

# Temporal trends in the adolescent birth rate in Brazil and regions, 2010-2019

Tendência temporal da taxa de natalidade na adolescência no Brasil e regiões, 2010-2019

Tendências temporárias na taxa de nascimento adolescente no Brasil e regiões, 2010-2019

## RESUMO

Objetivou-se analisar a tendência temporal da taxa de natalidade (TN) na adolescência no Brasil e regiões entre 2010 e 2019. Trata-se de estudo ecológico, de série temporal, com dados do Sistema de Informações sobre Nascidos Vivos (SINASC). A tendência da TN na adolescência foi analisada pela regressão de Prais-Winsten. Ocorreram 5.201.510 nascimentos de mães adolescentes, sendo a maioria entre as pardas (62,8%), com escolaridade entre 8-11 anos (60,4%) e solteiras (65,9%). As maiores médias da TN foram observadas no Norte (93/1.000) e no Nordeste (69,6/1.000). Houve tendência decrescente da TN nas adolescentes entre 10 e 14 anos (VPA -2,89; IC95% -5,24; -0,47;) em toda as regiões, exceto no Sudeste. Já naquelas entre 15 e 19 anos (VPA -2,84; IC95% -4,82; -0,82;) ocorreu tendência decrescente em todo o país. Apesar da tendência de redução, a TN ainda é mais elevada nas regiões com piores índices socioeconômicos.

**DESCRITORES:** Gravidez na adolescência; Saúde do adolescente; Saúde materno-infantil; Estudos de séries temporais; Epidemiologia descritiva.

## ABSTRACT

The objective was to analyze the temporal trend of the birth rate (BR) in adolescence in Brazil and regions between 2010 and 2019. This is an ecological study, of a time series, with data from the Information System on Live Births (SINASC - Sistema de Informações sobre Nascidos Vivos). The trend of BR in adolescence was analyzed using Prais-Winsten regression. There were 5,201,510 births to teenage mothers, the majority being among mixed races (62.8%), with 8-11 years of schooling (60.4%) and single (65.9%). The highest BR averages were observed in the North (93/1,000) and Northeast (69.6/1,000). There was a decreasing tendency for BR in adolescents aged between 10 and 14 years (APC -2.89; 95%CI -5.24; -0.47;) in all regions, except for the Southeast. For those between 15 and 19 years old (APC -2.84; 95% CI -4.82; -0.82;) there was a downward trend across the country. Despite the downward trend, BR is still higher in regions with the worst socioeconomic indices.

**DESCRIPTORS:** Teenage pregnancy; Adolescent health; maternal and child health; Time series studies; Descriptive epidemiology.

## RESUMEN

El objetivo de este estudio fue analizar la tendencia temporal de la tasa de natalidad (TN) en la adolescencia en Brasil y sus regiones entre 2010 y 2019. Se trata de un estudio ecológico, de series temporales, utilizando datos del Sistema de Información de Nacidos Vivos (SINASC). La tendencia de la mortalidad en la adolescencia se analizó mediante regresión de Prais-Winsten. Hubo 5.201.510 nacimientos de madres adolescentes, la mayoría de las cuales eran castañas (62,8%), tenían entre 8 y 11 años de escolarización (60,4%) y eran solteras (65,9%). Las tasas medias de TN más elevadas se registraron en el norte (93/1.000) y el noreste (69,6/1.000). Hubo una tendencia descendente de la TN entre los adolescentes de 10 a 14 años (APV -2,89; IC95% -5,24; -0,47;) en todas las regiones excepto en el Sureste. En el caso de los adolescentes de 15 a 19 años (VAP -2,84; IC95% -4,82; -0,82;) se observó una tendencia descendente en todo el país. A pesar de la tendencia descendente, la TN sigue siendo mayor en las regiones con peores índices socioeconómicos.

**DESCRIPTORES:** Embarazo en la adolescencia; Salud en la adolescencia; Salud materno-infantil; Estudios de series cronológicas; Epidemiología descriptiva.

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## INTRODUCTION

The highest teenage birth rates are found in countries in sub-Saharan Africa, followed by those in Latin America and Asia, with emphasis on middle- and low-income countries such as Nigeria, Congo, Angola, Afghanistan, Guatemala and Honduras. Higher teenage pregnancy rates are associated with the low percentage of women with secondary and higher education, high proportions of women with unmet reproductive planning needs, and low prevalence of contraceptive method use.<sup>1</sup>

In high-income countries, such as the United States, the trend of adolescent birth rates has shown a significant decline.<sup>2</sup> In that country, between 2007 and 2021, the pregnancy rate decreased by 67% in the 15-19 age group, from 41.5 to 13.9 per thousand women. A similar downward trend was observed among adolescents aged 14 years or less.<sup>2</sup> The highest teenage birth rates in this country are positively associated with poverty and negatively associated with education.<sup>3</sup>

In turn, in middle-income countries, although decreasing numbers are also observed, the reduction has been slow. In Kenya, the proportion of pregnancies at this stage of life in-

creased from 42% in 2003 to 38.9% in 2014.<sup>4</sup> In Brazil, from 2006 to 2015, there was a 14% decrease in births to adolescents between 15 and 19 years old and 3% among girls aged 10 to 14 years old.<sup>5</sup> In both countries, the largest reductions were related to better socioeconomic conditions.<sup>4,5</sup> In 2014 alone, 15% of deaths among female adolescents worldwide were due to maternal morbidities.<sup>6</sup> Pregnancy at this stage of life is also associated with worse maternal outcomes, such as lower body mass index and greater difficulty in recovering after childbirth, as well as infant outcomes, with a higher prevalence of low birth weight.<sup>7</sup>

Although Brazil has shown a downward trend in the teenage birth rate in the first decade of the 2000s,<sup>5</sup> there is a scarcity of recent national data that allow a comparative analysis between the regions of the country. Understanding the distribution of teenage pregnancy in different regions, identifying the most vulnerable population groups, is of fundamental importance for the articulation of prevention strategies for this event, such as improving access to health services and the distribution of contraceptive methods, as well as related biopsychosocial complications. This study aims to analyze the temporal trend of the

teenage birth rate in Brazil and regions between 2010 and 2019.

## METHODS

This is an ecological time-series study, whose units of analysis were the five geographic regions of Brazil: Northeast, North, South, Southeast and Midwest. In 2020, the estimated population of Brazil was approximately 211,755,692 inhabitants, with 32,602,483 adolescents aged 10 to 19 years old, which represents 15.4% of the population. Of this total, 15,973,609 are female adolescents.<sup>8</sup>

The study outcome was the birth rate of adolescent mothers (10 to 19 years of age). The records of live births to adolescent mothers, which occurred between 2010 and 2019, contained in the Information System on Live Births (SINASC - Sistema de Informações sobre Nascidos Vivos), were selected and accessed through the website of the Department of Informatics of the Unified Health System (DATASUS) in the period between May 19 and 23, 2021. SINASC gathers epidemiological information on births in the national territory within the scope of the Unified Health System (SUS). Data on the resident population were obtained from the 2010 Demographic

Census and population projections for the years 2011 to 2019, also available on DATASUS.

The following variables were analyzed: mother's age (in years: 10-14; 15-19), marital status (single; married; widow; legally separated; consensual union; not informed), level of education (in years of study: none; 1-3; 4-7; 8-11; 12 or more; and skin color (white; black; yellow; brown, indigenous). Teenage birth rates were obtained by dividing the number of live births to adolescent mothers (10 to 19 years old) by the population of women in the same age group, multiplied by one thousand. This rate was calculated for the 10-14 and 15-19 age groups for each region of the country and year of the time series.

Sociodemographic data were analyzed descriptively, using frequencies and percentages. Analysis of variance (ANOVA) was used to verify the difference in mean birth rates according to sociodemographic characteristics. The Prais-Winsten regression was used to verify the tendency of the birth rate in adolescence with the determination of the annual percentage change (APC) and their respective confidence intervals (95%CI). The independent variables were the years of occurrence of the births, while the birth rates were the dependent variables. This way, trend was interpreted as increasing ( $p < 0.05$  and positive regression coefficient), decreasing ( $p < 0.05$  and negative regression coefficient) and stationary ( $p \geq 0.05$ , regardless of the regression coefficient value). Statistically significant differences were those with  $p < 0.05$ . Statistical analyzes were performed using the STATA program, version 14.

Because it is a study with secondary, anonymous and publicly accessible data, there was no need for submission to the Research Ethics Committee.

Table 1. Sociodemographic characteristics and average birth rates. Brazil, 2010-2019.

Variables	N	%	Birth rate	p <sup>a</sup>
Skin color <sup>b</sup>				<0,001
White	1.429.115	28,5	6,7	
Black	239.942	4,8	1,1	
Yellow	14.053	0,3	0,1	
Brown	3.265.501	65,1	15,4	
Indigenous	65.767	1,3	0,3	
Total	5.014.378	100,0		
Education (in years of school) <sup>c</sup>				<0,001
None	19.093	0,4	0,1	
1-3	147.292	2,9	0,7	
4-7	1.695.047	33,2	8,0	
8-11	3.144.308	61,6	14,8	
12 or more	102.416	2,0	0,5	
Total	5.108.156	100,0		
Marital Status <sup>d</sup>				<0,001
Single	3.428.209	66,8	16,2	
Married	453.145	8,8	2,1	
Widow	2.803	0,1	0,01	
Judicially separated	5.853	0,1	0,03	
Consensual union	1.242.608	24,2	5,9	
Total	5.132.618	100,0	24,6	

<sup>a</sup>Analysis of variance (ANOVA); <sup>b</sup>Not informed: 187.132; <sup>c</sup>Not informed: 93.254; <sup>d</sup>Not informed: 68.992.

## RESULTADOS

In the period, 5,201,510 live births to adolescent mothers were registered in Brazil, which represents 17.8% of all births in the country. Most adolescent mothers were brown (62.8%), with between 8 and 11 years of schooling (60.4%) and single (65.9%) (Table 1).

The highest teenage birth rates were found in the North region (average 92.9/1,000) and the lowest in the Southeast region (average 50.9/1,000). Table 2 shows that there was a downward trend in the teenage birth rate in both age groups, in all regions, except for the

Southeast, which showed stability in the 10-14 age group (Table 2).

Brazil showed a total reduction of 23% in the teenage birth rate in both age groups between 2010 and 2019. The largest reductions occurred in the South, which showed a decrease of 38% in those mothers aged between 10 and 14 years (APC-5.21; 95%CI -8.84; -1.44;  $p=0.013$ ) and 26% in the age group of 15 to 19 years old (APC-3.34; 95%CI -5.77; -0.84;  $p=0.015$ ), followed by the Southeast with a reduction of 26% in both age groups. The smallest reductions occurred in the North region, with 16% among

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Table 2. Birth rate trend and number of live births to adolescent mothers, by region and age group. Brazil and regions, 2010-2019.

Regions	Birth rate			APC <sup>b</sup>	95% CI <sup>c</sup>	p <sup>d</sup>	Trend	Variation (%)
	2010	2019	Mean <sup>a</sup>					
Brazil								
10-14 a	3,2	2,5	3,1	-2,89	5,24; -0,47	0,025	Descending	-22,9
15-19 a	62,2	48,0	58,7	-2,84	-4,82; -0,82	0,012	Descending	-22,8
North								
10-14 a	5,7	4,8	5,6	-2,17	-3,75; -0,56	0,015	Descending	-15,9
15-19 a	92,6	75,0	87,4	-2,37	-3,66; -1,07	0,003	Descending	-19,1
Northeast								
10-14 a	4,0	3,1	3,8	-2,95	-4,32; -1,55	0,001	Descending	-22,9
15-19 a	69,7	54,5	65,8	-2,69	-4,28; -1,06	0,005	Descending	-21,9
10-14 a	2,1	1,6	2,1	-3,37	-6,81; 0,19	0,061	Stationary	26,4
15-19 a	52,0	38,2	48,9	-3,36	-5,84; -0,81	0,016	Descending	-26,4
10-14 a	2,5	1,5	2,2	-5,21	-8,84; -1,44	0,013	Descending	-37,6
15-19 a	52,9	39,0	49,9	-3,34	-5,77; -0,84	0,015	Descending	-26,4
10-14 a	3,4	2,6	3,2	-3,18	-5,77; 0,52	0,025	Descending	-24,4
15-19 a	63,2	50,1	60,3	-2,58	-4,71; -0,39	0,027	Descending	-20,8

<sup>a</sup> Mean: mean value of teenage birth rates (2010-2019); <sup>b</sup> Annual percentage change (APC); <sup>c</sup> 95% CI : confidence interval; <sup>d</sup> Prais-Winsten regression.

adolescents aged 10 to 14 years (APC -2.17; 95%CI -3.75; -0.56; p=0.015) and 19% among those aged 15 to 19 years (APC -2.37 ;95%CI -3.66; -1.07; p=0.003) (Table 2; Figures 1 and 2).

## DISCUSSION

The results show that the teenage birth rate was more prevalent in brown women, with low education and among single women. It was also observed that the North and Northeast regions had the highest birth rate averages in this phase of life. The rate trend in the evaluated period showed a reduction in all regions, in both age groups, with the exception of the Southeast region, which showed stability in the age group of 10 and 14 years.

Despite the reduction, teenage birth rates are high in Brazil (65.5/1,000), especially in regions with worse socio-

economic and health conditions, both in comparison to the world average (46/1000) and in relation to its South American neighbors, such as Chile (49.3/1000) and Argentina (64/1000) in 2016. <sup>1</sup> The finding that the highest birth rates are concentrated in the Northeast and North regions is justified by the fact that these states have the worst socioeconomic indices in the country, <sup>9</sup> such as poverty and low education, factors known to be related to high birth rates at this stage of life. <sup>1,3</sup>

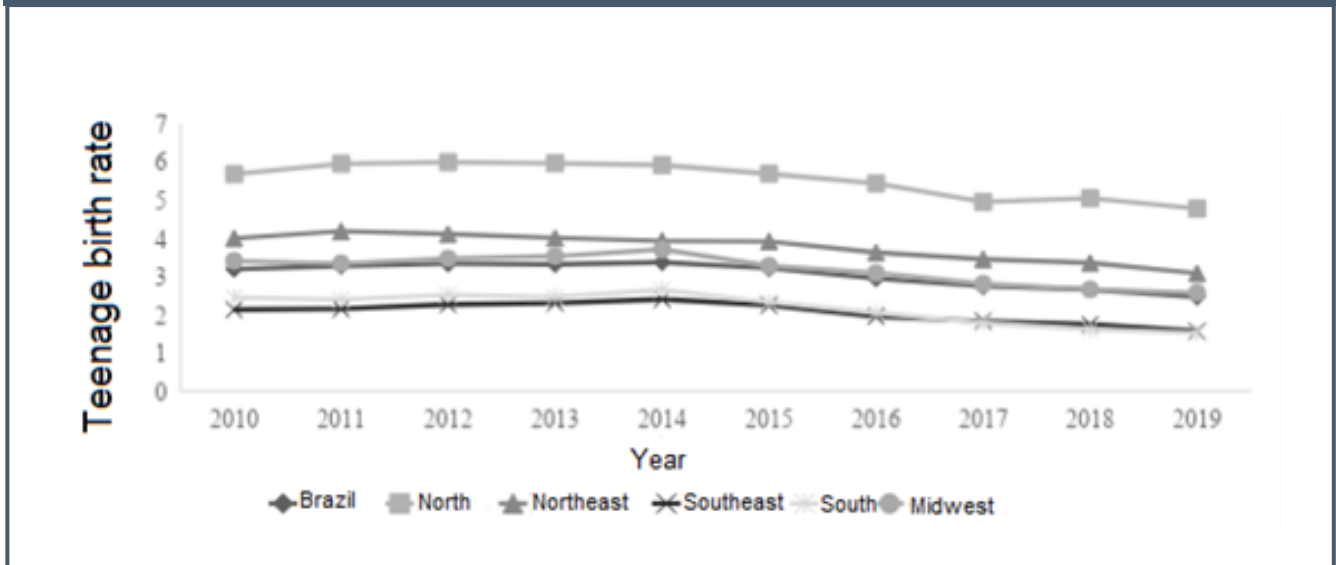
The fact that births were more prevalent among mixed-race adolescents is supported by three cohorts conducted in Pelotas, Rio Grande do Sul, which demonstrated that brown and black women and women with worse socioeconomic conditions had a higher prevalence of pregnancy. <sup>10</sup> It is known that teenage pregnancy is related to other vulnerability markers such as poor ac-

cess to education, health and professional qualification. <sup>11</sup>

Teenage pregnancy, in most cases, can have a negative effect on women's education, in addition to resulting in changes in the social and family aspects of young people who become pregnant before reaching adulthood. <sup>12</sup> Some studies have shown a relationship between teenage pregnancy and school dropout. <sup>12,13</sup> Dropping out of school at this stage of life has serious repercussions for adolescents, their children and society, as it deprives these young women of the possibility of economic advancement, as it interferes with completing basic education and entering higher or professional education, that would make it easier to enter the labor market and, consequently, better wages. <sup>12,13</sup>

Most births were to single teenage mothers, which can be explained by the young age at this stage of life, followed

Figure 1. Trend of birth rate in adolescence (10-14 years). Brazil and regions, 2010-2019.



by stable union. Data from other studies demonstrate that motherhood among adolescents is more frequent among single women without a stable partner, with conjugality in this age group being strongly associated with low socioeconomic status.<sup>5,13,14</sup> It is also known that adolescents who are not in stable relationships have a lower proportion of use of long-term contraceptive methods and greater difficulty in negotiating condoms.<sup>7,13</sup> Even more, often the greater social pressure to formalize the union that pregnancy determines, can lead adolescents to share the same residence with their partners, even without adequate social conditions and financial independence.<sup>7,13</sup>

Some socioeconomic factors may explain teenage pregnancy and justify these higher rates in Brazil. A study carried out in Paraná in 2017 identified that pregnancy at this stage of life was more frequent among girls with low education, especially among those with incomplete primary education, among those living in urban areas, especially in regions with worse socioeconomic performance.<sup>15</sup> Other factors also showed an association with pregnancy at this

stage of life, such as not using contraceptives in the first sexual intercourse, greater access to media with sexual content,<sup>12</sup> early sexual initiation, illicit drug use and low family support,<sup>7,16</sup> although these were not analysis variables in this study.

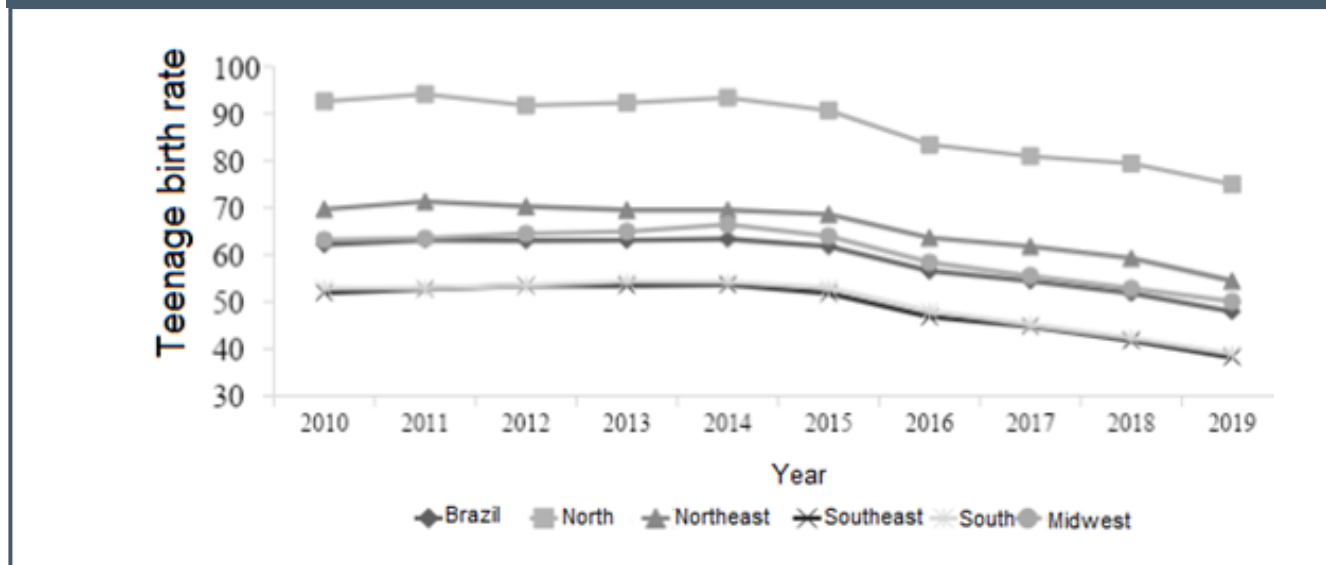
Although not as quickly and expressively as in high-income countries,<sup>1,2</sup> Brazil has shown a sustained downward trend in the teenage birth rate. Between 2006 and 2015, the number of births among adolescents aged 10 to 19 years in Brazil decreased by 13%.<sup>5</sup> Similar to the findings of the present study, the birth rate among adolescents decreased from 70.9/1,000 to 61.8/1,000, mainly in the South, Southeast and Northeast regions. The decrease in the number of children per woman is a fact observed in all regions of the country and in all maternal age groups.<sup>17</sup> This reduction is directly related to the degree of economic development in the regions, the good performance of public institutions and the new role played by women in society.<sup>17</sup> It should also be noted that education is related to birth rates, and it is observed that women with lower levels of education and income end up

having unplanned pregnancies at a very young age.<sup>17</sup> Although not explored by this study, these factors may explain the significant reduction in these rates that occurred in the South and Southeast, the two regions that have the best Human Development Indexes in Brazil and, therefore, better income, education, and health.<sup>9</sup>

Between 2006 and 2015, there was a 5% increase in the birth rate in the 10-14 age group in the North region and a decrease in the others.<sup>5</sup> Although lower, birth rates in this age group are always a matter of great concern, as many of these pregnancies are the result of sexual violence and have serious implications for the lives of girls and their children.<sup>18</sup> More than half of them are victims of recurrent violence, have a higher proportion of cesarean deliveries, start prenatal care late, have fewer consultations and with the possibility of affecting the health of the conceptus, which ends up having a higher probability of low birth weight.<sup>18</sup>

The improvement in these rates, even if not very expressively, is in line with the current global situation of sexual and reproductive health of adoles-

Figure 2. Trend of birth rate in adolescence (15-19 years). Brazil and regions, 2010-2019.



cents.<sup>18</sup> Compared to nearly three decades ago, today's teens are more likely to postpone their first sexual intercourse and their first birth, in addition to being more likely to use contraception.<sup>19</sup> These data explain the decrease in the birth rate among adolescents observed in most countries, especially in India, which went from 94.0/100,000 women aged 15 to 19 in 1990 to 13.2/100,000 women in 2020.<sup>1,19</sup> Even with the decrease in rates, several countries in sub-Saharan Africa still had rates in 2020 that exceeded 100 births per 100,000 women aged between 15 and 19 years.<sup>1,19</sup>

In Brazil, it is also worth highlighting some government initiatives that have improved sexual and reproductive health, which may be positively related to the reduction in birth rates in adolescence. One of them was the publication of the Family Planning Law, which instituted a set of preventive, educational actions or guaranteeing universal access to fertility regulation methods.<sup>20</sup> Also noteworthy is the institutionalization of the role of schools in sex education, strengthened by the implementation of the "Programa Saúde na Escola",<sup>20</sup> and

the creation of the National Teenage Pregnancy Prevention Week.<sup>21</sup>

A reduction in the teenage birth rate is possible with the application of a public policy that recognizes the exercise of sexuality responsibly and its acceptance as a basic human right. This policy should value the autonomy of individuals in relation to the use of condoms and other contraceptive methods on a regular basis, access and legal abortion and the promotion of the fight against discrimination motivated by gender differences.<sup>22</sup> In addition, it is necessary to implement or expand actions that allow adolescents to engage in professional, academic, artistic and cultural activities, with logistical and financial incentives for schools to implement and maintain sports, art and culture projects.

Among the limitations of this study, the ecological type design can be mentioned, especially with regard to the ecological fallacy, since the association verified between aggregates does not necessarily reflect that the same association will occur between the individuals that compose them. In this case, teenage birth rates were analyzed by region, making it not possible to make causal

inferences at the individual level. It is also worth mentioning the use of secondary data, still lacking information on some variables, such as skin color, education and marital status, but with a percentage of incompleteness of up to 3.5%, not affecting the study objectives. It is known that these incomplete or ignored data may be due to some problems, such as lack of care and/or insufficient training of the professional responsible for completing the live birth certificate. On the other hand, this study offers contributions in the field of public health by demonstrating that, although there has been a reduction in adolescent birth rates, the numbers are still alarming compared to global data and the Latin American scenario. The greatest reductions occurred in those regions with the highest levels of human development, suggesting an association between better health and education conditions and the most adequate birth rate.

## CONCLUSION

It was demonstrated that, although there has been a reduction in birth

rates in adolescence, the numbers are still alarming compared to world data and even to the Latin American scenario. The greatest reductions occurred in those regions with the highest levels of human development, suggesting an association between better health and education conditions and the most adequate birth rate.

Finally, it was identified that, althou-

gh there has been a downward trend in the birth rate, it remains high, especially in the poorest regions of the country and in less socially favored populations. This fact demonstrates the importance of facing teenage pregnancy not only as a health problem, but also as a social issue. Thus, there is a need for public policies aimed at tackling inequality and improving the living conditions

of families. It is the duty of the public power to offer opportunities to young people in the educational, professionalizing, artistic and cultural activities, in addition to recognizing adolescents as subjects with rights in relation to issues related to reproductive and sexual health, in order to maintain and intensify the downward trend in adolescent birth rates in Brazil.

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