

Temporal trend of adolescent pregnancy in Brasil

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SUMMARY

OBJECTIVE: To analyze the temporal trend and factors associated with adolescent pregnancy during ten years in Brasil.

METHODS: Data were extracted from the Live Births Information System, of the Brazilian Health System and included information regarding live births from adolescent mothers from 2006 to 2015. The overall proportion of gestation in adolescence and the specific proportions according to the characteristics analyzed were calculated using the standardized reporting coefficients and the simple linear regression method. The study was approved by the ethics committee of the University of Southern Santa Catarina (UNISUL).

RESULTS: The general proportion of Live Births from adolescent mothers varied from 21.4% in 2006 to 18.1% in 2015. This reduction occurred because of the negative variation observed among mothers aged 15 to 19 years. The indigenous group was the only that did not present a reduction. There was an increase in the proportion of adolescents with between four and seven years of formal education and in the proportion of adolescents living with partners. There was a reduction in all Brazilian Regions and in large part of the Federation Units.

CONCLUSION: The analysis of the temporal trend identifies a reduction in the proportion of live births among adolescent mothers in Brasil. However, there is a growing trend among some specific groups.

KEYWORDS: Pregnancy in adolescence. Epidemiology. Social conditions. Adolescent behavior. Human development.

INTRODUCTION

Adolescence is the stage of human development characterized by the passage to adulthood.¹ During this cycle, important changes occur in the physical, emotional, and psychological development.^{2,3}

Since it is a stage of great transformations and discoveries, it is also considered a period of vulnerability, associated with risk behaviors such as drug abuse and unprotected sexual practices, which brings a risk of infections and unplanned pregnancies.⁴

The topic of adolescent pregnancy has been widely discussed in recent years. While in the past it was considered an expected event part of the usual

scenario, nowadays many countries, including Brasil, consider it a public health problem associated to numerous unfavorable outcomes, especially for the mother and the baby.^{5,6}

Each year, worldwide, approximately 16 million adolescents between 15 and 19 years of age become pregnant; and 2 million under 15 years old.⁷ This is more common among young people from less privileged social classes, with few years of formal education and living outside of urban areas.⁸

The global rate of births among women under 19 years old dropped from 6% in 1990, to 4.8% in 2007.

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However, although birth rates in this age group are in decline, the absolute number of births had a smaller reduction, due to the increase in the adolescent population in recent years. In 2008, 11% of all births worldwide were still by adolescents, and 95% of them occurred in countries of low and medium levels of development.⁹

In Brasil, the proportion of adolescent pregnancy also decreased, and this occurred in all regions. In the capitals, there was a reduction from 10.1% in 1996, to 8.1% in 2011.¹⁰ According to the demographic census of 2000^{11,12}, compared with the one from 2010, the number of children of adolescent mothers decreased due to the reduction of pregnancies between 15 and 19 years old, while that in the age range between 10 and 14 years old the number has increased.

National studies indicate that school evasion is much more prevalent among adolescents who become pregnant, when compared with those who do not^{5,13} Furthermore, pregnancies during this life stage are more vulnerable to obstetric and perinatal complications.^{5,14}

Thus, adolescent pregnancy, even when desired, and its consequences to society remain present and affect the human development of their communities.¹⁵ Thus, studies are vital to understand its causes and find the best ways to prevent them. The analysis of the temporal trend of adolescent pregnancy may contribute to the understanding and planning of educational measures, strengthening, and support for young mothers. The objective of this study was to analyze the temporal trend of adolescent pregnancy and its associated factors in Brasil between 2006 and 2015.

METHODS

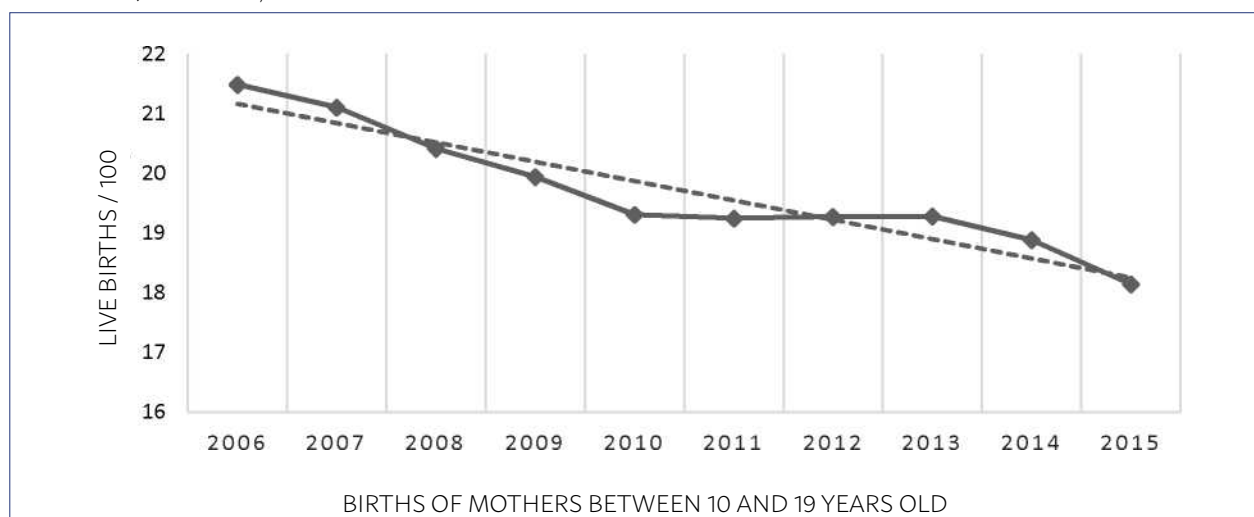
This is an ecological time-series study carried out based on the data from the Information System on Live Births (SINASC), provided by the Single Health System Department of Informatics (Datapus). We included in the study information on live births by adolescent mothers aged 10 to 19 years from 2006 to 2015, totaling 5,761,082 infants. The data were using the SPSS 18.0 software.

The proportion of live births by adolescent mothers was calculated using this age group's percentage in relation to the total number of live births reported, as well as the specific proportion of adolescent pregnancy according to each variable analyzed.

For the temporal trend, we used the standardized coefficients of notification and the method of simple linear regression. The dependent variables were the proportions of adolescent pregnancy, according to age, skin color, years of formal education, marital status, region, and Federation Units (UF). The independent variables were the years over which the information was collected (2006 to 2015). Thus, we obtained the estimated model using the formula $y=b_0+b_1x$, in which y is the standardized coefficient, b_0 is the average period coefficient, b_1 is the average annual increment, and x is the year. Variations with $p<0.05$ with a confidence interval of 95% were considered significant.

The research project was approved by the Research Ethics Committee at UNISUL, under Caae 70233017.1.0000.5369, on July 3rd, 2017.

CHART 1 - TREND OF THE OVERALL PROPORTION OF LIVE BIRTHS AMONG ADOLESCENT MOTHERS (10 TO 19 YEARS OLD) IN BRASIL, FROM 2006 TO 2015.



RESULTS

The proportion of live births to teenage mothers varied from 21.4% in 2006 to 18.1% in 2015. We found a very strong negative correlation (*r*) between the time in years and the proportion of live births by adolescent mothers (-0.951). The coefficient of determination (*R*²) showed that the time factor was responsible for approximately 91.0% of the reduction in the proportion of adolescent pregnancies (0.91). The beta coefficient (*β*) represented an average reduction trend of 0.324 of the outcome each year (*p*<0.001) (Chart 1).

After classifying the adolescents by age groups, the proportion of live births among mothers aged between 10 and 14 years presented a variation from 0.9% in 2006, to 0.8% in 2015 (*p*=0.196), a tendency to stability. While the proportion of live births among mothers aged between 15 and 19 years ranged from 20.5% to 17.2%, respectively (*p*<0.001), a trend of reduction.

In relation to the skin color declared, the highest rates of live births were found among indigenous adolescents, and the variation observed was from 27.3%, in 2006, to 29.5%, in 2015 (*p*=0.070), tendency to stability. The other groups showed a reduction, with a decrease from 19.5% to 13.0% among yellow

women (*p*<0.001), 18.5% to 13.0% among white women (*p*<0.001), 21.2% to 17.2% among black women (*p*<0.001), and 25.1% to 21.5% among brown women (*p*<0.001).

Regarding maternal formal education, the only group to present an increasing trend in the period was the one classified as between four and seven years of complete formal education. This group varied from 29.4% to 30.4% at the end of the decade analyzed (*p*=0.004). All other categories showed a reduction. The proportion of those who had studied up to three complete years ranged from 17.2% to 13.3% (*p*<0.001), those who had eight to 11 complete years ranged from 21.6% to 19.6% (*p*=0.015), and the proportion of adolescents with 12 complete years or more of formal education ranged from 6.4% to 1.6% at the end of the period (*p*<0.001).

As for the mother's marital status, the proportion of adolescent mothers living with a partner presented an increasing trend, with a variation from 9.8% to 11.8% (*p*=0.025). On the other hand, among adolescent mothers living without a partner, there was a trend of stability, and the variation observed was from 28.6% in 2006 to 26.4% in 2015 (*p*=0.186) (Table 1).

Regarding the place of birth, the proportion of adolescent pregnancies showed a decreasing ten-

TABLE 1 - TRENDS IN ADOLESCENT PREGNANCY ACCORDING TO SOCIAL AND DEMOGRAPHIC VARIABLES IN BRASIL, FROM 2006 TO 2015.

YEAR	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	<i>β</i>	<i>r</i>	P-value
Live births (%)													
10 a 19 years	21.4	21.1	20.4	19.9	19.3	19.2	19.2	19.2	18.8	18.1	-0.324	-0.951	<0.001
Mother's age range													
10 a 14 years	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.8	-0.004	-0.447	0.196
15 a 19 years	20.5	20.1	19.4	18.9	18.3	18.3	18.3	18.3	17.9	17.2	-0.320	-0.951	<0.001
Skin color													
Indigenous	27.3	28.4	29.0	29.0	29.0	28.3	28.5	28.9	28.7	29.5	0.120	0.594	0.070
Yellow	19.5	17.9	18.6	15.9	15.2	13.6	13.8	14.8	13.4	13.0	-0.710	-0.920	<0.001
White	18.5	17.8	16.9	16.3	15.5	15.2	14.7	14.5	13.9	13.0	-0.567	-0.991	<0.001
Black	21.2	20.1	19.7	19.6	19.3	19.3	18.8	18.8	18.1	17.2	-0.348	-0.954	<0.001
Brown	25.1	24.7	24.0	23.4	22.8	22.7	22.5	22.6	22.2	21.5	-0.356	-0.961	<0.001
Years of formal education													
< 3 years	17.2	16.9	16.4	16.1	15.9	15.3	14.4	14.0	13.4	13.3	-0.466	-0.988	<0.001
4 to 7 years	29.4	29.5	29.4	29.4	29.3	30.2	31.1	31.2	30.9	30.4	0.205	0.811	0.004
8 a 11 years	21.6	21.1	20.5	20.1	19.6	19.3	19.5	20.1	20.1	19.6	-0.180	-0.739	0.015
>12 years	6.4	6.1	5.4	5.1	4.4	3.2	1.9	1.8	1.7	1.6	-0.628	-0.972	<0.001
Marital status													
Lives with partner	9.8	9.0	8.3	7.5	7.2	11.5	13.0	13.1	12.6	11.8	0.531	0.699	0.025
Lives without partner	28.6	28.1	27.3	26.7	26.1	26.5	27.5	27.8	27.3	26.4	-0.120	-0.455	0.186

r = Pearson coefficient; *β* = regression coefficient. Source: Buratto (2018).

TABLE 2 - TRENDS IN ADOLESCENT PREGNANCY ACCORDING TO PLACE OF BIRTH IN BRASIL, FROM 2006 TO 2015.

YEAR	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	r	β	P-value
Live births (%)													
Region													
North	28.1	27.7	27.1	26.9	26.3	26.4	26.5	26.5	26.2	25.5	-0.925	-0.229	<0.001
Northeast	24.6	24.1	23.2	22.5	22.0	22.1	22.1	22.1	21.8	21.2	-0.909	-0.319	<0.001
Central-West	21.8	21.2	20.4	19.8	19.3	19.0	19.1	18.9	18.5	17.5	-0.961	-0.411	<0.001
South	19.2	18.8	18.3	18.1	17.5	17.0	17.1	16.9	16.4	15.3	-0.978	-0.380	<0.001
Southeast	17.8	17.5	16.9	16.5	15.9	15.8	15.9	16.1	15.6	14.9	-0.937	-0.274	<0.001
Federation Unit													
Rorônia	26.0	25.2	24.5	24.1	23.2	22.9	22.3	21.8	21.1	20.1	-0.996	-0.607	<0.001
Acre	27.4	26.9	26.9	26.7	26.8	26.7	26.7	27.2	27.2	26.9	-0.102	-0.008	0.779
Amazonas	27.0	26.8	26.4	26.6	25.8	26.8	27.1	27.4	26.7	26.4	0.064	0.009	0.861
Roraima	25.9	26.4	25.2	25.3	25.0	25.0	25.5	25.4	25.7	24.3	-0.563	-0.108	0.090
Pará	29.2	28.9	28.2	28.0	27.4	27.5	27.5	27.3	27.2	26.5	-0.941	-0.251	<0.001
Amapá	27.2	26.6	26.1	25.8	25.5	25.8	26.1	25.8	26.1	25.4	-0.687	-0.122	0.028
Tocantins	28.4	27.6	26.9	26.0	25.4	24.4	24.1	24.0	23.6	23.0	-0.982	-0.587	<0.001
Maranhão	29.4	28.9	28.0	27.1	26.3	25.9	25.7	25.7	25.5	25.5	-0.933	-0.451	<0.001
Piauí	25.9	25.9	24.0	22.9	22.4	21.5	21.8	21.7	22.0	21.8	-0.867	-0.489	0.001
Ceará	22.6	22.2	21.4	21.3	20.5	20.6	20.8	20.8	20.7	19.4	-0.886	-0.266	0.001
Rio Grande do Norte	23.4	22.8	22.0	20.6	20.5	20.5	20.6	20.7	19.9	19.1	-0.907	-0.392	<0.001
Paraíba	23.2	22.2	21.3	20.8	19.9	20.3	20.3	20.2	19.7	19.4	-0.897	-0.347	<0.001
Pernambuco	23.3	23.1	22.5	22.0	21.3	21.4	21.7	21.5	21.3	20.5	-0.907	-0.263	<0.001
Alagoas	25.8	25.7	24.9	24.2	24.4	25.3	26.1	26.9	26.3	26.3	0,515	0,149	0,127
Sergipe	22.1	21.6	20.9	19.8	20.3	21.0	21.3	21.7	21.4	21.6	0.117	0.027	0.747
Bahia	24.3	23.5	22.4	21.9	21.3	21.6	21.3	21.1	20.6	20.0	-0.946	-0.402	<0.001
Minas Gerais	18.8	18.7	18.0	17.4	16.8	16.4	16.3	16.4	16.0	15.4	-0.970	-0.370	<0.001
Espírito Santo	20.5	20.0	19.0	18.2	17.5	17.1	17.7	18.0	17.6	16.7	-0.851	-0.349	0.002
Rio de Janeiro	19.0	19.0	18.6	18.1	17.7	17.9	18.3	18.4	17.8	17.1	-0.794	-0.152	0.006
São Paulo	16.7	16.3	15.7	15.5	14.8	14.7	14.8	14.9	14.5	13.8	-0.939	-0.273	<0.001
Paraná	20.6	20.1	19.6	19.9	19.1	18.6	18.5	18.6	17.9	16.8	-0.963	-0.363	<0.001
Santa Catarina	18.2	18.2	17.6	16.9	16.4	16.1	15.8	15.6	15.0	14.2	-0.988	-0.433	<0.001
Rio Grande do Sul	18.4	17.8	17.4	16.9	16.3	15.9	16.2	16.0	15.6	14.5	-0.963	-0.360	<0.001
Mato Grosso do Sul	24.2	23.8	23.2	23.0	22.4	22.1	22.1	21.6	21.6	19.9	-0.960	-0.389	<0.001
Mato Grosso	25.2	24.3	23.2	22.6	22.0	21.1	21.7	21.2	20.4	19.5	-0.968	-0.557	<0.001
Goiás	22.2	21.5	20.6	19.9	19.2	18.9	18.8	19.0	18.5	17.6	-0.953	-0.450	<0.001
Distrito Federal	15.4	14.8	14.2	13.6	13.4	13.5	13.6	13.3	13.2	12.3	-0,916	-0,267	<0,001

r = Pearson coefficient; β = Regression coefficient. Source: Buratto 2018

dency in all Brazilian regions. In the North region, the variation was from 28.1% in 2006, to 25.5%, in 2015 ($p<0.001$); in the Northeast, from 24.6% to 21.2% ($p<0.001$); in the Center-West, from 21.8% to 17.5% ($p<0.001$); in the South, from 19.2% to 15.3% ($p<0.001$), and finally, in the Southeast, the variation was from 17.8% to 14.9% ($p<0.001$).

The proportion of live births from teenage mothers decreased in all Brazilian UF's, with the exception of Alagoas. In this state, the proportion increased from 25.8% to 26.3% ($p=0.127$), showing a tendency to stability (Table 2).

DISCUSSION

During the decade examined, the proportion of live births among adolescent mothers in Brasil was reduced due to the decrease of this event among adolescents over the age of 15 years. Although the proportions of pregnancies among young adolescents are low, in absolute terms, the numbers are still high. Pregnancy in this group (10 to 14 years) can be more strongly associated with health, emotional, and social problems. It is also worth noting the existence of rape and sexual assault as important causal factors of pregnancy in patients younger than 15 years.^{8,16}

Among the factors that influence the high incidence of pregnancy among younger adolescents, the increasingly early beginning of sexual intercourse and the lack of public policies on sexual and reproductive health education targeted at this age group.¹⁷ According to a study conducted based on data from the National Survey on Students' Health, 88.0% of adolescents started having sexual intercourse between 13 and 15 years of age.¹⁸

In recent years we have observed a drop in fertility rates in all ethnicities; however, among indigenous populations, these numbers remain high and above the average in Latin America.¹⁹ In 2010, the percentage of mothers aged between 15 and 19 years in Latin America was of 26.4% among indigenous peoples, and only 11.8% among adolescents of other ethnicities.¹⁹

As to the relationship between skin color and formal education in Brasil, according to the Brazilian Institute of Geography and Statistics (IBGE), in 2015, white adolescents had the lowest proportions of live births and the highest proportions of maternal formal education.²⁰

Regarding maternal formal education, the only group to present an increasing tendency was that of mothers with between four and seven years of formal education. This category comprises primary education and is probably composed of young people under 15 years of age. It is important to emphasize that the degree of formal education described the one corresponding to the time the newborns are registered in Sinasc; it is not possible to observe if the adolescent continued her studies after childbirth.

National studies indicate that the trajectory of formal education is what is most affected by motherhood in adolescence. School evasion among pregnant

women and the postponement of their professionalization affect their transition to adulthood and keep them financially dependent on their family of origin or their companion. In addition, it increases exposure to social risks, such as drug use, violence, and emotional and cultural deprivation.^{21,22}

The rising trend observed among adolescents who lived with their partners deserves special attention, because, according to the 2010 census, marriage is strongly related to adolescent pregnancy.¹² Moreover, living with a partner is also related to less formal education.¹³

A limitation of this study is that it did not allow to observe if the marriage occurred before or during pregnancy. So it is impossible to infer if pregnancy is more of a risk factor or the outcome of early marriage.

In relation to the place of birth, there was a downward trend in all Brazilian regions, and the greatest variation was observed in the Center-West Region.

As for the UF of birth, there was a decreasing trend in almost all states. We found a trend of stability in the states of Acre, Amazonas, Roraima, Alagoas, and Sergipe.

CONCLUSION

The trend analysis identified a reduction in the proportion of live births among adolescent mothers in Brasil. However, there is an increasing trend among some specific groups, such as indigenous populations, adolescents in primary education, and those with marital stability. This downward trend is evidenced in all Brazilian regions and in most Federation Units.

RESUMO

OBJETIVO: Analisar a tendência temporal da gestação na adolescência e de fatores associados durante dez anos no Brasil.

MÉTODO: Estudo ecológico de séries temporais realizado com base no banco de dados do Sistema de Informações sobre Nascidos Vivos (Sinasc). Fizeram parte do estudo informações referentes a nascidos vivos filhos de mães adolescentes no período de 2006 a 2015. A proporção geral de gestação na adolescência e as proporções específicas conforme as características analisadas foram calculadas pelos coeficientes de notificação padronizados e o método de regressão linear simples. Aprovado pelo comitê de ética da Universidade do Sul de Santa Catarina (Unisul).

RESULTADOS: A proporção de nascidos vivos de mães adolescentes variou de 21,4% em 2006 para 18,1% em 2015, e essa redução ocorreu à custa da variação negativa observada entre mães na faixa de 15 a 19 anos de idade. A população indígena foi a única que não apresentou redução. Houve aumento das proporções de adolescentes com escolaridade entre quatro e sete anos de estudo e das proporções de adolescentes que vivem com parceiro. Houve redução em todas as regiões brasileiras e em grande parte das Unidades da Federação.

CONCLUSÃO: A análise de tendência identifica redução das proporções de nascidos vivos entre mães adolescentes no Brasil. Porém, há uma tendência de aumento entre alguns grupos específicos.

PALAVRAS-CHAVE: Gravidez na adolescência. Epidemiologia. Condições sociais. Comportamento do adolescente. Desenvolvimento humano.

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