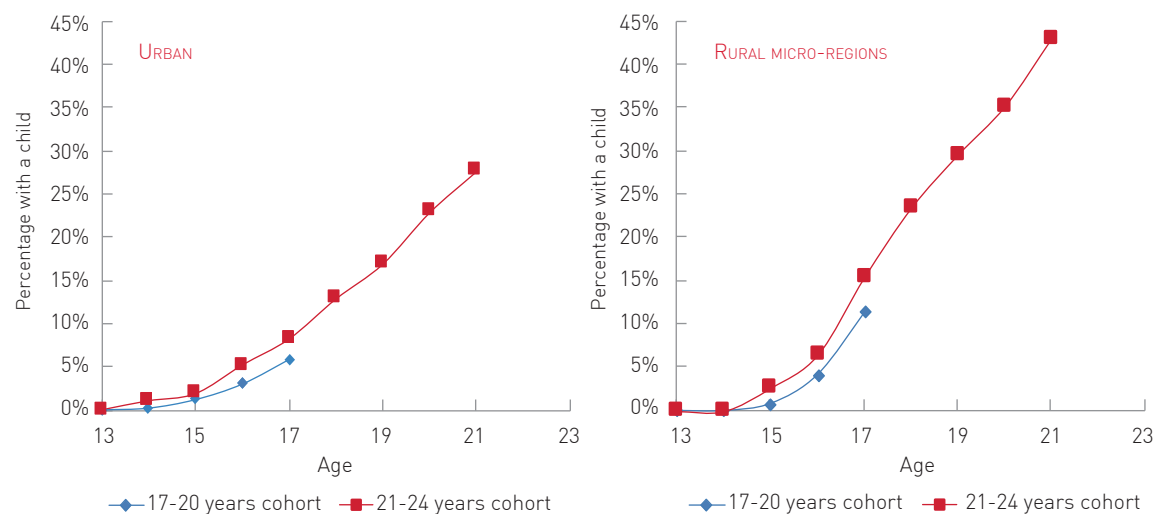
### 2.3. CHARACTERIZATION OF THE FEMALES UNDER STUDY

There is a lower prevalence of pregnancy for females living in urban areas than there is for females living in rural micro-regions for every age between 15 and 24 (Graph 2.2). This not only implies that adolescent girls are becoming pregnant at younger ages in rural areas, but also that there is also a higher incidence, which is confirmed by the results of previous studies (MinSalud-Profamilia, 2017). Moreover, Graph 2.2 also indicates that there is a lower prevalence of pregnancy in the younger cohort (17-20) than there is in the older cohort (21-24). This is consistent with the results from the Demographics and Health Survey (DHS), which indicates that the adolescent fertility rate and the prevalence of adolescent pregnancy began to reduce from 2005 (MinSalud-Profamilia, 2017).

Table 2.2 presents the frequency of individual factors and the bivariate descriptive statistics for adolescent pregnancy. It can be seen that that the females in the study are, for the most part, single in 2016: 92% of females living in urban areas and 85.7% of females living in rural micro-regions were single. However, as expected, the percentage of females who at one time had a partner increases over time as they get older and get partners. Moreover, the results confirm previous findings regarding patterns of marriages/ partnerships that happen at a younger age in the rural areas. Similarly, based on

**GRAPH 2.2.**

PERCENTAGE OF WOMEN WITH AT LEAST ONE CHILD BY AGE AND COHORT ACCORDING TO ZONE



Source: ELCA 2010, 2013, and 2016. Authors' own calculations

the ages of the females who were studied, the majority live in households in which they are daughters/ stepdaughters (at least 89% in the urban areas and 84% in the rural areas), which is something that does not really change over time. However, females' level of education increases significantly, particularly in the rural micro-regions: in 2010 45.7% of females living in urban areas and 65.4% living in rural micro-regions had finished primary school or less; while, in 2016, only 1.8% and 5.1%,

respectively, of females only had this level of education. This is consistent with the fact that, in 2010, the females were six years younger, and, also, that there have been advances in the Colombian education system's coverage.

Furthermore, the bivariate descriptive statistics of the individual factors for early pregnancy show marked differences for marital status and for level of education, especially in the rural micro-regions.

**TABLE 2.2.**

DISTRIBUTION OF FEMALES AND PREVALENCE OF ADOLESCENT PREGNANCY ACCORDING TO INDIVIDUAL FACTORS BY ELCA ROUND, AND BY ZONE

Individual factors		2010		2013		2016	
		Distribution	Adolescent pregnancy	Distribution	Adolescent pregnancy	Distribution	Adolescent pregnancy
<b>URBAN</b>							
Marital status	Single			97.1%	1.4%	92.6%	2.9%
	Married, partnership, other			2.9%	52.9%	7.4%	13.0%
	Total			100.0%	2.9%	100.0%	3.6%
Relationship with head of the household	Head or spouse	0.9%	79.4%	0.8%	5.6%	1.1%	0.0%
	Daughter or stepdaughter	89.1%	1.0%	90.4%	2.6%	88.8%	3.6%
	Other relationship	10.0%	0.8%	8.8%	6.0%	10.1%	4.5%
	Total	100.0%	1.6%	100.0%	2.9%	100.0%	3.6%
Education	Primary or less	45.7%	0.3%	9.3%	1.2%	1.8%	5.0%
	Basic/ Secondary	15.2%	3.4%	51.3%	2.9%	23.8%	3.8%
	Middle level or higher	39.1%	2.5%	39.4%	3.3%	74.4%	3.6%
	Total*	100.0%	1.6%	100.0%	2.9%	100.0%	3.6%
N		967					
<b>RURAL MICRO-REGIONS</b>							
Marital status	Single			93.9%	2.1%	85.7%	5.2%
	Married, partnership, other			6.1%	36.8%	14.4%	22.4%
	Total			100.0%	4.2%	100.0%	7.7%
Relationship with head of the household	Head or spouse	1.7%	46.1%	1.5%	26.9%	2.7%	1.4%
	Daughter or stepdaughter	86.6%	1.3%	86.6%	4.2%	84.0%	8.0%
	Other relationship	11.5%	5.8%	12.0%	1.6%	13.3%	9.0%
	Total	100.0%	2.6%	100.0%	4.2%	100.0%	7.7%
Education	Primary or less	65.4%	1.8%	15.7%	5.0%	5.1%	13.3%
	Basic/ Secondary	9.3%	4.9%	58.8%	3.1%	36.3%	7.9%
	Middle level or higher	25.4%	3.5%	25.6%	6.3%	58.5%	7.1%
	Total	100.0%	2.6%	100.0%	4.2%	100.0%	7.7%
N		987					

Source: ELCA 2010, 2013, and 2016. Authors' own calculations



Table 2.3 summarizes the descriptive characteristics for the interpersonal factors. It can be seen that the majority of females (at least 60% living in urban environments and 77% in rural micro-regions) live in households where there are two parents. However, there are less households with two parents between 2010 and 2016, which is consistent with the evidence from available studies that indicated an increase in households with only one parent due to the increase in the divorce and separation rate (Flórez & Rodríguez, 2016). Table 2.3 also reports the mothers of the studied females' level of education, which is a variable that is fixed over time. It can be seen that the education level of mothers of females who live in urban areas is higher than that of those who live in rural micro-regions: 77.4% of females in rural micro-regions have mothers who only have a primary level of education; this figure is only 34% in urban areas.

Family shocks between ELCA rounds (death of the head of the household or their spouse, or separations/ divorces) are more common in the micro-regions than in urban zones, and they become more frequent over time: in 2016, close to 25% of females living in urban areas and 34% living in rural micro-regions suffered a family shock. The same behavior was observed for shocks caused by displacement (either a natural disaster or violence): in 2016, 7.6% of females living in urban areas and 32.5% living in rural micro-regions suffered a shock caused by displacement.



→ Thirteen year-old María Isabel García answers the tests that were given to children in ELCA. She lives in Bogotá, and her parents earn their livelihood from a market stall in Corabastos.

**TABLE 2.3.**  
DISTRIBUTION OF FEMALES AND PREVALENCE OF ADOLESCENT PREGNANCY ACCORDING TO INTERPERSONAL FACTORS BY ELCA ROUND, AND BY ZONE

Interpersonal factors		2010		2013		2016	
		Distribution	Adolescent pregnancy	Distribution	Adolescent pregnancy	Distribution	Adolescent pregnancy
URBAN							
Type of household	Single parent	35.3%	1.5%	34.6%	3.9%	37.9%	3.9%
	Two parents	64.7%	1.7%	65.5%	2.3%	62.1%	3.5%
	Total	100.0%	1.6%	100.0%	2.9%	100.0%	3.6%
Mother's education	None	2.7%	2.6%	2.7%	5.5%	2.7%	10.0%
	Some primary education	18.3%	0.3%	18.3%	1.8%	18.3%	2.5%
	Full primary education	13.0%	3.8%	13.0%	5.2%	13.0%	6.4%
	Some secondary education	19.2%	3.7%	19.2%	4.3%	19.2%	5.3%
	All secondary education	21.7%	1.1%	21.7%	3.4%	21.7%	4.3%
	Further education	25.2%	0.1%	25.2%	0.6%	25.2%	0.2%
	Total*	100.0%	1.6%	100.0%	2.9%	100.0%	3.5%
Family shock	No	85.5%	1.8%	74.4%	2.6%	72.2%	4.0%
	Yes	14.5%	0.7%	25.6%	3.8%	24.8%	2.7%
	Total	100.0%	1.6%	100.0%	2.9%	100.0%	3.6%
Displacement shock	No	98.8%	1.5%	92.4%	2.6%	92.4%	3.7%
	Yes	1.2%	12.1%	7.6%	6.2%	7.6%	2.5%
	Total	100.0%	1.6%	100.0%	2.9%	100.0%	3.6%
Wealth tertile	Low	38.1%	2.0%	28.2%	6.5%	31.1%	5.2%
	Middle	33.5%	1.6%	38.7%	1.1%	34.1%	3.6%
	High	28.5%	1.2%	33.0%	1.9%	34.9%	2.4%
	Total	100.0%	1.6%	100.0%	2.9%	100.0%	3.6%
N		967		967		967	
*N		898		898		898	
RURAL MICRO-REGIONS							
Type of household	Single parent	17.5%	2.5%	19.0%	4.4%	22.9%	7.6%
	Two parents	82.5%	2.6%	81.0%	4.2%	77.2%	7.7%
	Total	100.0%	2.6%	100.0%	4.2%	100.0%	7.7%
Mother's education	None	9.4%	2.2%	9.4%	4.6%	9.4%	10.1%
	Some primary education	39.2%	3.1%	39.2%	4.2%	39.2%	11.4%
	Full primary education	28.8%	2.3%	28.8%	4.0%	28.8%	5.5%
	Some secondary education	16.7%	2.9%	16.7%	4.7%	16.7%	5.3%
	All secondary education	4.3%	1.2%	4.3%	4.8%	4.3%	0.0%
	Further education	1.7%	4.3%	1.7%	0.0%	1.7%	0.0%
	Total*	100.0%	2.7%	100.0%	4.2%	100.0%	7.9%
Family shock	No	83.2%	2.7%	70.9%	4.5%	66.1%	8.1%
	Yes	16.8%	2.2%	29.1%	3.6%	33.9%	7.0%
	Total	100.0%	2.6%	100.0%	4.2%	100.0%	7.7%
Displacement shock	No	99.4%	2.6%	74.1%	4.2%	68.5%	6.6%
	Yes	0.6%	0.0%	25.9%	4.3%	31.5%	10.1%
	Total	100.0%	2.6%	100.0%	4.2%	100.0%	7.7%
Wealth tertile	Low	35.8%	2.7%	35.8%	4.9%	33.7%	11.9%
	Middle	33.3%	3.5%	31.1%	4.6%	32.0%	5.2%
	High	30.9%	1.4%	33.2%	3.2%	34.3%	5.8%
	Total	100.0%	2.6%	100.0%	4.2%	100.0%	7.7%
N		987		987		987	
*N		937		937		937	

Source: ELCA 2010, 2013, and 2016. Authors' own calculations





→ In 2014, sixteen-year old Antonia Peláez Rincón dreamt of studying music and playing the cello. By 2017, her dream had changed and she now wants to become a scientist.

Both the rural and urban females in the study belong to households from the three wealth tertiles, and there is no specific concentration: there is roughly a third in each tertile, and there are no important changes over time.

The bivariate descriptive statistics for the interpersonal factors relating to early pregnancy that are presented in Table 2.3 show a negative relationship with the mother's level of education and with the wealth tertile, which confirms the results from previous studies. The mother's education, as well as household wealth, has been a factor that has been widely recognized as a determinant of early pregnancy. Conversely, a family shock does not

show a relationship with early pregnancy; however, a shock caused by displacement shows a positive relationship in the rural micro-regions: the prevalence of early pregnancy is higher for females who have experienced a shock due to displacement than for those who have not.

Table 2.4 presents the contextual descriptive factors. It can be seen that the majority of females who live in urban areas lived in intermediate sized municipalities (more than 50%) or large sized municipalities (close to 40%) during the time of the study; however, females from rural micro-regions lived in small municipalities (around 30%) and in intermediate sized municipalities (69%). Despite a high percentage (40%) of females having lived in the four big cities<sup>7</sup> during the time in which the observation took place, they have lived in communities in which they have not had complete access to health care centers or to secondary education. 62% have lived in communities that do not have health care centers, and 50% do not have a secondary school. Females from rural micro-regions have been seriously limited in terms of their supply of healthcare and education. At least 90% lived in communities without a healthcare center and 80% in communities without a secondary school.

The bivariate descriptive statistics for the contextual factors of early pregnancy indicate a negative relationship with the size of the municipality, particularly in urban areas and if there is a healthcare center and secondary school, especially in the rural micro-regions.

## 2.4. FACTORS ASSOCIATED WITH PREGNANCY BASED ON A LONGITUDINAL APPROACH

As was noted in the methodology section, in order to estimate the effect that the different factors have on early pregnancy, we estimated a discrete risk model (logit). The model was estimated in stages: first we included the set of variables for individual factors (model 1), then we included the interpersonal factor variables (model 2). Lastly, we included the set of variables for the contextual factors (model 3). The models were estimated separately for both the urban areas and the rural micro-regions. Table 2.5 presents the marginal effects; the standard errors are presented in brackets.

The results indicate that in both the urban areas as well as the rural micro-regions, the set of individual factors (the female's age, civil status, and education level) are variables that have significant effects. In terms of having a child, as age increases, the probability increases; there is a higher probability for married females/ females with partners/ than there is for single females, and the probability decreases with an high school education or higher. These effects are higher in urban zones than in rural micro-regions. The marginal effects of these variables tend to reduce when interpersonal and contextual factors are included, but they do not lose significance. This suggests an important direct effect from this set of variables.

.....→

7. Municipalities that have more than 1 million inhabitants.

**TABLE 2.4.**

DISTRIBUTION OF FEMALES AND PREVALENCE OF ADOLESCENT PREGNANCY ACCORDING TO CONTEXTUAL FACTORS BY CLS ROUND, AND BY ZONE

Contextual factors		2010		2013		2016	
		Distribution	Adolescent pregnancy	Distribution	Adolescent pregnancy	Distribution	Adolescent pregnancy
<b>URBAN</b>							
Size of municipality (population)	Less than 25,000 habitants	4.9%	1.9%	4.6%	3.1%	4.4%	6.9%
	From 25,000 to 1,000,000 habitants	56.6%	1.5%	56.5%	3.4%	51.9%	4.4%
	More than 1,000,000 habitants	38.5%	1.8%	38.9%	2.2%	43.7%	2.4%
	Total	100%	1.62	100%	2.9%	100%	3.6%
Community has a health center	Yes	29.2%	1.8%	24.7%	2.5%	36.8%	4.0%
	No	70.8%	0.6%	75.3%	4.2%	63.2%	4.3%
	Total*	100.0%	0.9%	100.0%	3.8%	100.0%	4.2%
Community has a secondary school	Yes	45.7%	1.4%	37.8%	2.4%	48.6%	4.7%
	No	56.3%	0.4%	62.2%	4.6%	51.4%	3.7%
	Total	100.0%	0.9%	100.0%	3.8%	100.0%	4.2%
N		967		967		967	
*N		542		542		542	
<b>RURAL MICRO-REGIONS</b>							
Size of municipality (population)	Less than 25,000 habitants	32.3%	1.8%	30.2%	2.6%	29.4%	4.4%
	From 25,000 to 1,000,000 habitants	67.7%	3.0%	68.9%	5.0%	68.6%	9.2%
	More than 1,000,000 habitants	0.0%	0.0%	1.1%	0.0%	2.0%	4.9%
	Total	100%	2.58	100%	4.2%	100%	7.7%
Community has a health center	Yes	10.3%	0.5%	7.8%	3.5%	6.3%	5.1%
	No	89.7%	1.0%	92.2%	3.4%	93.7%	7.6%
	Total*	100.0%	1.0%	100.0%	3.4%	100.0%	7.4%
Community has a secondary school	Yes	19.1%	0.3%	17.8%	2.4%	17.9%	6.7%
	No	80.9%	1.1%	82.3%	3.6%	82.1%	7.6%
	Total	100.0%	1.0%	100.0%	3.4%	100.0%	7.4%
N		987		987		987	
*N		686		686		686	

Source: ELCA 2010, 2013, and 2016. Authors' own calculations



**TABLE 2.5.**

LOGIT MODEL FOR THE PROBABILITY OF HAVING A CHILD DURING ADOLESCENCE. MARGINAL EFFECTS.  
FEMALE BETWEEN 15-24 YEARS. URBAN AND RURAL MICRO-REGIONS.

VARIABLE		URBAN			RURAL MICRO-REGIONS		
		Model (1)	Model (2)	Model (3)	Model (1)	Model (2)	Model (3)
		mfy dydx	mfy dydx	mfy dydx	mfy dydx	mfy dydx	mfy dydx
Individual factors	Age	0.007*** (0.001)	0.006*** (0.001)	0.006*** (0.001)	0.008*** (0.001)	0.005*** (0.001)	0.004*** (0.001)
	Marital status (Married, partner, other)	0.254*** (0.061)	0.255*** (0.067)	0.254*** (0.072)	0.120*** (0.032)	0.060** (0.024)	0.056** (0.025)
	Relationship (Head or spouse)	-0.005 (0.004)	-0.002 (0.005)	0.001 (0.008)	-0.004 (0.006)	-0.001 (0.004)	-0.003 (0.002)
	Relationship (other)	0.008 (0.006)	0.001 (0.005)	0.001 (0.005)	-0.002 (0.004)	0.005 (0.005)	0.006 (0.006)
	Education (Basic secondary)	0.001 (0.003)	0.001 (0.003)	0.001 (0.003)	0.010*** (0.004)	0.005 (0.004)	0.000 (0.003)
	Education (Middle level or higher)	-0.006** (0.003)	-0.005* (0.003)	-0.003 (0.003)	-0.007** (0.003)	-0.004 (0.002)	-0.004* (0.002)
Interpersonal factors	Type of household (Single parent)		0.004 (0.003)	0.004 (0.003)		0.002 (0.003)	0.000 (0.002)
	Mother's education (Some primary education)		0.005 (0.007)	0.017 (0.014)		0.004 (0.004)	0.000 (0.003)
	Mother's education (Full primary education)		0.008 (0.008)	0.012 (0.011)		0.002 (0.005)	-0.001 (0.003)
	Mother's education (Some secondary education)		0.020* (0.011)	0.031* (0.017)		0.015 (0.012)	0.005 (0.006)
	Mother's education (Full secondary education)		0.019* (0.011)	0.030* (0.017)		-0.002 (0.007)	-0.002 (0.004)
	Mother's education (Higher education)		0.003 (0.008)	0.008 (0.012)			

(Continue...)

**TABLE 2.5.**

LOGIT MODEL FOR THE PROBABILITY OF HAVING A CHILD DURING ADOLESCENCE. MARGINAL EFFECTS.  
FEMALE BETWEEN 15-24 YEARS. URBAN AND RURAL MICRO-REGIONS. (...Continuation).

VARIABLE		URBAN			RURAL MICRO-REGIONS		
		Model (1)	Model (2)	Model (3)	Model (1)	Model (2)	Model (3)
		mfy dydx	mfy dydx	mfy dydx	mfy dydx	mfy dydx	mfy dydx
Interpersonal factors	Family shock (Yes)		-0.002	-0.002		0.002	0.003
			(0.002)	(0.002)		(0.003)	(0.003)
	Displacement shock (Yes)		-0.003	-0.002		-0.004	-0.003*
			(0.003)	(0.004)		(0.002)	(0.002)
	Poorest tertile		0.006**	0.004		0.001	0.001
		(0.003)	(0.003)		(0.003)	(0.002)	
	Richest tertile		0.001	-0.001		0.002	0.002
			(0.003)	(0.003)		(0.003)	(0.003)
	Size of household (Number of people)		0.001**	0.001**		0.000	-0.000
			(0.001)	(0.001)		(0.000)	(0.000)
Contextual factors	Municipality (25,000 to 1 million)			0.002			-0.002
				(0.003)			(0.002)
	Municipality (4 main cities)			-0.000			
				(0.004)			
	Health center in the community (Yes)			0.001			-0.003
			(0.003)			(0.002)	
	Secondary school in the community (Yes)			-0.006**			-0.001
				(0.003)			(0.002)
	Observations	3.857	3.552	3.064	4.122	2.146	1.931

Standard errors in brackets

\*\*\* p<0.01. \*\* p<0.05. \* p<0.1

Source: ELCA 2010, 2013, and 2016. Authors' own calculations

For the group of variables belonging to the interpersonal factor, it can be seen that the level of wealth has a positive effect on the probability of early pregnancy in urban areas but not in rural micro-regions. This could be related to the evidence from available studies, which indicates that in these urban areas there is a higher level of average wealth but also a higher level of inequality; in rural areas there is more poverty but they are more homogeneous. Contrary to what would have been expected, the mother's education does not show important effects on rural micro-regions; however, there is a positive effect for urban areas.

For the group of variables relating to the contextual factor: there being a secondary school in the community in which the female lives has a negative effect on the probability of early pregnancy, but only in urban areas.

In summary, the results from the models that take a longitudinal approach are consistent with the results from previous studies that highlight the importance of marital status, the female's level of education, and the household's level of wealth in terms of early motherhood. Moreover, the supply of services is important, especially in terms of education, which translates into a greater opportunity to attend a school and, thus, lesser probability of early pregnancy.



→ As a child, Daniela Cruz Rodríguez dreamt of becoming a model, but her dreams have changed over time. She now wants to be a football player or go to university. She lives in Simijaca (Cundinamarca).

The results indicate that in both the urban areas as well as the rural micro-regions, the set of individual factors (the female's age, civil status, and education level) are variables that have significant effects.



## 2.5. CONCLUSIONS

The information from the ELCA allows us to carry out a first longitudinal approximation for factors associated with early pregnancy in Colombia. The data show, as do other surveys (MinSalud - Profamilia, 2017), a reduction in the prevalence of adolescent pregnancy over time. Although it has been reduced in younger cohorts, there is a greater prevalence in the rural micro-regions than in urban zones; this is lower the higher the young person's level of education, and in urban zones the better living conditions (measured by wealth index) reduce the probability of pregnancy before the age of twenty.

These results reinforce other studies' findings, and this is important to be able to generate public policy based on evidence to reduce the prevalence of early pregnancy for young people. Prevention

strategies and the creation of protective environments should be different depending on the zone in which they are implemented due to the prevalence in rural micro-regions. Additionally, factors such as education that help to prevent the phenomenon should be given priority, not only to increase school attendance but also due to the positive benefit that a higher level of education has on young people.

These conclusions should be analyzed taking into account the limitations of the model and the analysis that this chapter presents. These limitations are associated with: topics that are not included in this survey as the sample includes all the females that are part of the panel data and not only those who are part of the follow-up. Regarding the topics not taken into a count, lacking information on distal factors of fertility (beginning of sexual relations and use of contraceptive methods) it can only be

observe the direct effects of these. For the sample used, we do not have complete information for all females; those who were included in the follow-up were asked more questions than the context group, for example: when they first got married, interaction with parents, habits, expectations, and health conditions.

The results presented in this chapter are, therefore, an approximation. We hope that this is a first step towards more comprehensive exercises that can be undertaken with this vast amount of longitudinal information. Finally, the next round of the ELCA is an opportunity to not only have more information that allows proximal factors of fertility to be analyzed -such as sexual relations and the use of contraceptives-, but it also presents the possibility to carry out research on both early pregnancy and on early parenthood.

Prevention strategies and the creation of protective environments should be different depending on the zone in which they are implemented due to the prevalence in rural micro-regions. Additionally, factors such as education that help to prevent the phenomenon should be given priority, not only to increase school attendance but also due to the positive benefit that a higher level of education has on young people.

## REFERENCES

- Barrera F., & Higuera L. (2003). *Embarazo y fecundidad adolescente. Análisis de encuestas de coyuntura social*. October. Fedesarrollo: Bogotá.
- Braveman, P., Egerter, S., & Williams, D. R. (2011). The Social Determinants of Health: Coming of Age. *Annual Review of Public Health*, 32(1), 381–398.
- Flórez C.E., & Rodríguez K. (2016). Tipologías de Familias en Colombia: Evolución 1993 – 2014. *Observatorio de Políticas de las Familias*. Documento de Trabajo No. 2016-1. DNP-DDS.
- Flórez, C. E. (2011). *Nota técnica sobre embarazo adolescente en Colombia*. Working paper. BID, Unidad de Género y Biodiversidad. 29.
- Flórez, C. E., & Soto, V. E. (2013). Factores protectores y factores de riesgo del embarazo adolescente en Colombia. *Encuesta Nacional de Demografía y Salud-ENDS-1990/2010*. 41-49.
- Flórez C.E., & Soto V. (2006). Salud sexual y reproductiva de las adolescentes. Fondo de Población de las Naciones Unidas: Bogotá, 91.
- Flórez et al. (2004). Fecundidad adolescente en Colombia: incidencia, tendencias y determinantes. Un enfoque de historia de vida. *Documento CEDE No. 31*, August. Universidad de los Andes: Bogotá.
- Gaviria A. (2000). Decisiones: sexo y embarazo entre las jóvenes colombianas. *Coyuntura Social*. November. Fedesarrollo: Bogotá.
- MinSalud-Profamilia (2017). *Encuesta Nacional de Demografía y Salud. ENDS- Colombia 2015*. Folder. Chapter. 7: Fecundidad, 265-299.
- Ordóñez, M., & Murad, R. (2002). Variables predictoras de la salud general y de la salud sexual y reproductiva de las mujeres en edad fértil. *Estudio a profundidad de la ENDS- 2000*. Profamilia.
- Vargas, E. (2017). Prevención del embarazo en la niñez y la adolescencia en Colombia. Avances y desafíos de política pública. *Informe Final*. Departamento Nacional de Planeación – Fondo de Población de las Naciones Unidas.
- Vargas E., Henao J., & González C. (2004). Fecundidad adolescente en Colombia. Un enfoque de historia de vida. Resultados preliminares del estudio cualitativo. *Informe No. 4. CEDE*, Universidad de los Andes: Bogotá.





→ Yondó [Antioquia] lies opposite to Barranca on the other side of the Magdalena River. This is where the Palacios Campo family looks for farm work.









→ 2017. Elva Marina Santander Morales, a teacher, walks the streets of Nuevo Gramalote (Norte de Santander), where she will be given her new house.