

Factors Associated with Pregnancy and Perinatal Outcomes in Adolescent Couples in the State of Santa Catarina

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Abstract

Objective: To investigate factors associated with pregnancy in adolescent couples and the perinatal outcomes.

Method: A cross-sectional study with SINASC/SC data, included 17,156 deliveries of primiparous women with single pregnancy. Prevalence ratios adjusted according to hierarchical model and Percentage Attributable Risk (RAP) were calculated to obtain the excess in the chances of the outcomes among the adolescent couples.

Results: Findings show that in the 16.6% of deliveries among adolescent mothers, more than 1/3 of these occurred among live births of adolescent parents. This group had a less privileged profile regarding socio-demographic factors, prenatal care and an excess in the relative risk and attributable risk for practically all the variables of interest when compared to pairs of adolescent mother and adult father.

Conclusion: When strategies are designed directed at the issue of adolescent pregnancy, it is essential to look at the adolescent couple as a special group, and the adolescent father as an independent factor, with an important role in the final definition of risk in this group.

Keywords: Pregnancy, Adolescence, Teenage Father, Risk Factors, Pregnancy in Adolescence.

INTRODUCTION

According to the World Health Organization (WHO), adolescence is characterized as a critical period of development with biopsychosocial transformations and repercussions in various sectors of human development, including sexual and reproductive health[1]. In this context, pregnant teenagers are exposed to the same pregnancy risks as an adult woman, whether planned or not, and often unwanted [2].

Several studies in Brazil call attention to the high rates in the occurrence of teenage pregnancy, making it a challenge for health professionals [2]. Annually, more than 16 million women become pregnant between the ages of 15 and 19, with the vast majority occurring in underdeveloped and developing countries. These

newborns represent 11% of live births[3]. Brazil has the seventh highest rate in South America, with a rate of 68.4 pregnancies for every 1,000 girls aged 15 to 19 years[4].

Although a temporal reduction in the proportion of childbirths among adolescents has been reported in Brazil[5], a higher occurrence of teenage pregnancy, in contexts of increased social vulnerability, points to the consequent increase in the risk associated with the most serious perinatal outcomes in this age group, among low-income populations[6]. In this context, among women in their early teens (<16 years) the factors associated with risks to maternal and fetal health will be exacerbated[7]. It is worth mentioning that linked to the low socioeconomic level, in the adolescent age group, access to more precarious health

services, greater exposure to risky behaviors and inadequate nutrition habits can be expected[8,9,10].

Adolescence is considered an inappropriate age for motherhood, given its association with adverse maternal and neonatal outcomes[11]. Approximately 3.9 million unsafe abortions among girls aged 15 to 19 years occur each year, contributing to maternal mortality[12]. Child maternity also can carry risks for newborns, such as low birth weight, premature birth and admission to a neonatal intensive care unit[11,13], which can lead to the predisposition of the newborn to infections, hypoglycemia, hypoxia and delay in neuropsychomotor development[14]. Adequate prenatal care has been shown to be one of the main factors in preventing low birth weight, prematurity and perinatal death[15,16]. Thus, for pregnant adolescents, prenatal care can have a positive impact on maternal and perinatal outcomes, in order to minimize possible disadvantages typical of this age[9].

Although most studies on teenage pregnancy start from the perspective of pregnant adolescents, information based on statistical data brings the occurrence of a significant number of unplanned pregnancies among adolescent couples[17]. In this regard, an “invisibility of adolescent parents” has been mentioned in investigations of fertility, where the data collected are almost exclusively focused on the adolescent mother and her newborn, neglecting the importance of the paternal age and the exclusion of the father’s role in the experience and their commitment to fatherhood[18].

The most original aspect in our study refers to the focus on the binomial “teenagers father and mother” in view of the great scarcity of information, the theme in our environment where almost all of the literature is addressed to the teenage mother. Thus, the objective of this study is to investigate the factors associated with the chance of pregnancy in adolescent couples and their perinatal outcomes.

MATERIALS AND METHOD

A cross-sectional study analysed data from the Live Birth Information System for Santa Catarina (SINASC / SC), made available online by the Santa Catarina State Health Department. The population consisted of 17,156 live births from the nine macroregions of the State of Santa Catarina, in the year 2012. Single gestation deliveries among primiparous women, of

teenage couples, adult couples and couples of teenage mother and adult father were included, Multiparous and twin births were excluded. The project was approved by the Unisul Research Ethics Committee (CEP/UNISUL)

The dependent variable was adolescent pregnancy stratified into three groups according to parents’ age at the date of delivery: Group I - pregnancy of adolescent couples (father and mother <20 years); Group II - pregnancy of adult couples (father and mother ≥ 20 years of age) and Group III - pregnancy of couples of adolescent mother (maternal age <20 years) and adult father (paternal age ≥ 20 years). The independent variables were: marital status (single, consensual / married union), maternal education (complete elementary school: yes or no), ethnicity / skin color (white or non-white), number of prenatal consultations (<6 or ≥ 6), type of delivery (vaginal or cesarean), prematurity (Yes: 22-36 weeks; No: ≥ 37 weeks) Agar index at the first minute (up to 7; ≥ 8) and at the fifth minute (up to 7; ≥ 8), birth weight (<2000 g or ≥ 2000 g) and institutional profile of maternity wards (public or private).

The variables of interest were selected from the Sinasc Database and analysed using the software SPSS Statistics, version 18.0 (IBM Corp., Armonk, NY, EUA). Data were obtained from 88,772 live births in the State of Santa Catarina. Six municipalities with the highest number of deliveries were selected for each of the nine macro-regions in the state. From this sample, the inclusion and exclusion criteria were applied and the final sample of 17,156 births was obtained. Information regarding the institutional profile (public/private) of maternity hospitals was obtained through the National Register of Health Facilities (CNES).

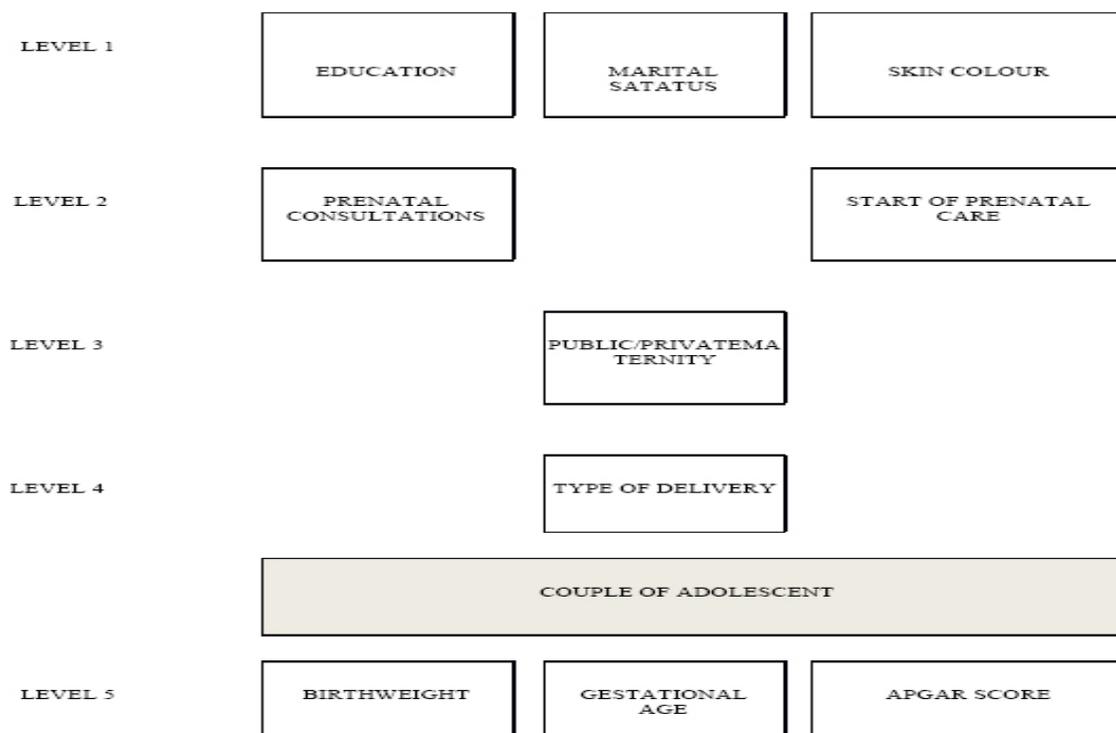
First, the absolute and proportional distribution of the individual variables, of the mother and the newborn, was presented, according to the age group of the parents stratified in 3 groups (Groups I: adolescent couples, Group II: couples of adolescent mothers and adult parents and Group III: couples of adult fathers and mothers). The chi-square test was applied to obtain statistical significance between groups. A model of Multivariate Analysis by Logistic Regression was used, following a Hierarchical Analysis Model, as shown in Figure 2, investigated differences in the occurrence of factors potentially associated with the pregnancy

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of teenage couples, compared to couples of teenage mothers and adult fathers. The choice of these two specific groups, follows the central hypothesis that, eventual excesses in the chances of the occurrence of events of interest ($OR > 1$), between adolescent couples, when compared to couples of adolescent mothers and adult fathers, could be attributed to the presence of a teenage father as part of the binomial.

As part of the Hierarchical Model, the variables related

to the characteristics of the parturient were first included (Level 1). Next, the variables of prenatal care (Level 2), Type of Maternity (Level 3), Type of delivery (Level 4) and finally the variables of perinatal events of the newborn (Level 5). At each level, the variables that, after adjustment, showed an association with the outcome ($P < 0.05$) were maintained in the model at the lower hierarchical levels, adopting the same procedure for all hierarchical levels.



Also, based on the adjusted model, the percentage change in the prevalence of events was calculated, represented by the Percent Attributable Risk (RAP). In this analysis, those factors with odds (OR) greater than 1.1 and statistical significance (p-value less than 0,20) were included in the final analysis. The RAP sought to estimate the excess in the chances of the independent variables, which could be attributed to adolescent couples and was calculated according to the formula: $RAP = OR - 1 / OR$. The statistical significance of the associations was calculated by testing the likelihood ratio, with a pre-established significance level of 5%.

RESULTS AND DISCUSSION

According to data from SINASC, 61,278 live births were registered in 2012, with 16.6% occurring among adolescent mothers. Among the 17,156 births that comprise the sample of this study, 1,085 (6.3%) occurred among adolescent couples (father

and mother adolescents), 12,564 (73.2%) among adult couples and 3,507 (26.8%) among couples of adolescent mothers and adult parents. The average age of mothers of adolescent couples was 16.7 years (SD: 1.5) and 18.1 years (SD: 1.1) among adolescent parents. On the other hand, the mothers of the adult couples had an average age of 26.5 years (SD: 4.8) and the adult parents an average of 29.8 years (SD: 6.1), finally, among the couples of adolescent mothers and adult fathers the average age of mothers was 17.4 years (SD: 1.4) and of parents 24.3 years (SD: 4.7).

Tables 1 and 2 show the distribution of the study population according to sociodemographic variables of pregnancy, childbirth and perinatal stratified by the age groups of the parents during pregnancy. The groups including teenage mothers, compared to adult couples, had less education (34.1% and 30.5% versus 11.1%), single (51.4% and 40.9% versus 22.4%),

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ethnicity non-white (10.5% and 12.8% versus 6.4%), with fewer prenatal consultations (40.6% and 34.5% versus 19.3%), with the beginning of prenatal care after the first trimester (25.0% and 20.9% versus 8.5%) and delivery in public maternity hospitals (95.9% and 95.7% versus 72.9%). On the other hand, having a cesarean delivery was more common among adult couples (74.8% versus 44.1% and 48.5%, respectively). Couples of teenage mothers and fathers and teenage mothers and adult fathers also had a higher proportion of premature newborns (13.2% and 11.7% versus 10.5%) with scores below 8 for Ápgar

in the first minute (15,6% and 13.5% versus 11.2%) and in the 5th minute (3.3% and 2.7% versus 2.0%). All of these differences were statistically significant ($P < 0.05$). On the other hand, the only factor not following this linearity was low birth weight which, although higher in couples of adolescent fathers and mothers compared to adult couples (3.4% versus 2.7%), presented a lower proportion among couples of adolescent mothers and adult fathers compared to adult couples (2.3% versus 2.7%), although this was the only variable whose distribution showed no statistical significance ($p = 0.171$).

Table 1. Distribution of the study population according to sociodemographic variables of pregnancy and delivery stratified by age of the parents at birth.

Variables	Couple's age group at birth						P
	Adolescent couple		Adolescent Mother/ Adult father		Adult couple		
	n	(%)	N	(%)	n	(%)	
Incomplete elementary school							
Yes	359	(34,1)	1023	(30.5)	884	(11,1)	<0,001
No	694	(65,9)	2334	(69.5)	7110	(88,9)	
Marital Status							
Married/stable relationship	527	(48,6)	2067	(59.1)	9727	(77,6)	<0,001
Single/other	557	(51,4)	1429	(40.9)	2810	(22,4)	
Skin colour/ Ethnicity							
White	927	(89,5)	2957	(87.2)	11525	(93,6)	0,052
Non-white	109	(10,5)	434	(12.8)	786	(6,4)	
Prenatal consultations							
0-6	440	(40,6)	1209	(34.5)	2422	(19,3)	<0,001
7+	645	(59,4)	2297	(65.5)	10135	(80,7)	
Start of prenatal care							
First Trimester	772	(75,0)	2660	(79.1)	11196	(91,5)	<0,001
Second and Third Trimester	258	(25,0)	702	(20.9)	1044	(8,5)	
Maternity profile							
Public	1040	(95,9)	3355	(95.7)	9160	(72,9)	<0,001
Private	45	(4,1)	152	(4.3)	3404	(27,1)	
Type of delivery							
Cesarian	478	(44,1)	1701	(48.5)	9400	(74,8)	<0,001
Vaginal	605	(55,9)	1806	(51.5)	3164	(25,2)	

Source: SINASC, 2012

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Table 2. Distribution of the study population with perinatal sociodemographic variables according to the age of the parents during pregnancy.

Variables	Couple's age group at birth						p
	Adolescent couple		Adolescent Mother/ Adult father		Adult couple		
	n	(%)	N	(%)	n	(%)	
Prematurity							
Yes	140	(13,2)	403	(11,7)	1305	(10,5)	0,036
No	924	(86,8)	3045	(88,3)	11174	(89,5)	
Birthweight							
< 2.000gr	37	(3,4)	82	(2,3)	337	(2,7)	0,171
2.000gr and more	1048	(96,6)	3425	(97,7)	12226	(97,3)	
Apgar First Minute							
< 8	169	(15,6)	474	(13,5)	1411	(11,2)	<0,01
8+	916	(84,4)	3032	(86,5)	11148	(88,8)	
Apgar Fifth Minute							
< 8	36	(3,3)	96	(2,7)	252	(2,0)	0,024
8+	1049	(96,7)	3409	(97,3)	12307	(98,0)	

Source: SINASC, 2012

Table 3 presents the results of the multivariate analysis of the factors associated with the pregnancy of adolescent couples. The multivariate analysis showed statistically significant differences when comparing teenage couples and couples of teenage mothers and adult parents, for most variables. Adolescent couples had higher chances of not having completed elementary school, (OR = 1.21; CI: 1.03-1.39), having less than 6 prenatal care consultations (OR = 1.29; CI: 1, 13-1,49), starting prenatal care after the first trimester (OR = 1.27; CI: 1.08-1.49) and not being married or in a stable relationship (OR = 1.49; CI: 1.29-1.72). Still, having a cesarean delivery was approximately 14% less likely among adolescent

couples. (OR = 0.86; CI: 0.41-0.75). The chances of low birth weight were almost 50% higher among adolescent couples (OR = 1.47; CI: 0.94-2.11) despite the statistical significance, for this association to have been borderline to the confidence limit of 5%. On the other hand, even though negative perinatal outcomes were more frequent among adolescent couples, less important associations, and not statistically significant, after adjustment, were found for Ápgar score and prematurity. No differences were found for delivery in the public health system. Having non-white skin color was the single most common outcome among couples of teenage mother and adult father compared to teenage couples.

Table3. Multivariate analysis of factors associated with the pregnancy of adolescent couples and Attributable Risk for couples of adolescent parents (AR).

Variáveis	Adolescent couple (AC) x Adolescent mothers/ Adult fathers (AM)					
	AC %	AM %	OR _(AM)	I.C. 95%	p	RAP*
Incomplete elementary school	34,1	30,5	1,21	(1,03-1,39)	0,017	17,4%
Single	51,4	40,9	1,49	(1,29-1,72)	< 0,001	32,9%
Non-White	10,5	12,8	0,77	(0,61-0,96)	0,023	- 22,4%
< 6 Prenatal consultations	40,6	34,5	1,29	(1,13-1,49)	< 0,001	22,5%
Prenatal Care 2ns and 3th Trimester	25,0	20,9	1,27	(1,08-1,49)	0,005	21,3%
Public maternity	95,9	95,7	0,98	(0,69-1,41)	0,932	-
Cesarean Delivery	44,1	48,5	0,86	(0,75-0,98)	0,04	-13,7%
Prematurity	13,2	11,7	1,07	(0,87-1,33)	0,54	-
Birthweight <2.000g	3,4	2,3	1,47	(0,94-2,11)	0,054	32%
Apgar First Minute < 8	15,6	13,5	1,16	(0,96-1,41)	0,138	13,8%
Apgar Fifth Minute < 8	3,3	2,7	1,22	(0,83-1,79)	0,319	18%

• PAR (Percent Attributable Risk): Percentage variation when comparing excess prevalence among teenage couples compared to couples of teenage mothers and adult fathers

Results of Percent Attributable Risk (RAP) representing the proportional variation when calculating the excess in the prevalence of the factors of interest, in adolescent couples, compared to couples of adolescent mothers and adult fathers, fully corroborated the results obtained by the multivariate model and brings the expected excess in the occurrence of the outcome among adolescent couples. Outcome proportions were 30% higher among single or unstable adolescent couples. Prenatal variables (fewer consultations and late onset) showed an increase of more than 20% among adolescent couples. Higher proportions among adolescent couples were also found for incomplete primary education (17.4%). On the other hand, the chance of cesarean delivery showed a drop of almost 14% among adolescent couples. As for newborn variables, a more important excess was found, among adolescent couples, for 3 of the 4 outcomes studied: Birth weight <2,000g (increase of 32%) and Ápgar <8, at 10 and 50 minutes (13.8% and 18%, respectively).

Adolescent pregnancy and its consequences for the future of the mother and the newborn, a problem of international scope, remains current as a matter of debate concerning public health in Brazil, despite having presented a drop in recent years, 19.3% in 2010 to 17% in 2016[5]. Results of different studies conducted in Brazil show rates of teenage pregnancy ranging from 11.0% to 29.6% [5,9,13,19] according to region and sociodemographic conditions.

In the present study, 16.6% of births occurred for mothers aged 14-19 years, and this proportion was 6.3% when father and mother were in their adolescent age at the time of delivery, 26.8% between couples of teenage mothers and adult parents and 66.9% among adult couples. No other studies were found in Brazil reporting the pregnancy rate in adolescent couples.

The factors classically associated with teenage pregnancy, according to the results of different studies, belong to two main groups: those of sociodemographic determinants[8-10,20] and in the area of consequences for the newborn of teenage mothers[11,13,14, 21]. Results of the present study show a population with less privileged social conditions. The results show that both adolescent couples and those of adolescent mothers and adult fathers belonged to a greater extent to the groups with lower levels of education, single marital state, non-white ethnicity, fewer prenatal

consultations, with late start of prenatal care, and giving birth in public maternity hospitals.

Several studies have associated a higher chance of pregnancy in adolescence among populations of low socioeconomic status[10,22]. In this study, the proportion of parturients with incomplete primary education was three times higher among adolescent couples compared to adult couples (34.1% versus 11.1%). In another study conducted in Maringá, Paraná, 30.6% of adolescents had not completed elementary school, pointing alone to a social problem[23]. In this context, low levels of education negatively impact the lives of adolescent women and their newborns[24,25]. Pregnancy among adolescents when associated with the "out-of-school" circumstances, given the difficulty of reconciling demands from the school and the burden of care for the newborn, can perpetuate the pre-existing social difficulties.

Data reported by other studies point that a higher frequency of adolescents living without a partner during this phase of life can be an additional problem[26] since, partner support has shown to be significantly associated with a lower risk of adverse outcomes at birth[27]. The results of this study show that the chances of finding a woman living without a partner were more than double among mothers of adolescent couples compared to pregnancies of adult mothers (51.4% versus 22.4%, respectively).

Quality prenatal care can be considered essential to the smooth running of a pregnancy even when it was not planned[16]. Association between late onset of prenatal care and low frequency of prenatal care among adolescents has been reported in the literature[4]. The results of this study show a proportion of more than twice the number of pregnancies with prenatal care below that recommended and a triple of late onset among adolescent couples (40.6% and 25%, respectively) when compared to adult couples (19.3% and 8.5%), respectively. Another study, showed more than twice higher the number of adolescents with the lowest number of prenatal consultations compared to pregnant women from other age groups[28]. A retrospective cohort compared mothers and newborns with an incidence of inadequate and adequate prenatal care (≥ 5 prenatal and initial consultations). The group with less than 4 prenatal consultations had a lower level of education and a higher level of unemployment, in addition to higher rates of smoking and drug use. In

addition to higher rates of admission to the neonatal intensive care unit and neonatal hospital stay[16]. The authors point to the need for awareness and incentive given the number of late arrivals and irregular attendance to prenatal care among adolescents.

A lower rate of cesarean sections among adolescents has been reported in Brazil[26]. Results of this study pointed to a rate of cesarean sections that, even high among adolescent couples (44%), were still much lower when compared to adult couples, who had a 74.8% rate of cesarean deliveries. A study conducted with the objective of investigating factors associated with the type of delivery in Santa Catarina found a 30% lower chance of cesarean delivery among adolescents compared to women aged 20-34 years and 60% lower when compared to those over 35 years of age[29].

The negative effects of an early pregnancy, associated with low social levels, impacts the newborn with an increased potential for morbidity and stillbirth[30]. In this study, couples of adolescent mothers and fathers and adolescent mothers and adult fathers also had a higher proportion of premature newborns and also low Apgar scores at the first and fifth minutes. These results are in agreement with results of other authors pointing to a higher risk of preterm delivery[30] and lower rates of Apgar[23,10] among newborns of adolescent mothers.

Most studies on teenage pregnancy, published in Brazil, are focused on the adolescent mother. However, there is a lack of investigations directed to the binomial (adolescent father and mother) thus neglecting the importance of paternal age[18]. However, the likelihood of differences in risk cannot be disregarded when integrating the “adolescent father” into the analyzes, since a significant number of unplanned pregnancies are reported among adolescent couples[17]. Bearing in mind that a central objective in this study refers to excess risk among adolescent couples and given the scarcity of information from other studies, the stratification of the outcome in three groups, as proposed here, allowed to access the excess in the chance of those events of interest, and also the expected attributable risk when integrating the “teenage father” into the “teenage couple” binomial.

Differences in the proportions of the factors of interest when comparing adolescent couples to couples

of adolescent mothers and adult parents, showed statistically significant excesses in the chances of these outcomes among adolescent couples ($OR > 1$; $p < 0.05$) for: lower levels of schooling, living in the absence of a partner, non-white skin color, and for low frequency and late start in prenatal care. Still, a lower chance of cesarean delivery was found among adolescent couples. On the other hand, although higher proportions of low birth weight among adolescent couples have been found, this excess reached borderline statistical significance ($OR > 1$; $p = 0.054$).

The Percent Attributable Risk (RAP) indicates the proportion of cases that could be avoided, among those exposed, by withdrawing the exposure. In the present study, the main exposure is represented by the “teenage father”. This measure is complementary to the findings of an excess in relative risk, expressed by the O.R. and, in addition to corroborating the strength and direction of the effects previously found, it brings to light an excess in the groups representing less privileged social conditions among adolescent couples, when integrating the “adolescent father” into the binomial. Excesses in the number of negative events above 30%, among adolescent couples, were found for the variables low birth weight and not being married or in a stable relationship (RAP = 32.9% and 32%, respectively). Excesses above 20% were found for the prenatal variables for both frequency below 6 consultations and late onset (RAP = 22.5% and 21.3%, respectively). Low Apgar Score in the first and fifth minutes and prematurity, despite having contributed to the increase in cases among adolescent couples (RAP = 13.8%, 18.8% and 6.5% respectively) did not show statistical significance. The only variable showing excess between the couples of an adolescent mother and an adult father refers to the contribution of the variable non-white skin color (RAP - 22.4%). There was no excess in public deliveries among teenage couples when compared to the other groups.

The investigation of the excess risk attributed to the presence of the “adolescent father”, can be considered the most original aspect in the present study, when it sought to define the magnitude of an excess in the number of unfavorable events (cases) one could expect when integrating the “teenage father” to the event of adolescent pregnancy.

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