

High incidence of low birth weight children among adolescent mothers in Brazil

By Humberto Corrêa and Glaucia dos Santos Marcondes*

* Universidade Estadual de Campinas (UNICAMP) – Núcleo de Estudos de População (NEPO).

Abstract - The purpose of this paper is to assess the importance of Maternal Age (MA) in the overincidence of low weight observed in children delivered to adolescent mothers (10-19 years old) in comparison with the children of 20-29 year-old women. Information has been gathered from the Brazilian Newborn Information System (SINASC) related to the cities of Rio de Janeiro and Recife (2000-2002) regarding MA, Gestational Age (GA) and the number of Prenatal Appointments (PA). The age specific low birth weight rates were calculated and the prevalence ratios for each set of MA, GA and PA were compared. Results suggest that MA seems to play an intervenient role, yet not determinant, as to the occurrence of LW newborns from adolescents mothers. The MA-GA-PA combination seems to had a great impact on LBW due to exogenous adverse variables that prevailed in this group before pregnancy.

Keywords - low birth weight, health inequality, adolescent pregnancy.

Resumo - O objetivo deste trabalho é avaliar a importância da Idade Materna na sobreincidência do Baixo Peso ao Nascer (BPN) observada em nascidos vivos de mães adolescentes (10-19 anos) *vis-à-vis* aos filhos de mulheres de 20-29 anos. Para a análise foram considerados os dados provenientes do Sistema de Informação de Nascidos Vivos (SINASC) sobre a Idade Materna (IM), Idade Gestacional (IG) e o Número de Consulta Pré-natal (NCP) referentes aos nascidos vivos do triênio 2000-2002, nas cidades do Rio de Janeiro e Recife. Foram obtidas as taxas específicas de nascidos vivos com BPN, segundo IM, IG e NCP e comparadas as razões de prevalência de baixo peso ao nascer obtidas para cada um dos conjuntos de variáveis. Os resultados sugerem que a idade materna assume um papel interveniente, porém não-determinante, para a ocorrência do BPN que sobreincide nos conceitos de mães adolescentes. A sobreincidência do baixo peso ao nascer deve-se à combinação IM, IG e NCP em virtude de fatores exógenos que prevaleciam neste grupo antes da gravidez.

Palavras-chave - baixo peso ao nascer, desigualdade em saúde, gravidez na adolescência.

Abbreviations: BW, birth weight; GA, gestational age; LBW, low birth weight; LW, low weight; MA, maternal age; PA, number of prenatal appointments.

Introduction

Throughout the last decade in Brazil the theme of adolescent pregnancy has gained visibility in the media, in academic centers and among public administrators mainly due to the increase of women fertility in the age groups of 10-14 and 15-19 years in the Total Fertility Rate (TFT).^[1-3]

The social implications of this phenomenon have fostered a broad debate and also a consideration of numerous questions that characterize adolescent pregnancy as an early event with negative effects, ranging from social relationships and life projects to the health of adolescent mothers and their children^[4,5].

Studies that privilege social and psychological aspects state that having a child at such an early age would interrupt the process socially considered as ideal or before adolescent has reached a psychosocial

condition understood as the most adequate to constitute a family. In most of these studies pregnancy is seen as undesirable, a misfortune resulting from the lack of information and maturity of individuals who experience it.^[6,7] Similarly, the use of the medical discourse has also strengthened the negative scenario associated to adolescent fertility by classifying it as a public health problem^[6] strongly connected to two important indicators: maternal mortality and infant mortality.

Epidemiologic studies indicate the relationship between maternal age and the incidence of a varied set of obstetrical problems. The most outstanding ones are prematurity and low birth weight. These factors represent the main causes of morbimortality in the first year of life.^[8-13] However, a numerous studies consider that some aspects related to the pregnant women social life – such as education,^[6,13-15] household income *per*

capita^[5,16,17] and access to medical services during pregnancy – may be more significant to birth outcomes than maternal biological age itself.^[5,12-14,16,18-26]

This type of evidence gives way to questioning if approaching the theme under labels such as “troublesome”, “risky”, “early”, “unwanted” would end up disseminating a discriminatory, moralist and reductionist perspective of the topic,^[20] thus contributing for its persistence and increase the exposure of adolescents to risk situations that could be otherwise reduced or avoided.^[6,7]

Finally, it is worth mentioning that adolescent pregnancy can be approached from the notion of reproductive rights, in conformity with the terms agreed upon in the international conferences organized by the United Nations during the 90’s.^[18] This perspective had already been considered in concrete actions since the reformulation of the Brazilian health system during the 80’s. Guaranteed access and quality to the services provided to women before, during and after delivery has always been in the list of feminist claims in the health area as an attempt to face high maternal mortality rate in Brazil. During the 80’s, under the influence of women organized movement, a process of change in paradigms has started within the Brazilian public health system that has led to the implementation of the Programa de Assistência Integral a Saúde da Mulher – PAISM (Full Health Assistance Program for Women), which focused on a broader and more adequate care to women’s health specificities at all ages. This context has favored a debate about the specific condition of pregnant adolescents that had been ignored by the system until then.^[27]

Prenatal care appears as one of the essential services that should be offered periodically, systematically and adequately, in conformity with the pregnancy risk level. Recognized as a basic right, the importance of prenatal care is emphasized by literature as a means to control the health status of the pregnant woman and her child.^[27] Proper follow-up during pregnancy – considering the multiple social inequalities experienced by women – would contribute to reduce a large number of risk factors and behaviors observed among pregnant women, especially pregnant adolescents.^[8]

In face of the aspects listed herein about the debate on adolescent fertility, this paper aims at assessing the incidence of low birth weight in the population of newborns to mothers between 10-19 and 20-29 years in Rio de Janeiro (capital of the State of Rio de Janeiro) and Recife (capital of the State of Pernambuco) by analyzing the impact of maternal age on delivery *vis-à-vis* the level of prenatal care received by the pregnant woman.

Methodology: concepts and procedures

Due to the evidences mentioned by the medical literature about the intrinsic relationship between Birth Weight (BW), Gestational Age (GA) and number of Prenatal Appointments (PA),^[8,28] we consider that whenever possible multiple combinations of these variables shall always be identified, broken-up and crossed, with the purpose of providing a more enlightening interpretation of their impact on birth outcome.^[29] Thus in addition to the demographic variable Maternal Age (MA), the following indicators will be analyzed: BW, or more specifically, Low Birth Weight (LBW), GA and PA.

Birth Weight

The World Health Organization (WHO) considers BW as an efficient neonatal and infant morbimortality indicator^[8,30] and we have followed its definition by which newborns with less than 2,500g are considered low weight.

Gestational Age

GA is a variable intrinsically associated to LBW. The last review of the International Classification of Diseases (ICD-10) defines GA as the time of gestation in completed days or weeks counting from the first day of the last regular menstrual period. In accordance with ICD-10 protocol gestations can be classified as: preterm (less than 37 weeks or 259 days of gestation); fullterm gestation (from 37 weeks to less than 42 weeks or from 259 to 293 days of gestation) or; postterm (from 42 weeks or from 294 days of gestation on).^[31]

Prenatal care

According to the WHO,^[30] adequate prenatal care may be measured by observing the PA that the woman undergoes during pregnancy. The WHO Technical Working Group suggests a minimum of four prenatal appointments, scheduled in specific periods in order to provide a basic level of care. Nevertheless, a larger number of appointments may be necessary, depending on the woman’s specific conditions and needs.

In Brazil, the recommendation contained in the Guidelines of Information for Administrators and Technicians (Cartilha de Informações para Gestores e Técnicos) of the Prenatal and Birth Humanization Program (Programa de Humanização no Pré-natal e Nascimento) prepared by the Public Health Policies Secretariat/Ministry of Health, pregnant women must have at least six appointments scheduled in the three trimesters of gestation.^[32]

Moreover, according to the publication contained in the Guidelines Project of the Brazilian Federation of

Gynecology and Obstetrics and the State Societies (FEBRASGO), it is consensus among physician and experts that observance to the recommended number of appointments associated to the beginning prenatal care still in the first pregnancy trimester indicates a qualitative perspective of a woman with her pregnancy.^[28]

A plausible hypothesis resulting from these observations is that living in unfavorable social contexts contributes for inadequate or insufficient prenatal care. Thus, in the absence of measurable socioeconomic variables regarding adolescent mothers at the time of delivery, prenatal care may be taken as a *proxy* to assess the socioeconomic context in which adolescents were inserted when their children were born.

Procedures

This analysis was based on birth records of Brazilian Newborn Information System (Sistema de Informações de Nascidos Vivos - SINASC) of the Ministry of Health, related to the triennium 2000-2002 for the cities of Rio de Janeiro (located in the Southeast Region of Brazil, the wealthiest in the country) and Recife (located in the Northeast Region of Brazil, the region that concentrates the poorest states of the country).

Figure 1 presents a synthesis of selected indicators for both cities.

Figure 1 Socioeconomic and demographic indicators. Rio de Janeiro, Recife and Brazil (2000-2002)

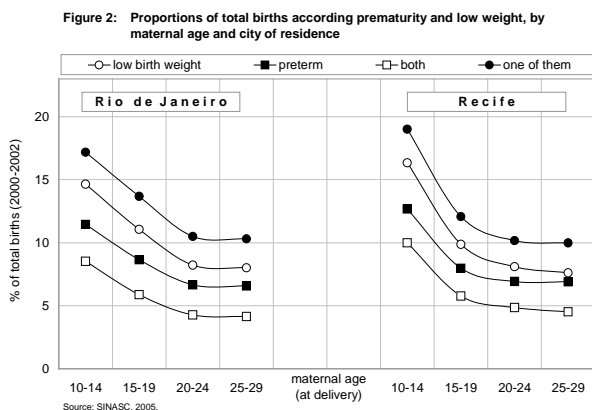
Year	Indicator	Rio de Janeiro	Recife	Brazil
-	Brazilian geographic region ¹	Southeast	Northeast	-
-	Geographical area (km ²) ¹	1,182	217	8,514,876
2001	Total population (millions) ¹	5,897	1,437	172,4
2001	% of female population ¹ base: total population	53.1	53.5	50.7
2001	% of 10-19-year-old female population ¹ base: total female population	15.2	18.4	20.3
2001	Population density (inhabitants/km ²) ¹	4,989	6,623	20
2000	Life expectancy at birth (e ^o) ²	70.26	68.62	68.61
2000	Total fertility rate (TFT) ²	1.87	1.81	2.37
2000	Human development ²	0.842	0.797	0.766
2000	Infant mortality rate (per 1,000 births) ²	21.83	29.78	30.57
2000	Income <i>per capita</i> (Reais) ²	596.65	392.46	297.23
2000	physician (per 1,000 inhabitants) ²	3.68	3.58	1.16
2000	Literate rate (percentage) ² base: population above 14 years	95.59	89.45	86.39
2001	Homicide rate (per 100,000 inhabitants) ²	55.52	96.86	27.79
2000	household income of the 80% poorest ²	34.5	27.4	31.9
2000	household income of the 10% wealthiest ²	48.2	55.1	52.4
2000	average income ratio of 10% wealthiest and 40% poorest ²	26.85	41.75	32.93
2000	Gini index ²	0.616	0.680	0.645
2002	Gross national product <i>per capita</i> (Reais) ¹	10,537	7,822	7,631

Sources: ¹ IBGE - Instituto Brasileiro de Geografia e Estatística (Brazilian Institute of Geography and Statistics).
² IPEA - Instituto de Pesquisa Econômica Aplicada (Institute Economic Research Applied).

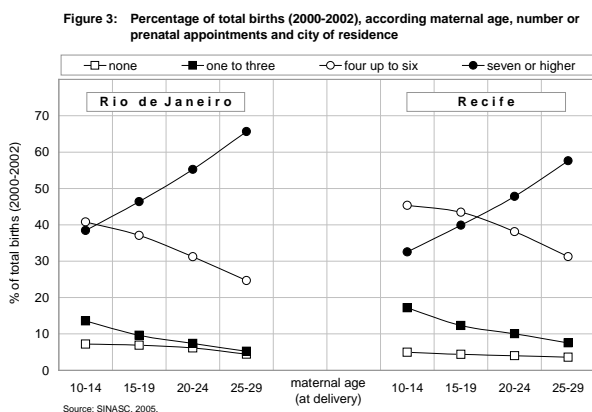
Results

The first step enclosed the complete database in order to characterize and compare newborns of adolescent mothers *vis-à-vis* of the children of mothers of the 20-29 years age group.

Results are in concordance with the findings described in the literature mentioned about higher LBW and preterm proportions among adolescent mothers in comparison with mothers from the 20-29 years age group (Figure 2).^[9-11,16,22,33-36]



Similarly, it is been noted that during that triennium, in both cities, adolescent mothers presented a lower number of PA than that observed in the other age groups (figure 3).^[9-11,16,22,33-36]



The 10-14 year-old mothers presented twice as high births proportions in classes PA=0 and [1;3] than those observed in the 25-29 year strata. This scenario suggests a situation of higher risk for these children and also a situation of vulnerability for adolescent mothers.

The following analyses have not considered records that presented “unknown” information for one or more fields that represented variables BW, GA and PA.

From a total of 255,204 births records to 10-29 year-old mothers during the triennium 2000-2002, 7,693 or 3% (3.6% in Rio de Janeiro and 1.2% in Recife) did not present the minimum requirements to be included in the analysis.

As mentioned previously, LBW global analysis hides differences that can make the results interpretation difficult. Nevertheless, this kind of obstacle can be overcome by building more homogeneous groups for analysis. Thus, in addition to MA, births data have been regrouped by variables GA, BW and PA.

Figure 4 shows the rates of newborn with LW (*per* thousand births) and the impact of MA, GA and PA on the incidence of LBW. Note that among the selected variables the isolated impact of GA outstands as the main determining factor of LBW occurrence. PA impact is also evident, mainly for the newborn with GA<37 weeks. Lastly, the impact of MA has shown to be the less evident at all GA and PA levels.

By virtue of the numerous possibilities to analyze the available information, the following synthesis is proposed in order to quantify each impact: in addition to discrimination by GA<37 weeks to represent preterm births and GA≥37 weeks to characterize the non-preterm births, three age groups have been considered, i.e. 10-19ⁱ; 20-24 and 25-29 years. We have decided to compare the level of prenatal care considered as the most deficient – due its absence (PA=0) or insufficiency (PA=[1;3]) – against the best level of prenatal care – PA≥7. The decision of considering the extremes levels was due to the fact that data was presented in SINASC database as fixed categoriesⁱⁱ.

Based on the Guidelines of Information for Administrators and Technicians, which recommends a total of seven or more appointments during a standard gestation,^[28] we have adopted PA≥7 to characterize the proper level of care, as this class is less subject to dubious interpretation than the previous one, i.e. PA at level [4;6].

It is worth mentioning that this level of prenatal care can be reached between the 28th and 32nd week of gestation, if care has been started and conducted in accordance with the schedule recommended in mentioned the document.^[28]

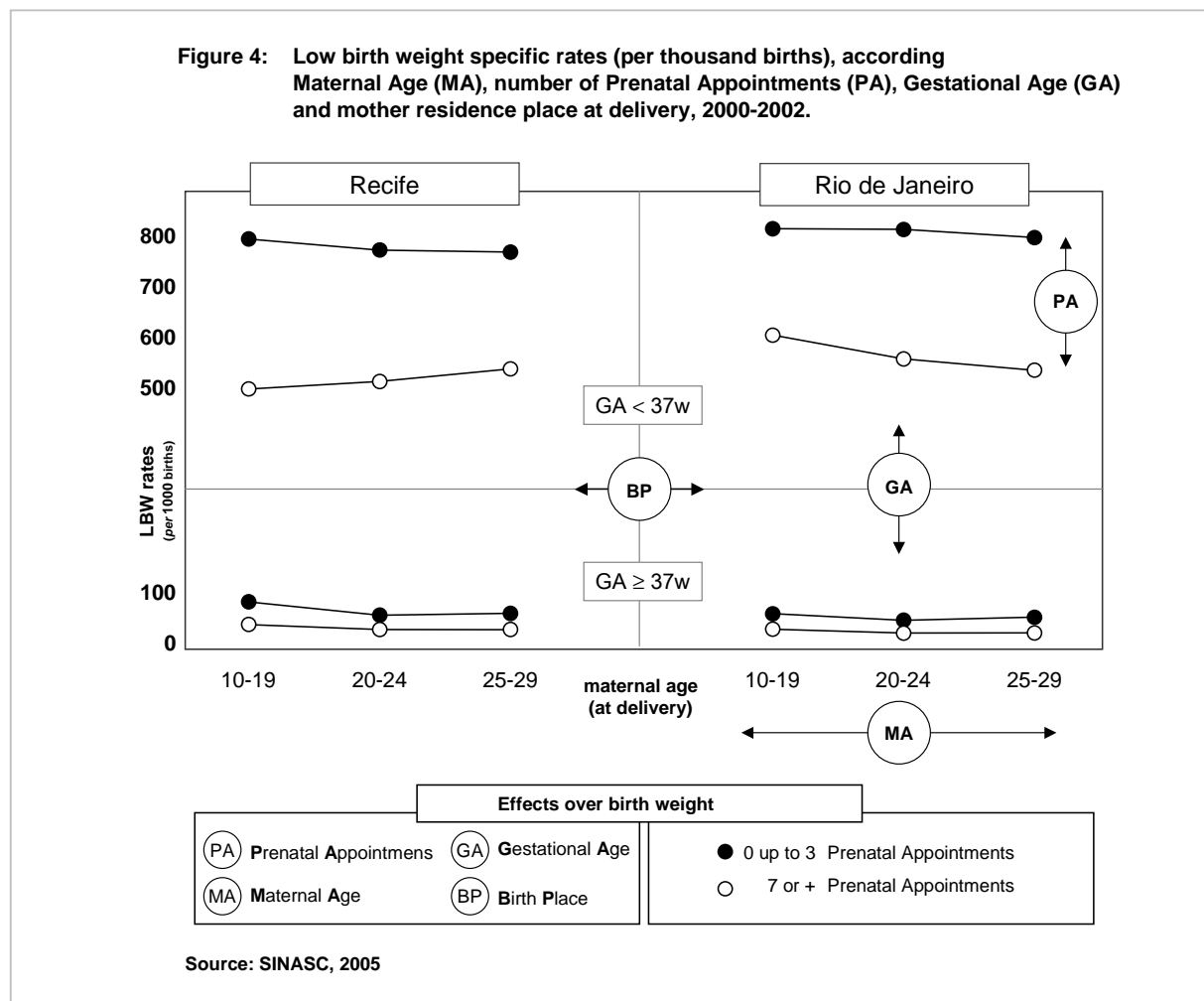


Figure 5 shows the LBW rates (*per* thousand births) for both cities, according MA, PA and GA.

Figure 5: LBW rates (per thousand births) by city, according Maternal Age, number of Prenatal Appointments and Gestational Age.

Prenatal Appointments	RIO DE JANEIRO			RECIFE		
	10-19	20-24	25-29	10-19	20-24	25-29
PRETERM						
PA [0;3]	802	781	777	823	821	805
PA ≥ 7	508	522	547	614	567	545
NON-PRETERM						
PA [0;3]	89	63	67	66	53	59
PA ≥ 7	45	35	35	36	28	28

Source: calculated based on SINASC database, 2005

Figure 6 presents the prevalence ratios of newborns with low birth weight, by city, according to the adjustments stated above. The numerator of each prevalence ratio is the specific rate (*per* thousand births) of newborns with low weight (Figure 5), by the indicated set of MA (see Figure 6: column 1, lines 4 to 6 for Rio de Janeiro; lines 7 to 9 for Recife), GA and

PA (headlines 1 and 2; columns 2 to 9). Except for the base variable (GA, PA or MA) indicated (at headline 3 of columns 2 to 9) the denominator of each ratio considers the same set of MA, GA, PA expressed in the numerator.

This representation clearly shows that GA had the highest impact on LBW. For example, in the 10-19 year group at PA level = [0;3] and GA<37 weeks, the prevalence ratio of LBW (*per* thousand births) was nine times higher than that obtained for the same age group with GA≥37 weeks in Rio de Janeiro and 12.5 times higher in Recife. The same ratio was 11.7 times higher in the 25-29 year group in Rio de Janeiro and 13.6 times higher in Recife. For level PA≥7 variation was even higher: 11.3 times for adolescents and up to 15.7 times for 25-29 year-old women living in Rio de Janeiro. In Recife ratios varied from 17.2 times among adolescents up to 20.2 times for 20-24 year-old mothers.

PA was the second variable that most affected the observed levels of LBW. However, its impact was quite lower than GA. We have also observed that PA effect was greater on GA≥37 weeks level.

Figure 6: Prevalence ratios among LBW specific rates with indicated set of MA, GA and PA vis-à-vis the age group and/or BASE variable

GESTATIONAL AGE		< 37w	< 37w	< 37w	≥ 37w	< 37w	≥ 37w	< 37w	≥ 37w	1
PRENATAL APPOINTMENTS		≥ 7	[0 ; 3]	[0 ; 3]	[0 ; 3]	[0 ; 3]	[0 ; 3]	≥ 7	≥ 7	2
BASE →		GA≥37w	GA≥37w	PA ≥ 7	PA ≥ 7	MA 20-24	MA 20-24	MA 20-24	MA 20-24	3
RIO DE JANEIRO	MA = 10-19	11.3	9.0	1.6	2.0	1.0	1.4	1.0	1.3	4
	MA = 20-24	14.9	12.4	1.5	1.8	*	*	*	*	5
	MA = 25-29	15.7	11.7	1.4	1.9	1.0	1.1	1.0	1.0	6
RECIFE	MA = 10-19	17.2	12.5	1.3	1.8	1.0	1.2	1.1	1.3	7
	MA = 20-24	20.2	15.4	1.4	1.9	*	*	*	*	8
	MA = 25-29	19.2	13.6	1.5	2.1	1.0	1.1	1.0	1.0	9
		1	2	3	4	5	6	7	8	9

Source: calculated based on SINASC database, 2005

Individual comparisons between PA level = [0;3] and PA≥7 in each age group indicate that relative differentials were similar for both GA levels considered. In addition, among adolescent mothers, prevalence ratios were always higher in Rio de Janeiro than in Recife at this PA level. This fact suggests that the implementation of policies with the purpose of providing universal prenatal care for this age group would be proportionally more efficient in Rio de Janeiro – where the difference between the worst and best scenario are greater than Recife. However, there are opportunities to improve prenatal care in both cities and this would certainly benefit the population of the three age groups analyzed. In spite of what common sense would suggest, MA had the lowest impact on the low weight newborns rate – which resulted from the comparison between the low weight newborns rates obtained for a given set of MA, GA and PA and the reference age group (20-24 year-old mothers) with the same GA and PA combination.

If the levels of prenatal care observed in the triennium 2000-2002 were to be maintained in both cities and if the 10-19 year population would postpone fertility for the third decennium of life, their LBW rates would see little change. Thus, in the best-case scenario, there would be a reduction of the number of newborns with LW in the adolescent population, yet that would not necessarily imply a reduction on the proportion of LW newborns from those mothers. We could also reasonably suppose a consequent increase, in absolute

numbers, of LW newborns of mothers who are 20 years or older.

Regardless of the facts and hypotheses that suggest GA and – less intensely – PA would have a higher impact on LBW incidence, we must ratify that with the same level of prenatal care, lower rates of LBW have also been reached by women older than 19 years.

In synthesis, it is indeed true that adolescent mothers give birth to LW children in higher proportions than 20-29 year-old women. However, there is evidence that improving prenatal care would provide for a large reduction of LBW rates in adolescent mothers and also their levels would be similar to those of the reference group (20-24 years). As shown in Figure 5, there is proportionally more room for improvement in prenatal care programs as to compliance and proper frequency in the adolescent mothers group (in quantitative terms).

Finally, analyses suggest that the hierarchy found in the set of variables as overincidence of LBW in adolescent mothers is the same in both cities considered in this study. The difference between them lies in the intensity of the relationship, as well as on the starting point of current LBW levels. In general terms, the situation in Rio de Janeiro has always been more favorable than in Recife. As the first city shows better socioeconomic indicators (Figure 1) than the second one, the hypothesis of the incidence of exogenous factors over LW gains strength.

Discussion

This study has explored the association of BW, GA, PA and MA with the purpose of demonstrating that exogenous factors have an impact on the overincidence of LW in newborns of adolescent mothers in comparison with 20-24 and 25-29 year-old groups. Prenatal care was used as a *proxy* to assess the maternal socioeconomic context at the time of delivery. Based on several studies, this procedure suggests that the group of adolescent mothers was inserted in a greater proportion in an unfavorable context.

Due to the complex interrelation of variables BW, GA and PA, more homogeneous subgroups were created, according to the variables mentioned. Regrouping the information allowed us to isolate how much each variable contributed to LBW occurrence.

GA was the variable that proved to be the most important in determining LBW. The minimum prevalence rate was 9 times (802/89) under inadequate care for the adolescent group living in Rio de Janeiro and reached a maximum of 20.2 times (567/28) under adequate care for the 20-24 year-old group living in the city of Recife at the time of delivery.

PA was the second variable with the most important individual impact although it was quite inferior to the level reached by variable GA. However, it was clear to notice that the response of LW to the increase in PA was quite similar in all age groups. Differences between adequate and inadequate prenatal care varied from 1.4 to 1.6 times for $GA < 37$ weeks and from 1.8 to 2.0 times for $GA \geq 37$ weeks in Rio de Janeiro. In Recife the differences varied from 1.3 to 1.5 times for $GA < 37$ weeks and from 1.8 to 2.1 for $GA \geq 37$ weeks. Nevertheless, as the LBW were higher in the 10-19 year-old group it is fair to suppose that they are the ones that would benefit the most (*per* thousand births) if prenatal care levels were improved.

Finally, MA impact revealed to be the lowest on the rates of LW newborn. However, data ratifies that the group of adolescent mothers is more vulnerable as to incidence of LBW.

Considering the results obtained and that prenatal care – as mentioned by the medical literature – is a good indicator that pregnant women are inserted in an unfavorable socioeconomic context at the time of delivery, MA seems to play an intervenient role, yet not determinant, as to the occurrence of LW newborns from adolescent mothers.

Thus, it would be feasible to suppose that the implementation of specific actions would be a paramount contribution to reduce the incidence of LBW linked to the risks caused by adverse socioeconomic contexts prevailed – according to PA *proxy* – in the 10-19 year-old group. If we consider the counterpart line of thought, that is, if adolescents had better life conditions during pregnancy and at the time

of delivery, a reduction of LBW could be expected in these age groups, in concomitance with an increase in prenatal care.

In spite of the convergence observed in LBW rates with a progressive elevation of PA and GA levels, it is not possible to guarantee that all age groups would reach the same rate of LBW – even if the analyzed variables were totally equalized. Nevertheless, the isolation of a few variables suggests that MA does not have a high impact on the incidence of LBW. Many studies point out that introducing more precise controls such as parturity, income, fertility history, conjugal status, degree of formal education and race/ethnic group weaken or even dilute this type of association.

As adolescent pregnancy tends to concentrate in population groups of which maternal nutrition and health conditions are inadequate a correlation between GA and the risks for the newborn is frequently stated in empirical studies. Nevertheless, nor the age at which pregnancy occurs, nor biological factors associated to GA respond for the true risks of adolescent pregnancy.^[37] Thus, we can infer that the interaction of these conditions with poor health condition, nutrition and prenatal care received by pregnant adolescents potentiate several risks as LBW.

In summary, the socioeconomic status of a large proportion of adolescents that give birth during the second decade of life seems to play a more important role than MA on the overincidence of LBW. It would not be acceptable to think that the simple age increase of conception and delivery could solve or reduce this type of problem, as in the 20-24 and 25-29 year-old groups – in which there is lower incidence of newborns with LBW – remains a significant number of women who experience this negative obstetric result.

Notes

ⁱ Due to the reduced number of cases in the 10-14 year group (1.2% of all records, or 4.4 of the newborn of mothers between 10 and 19 years), we have decided to accumulate it with the 15-19 year group to obtain more consistent results.

ⁱⁱ PA = zero; 1 to 3; 4 to 6; 7 or + appointments.

References

1. CORRÊA, Humberto. Aspectos sociodemográficos sobre a maternidade na adolescência: o contexto brasileiro. **Femina**, Rio de Janeiro. v. 31, n. 8, p. 691-5, set. 2003.
2. CAVENAGHI, Suzana M; BERQUÓ, Elza. Increasing adolescent and youth fertility in Brazil: a new trend or a one-time event? Paper presented at **2005 Annual**

-
- Meeting of Population Association of América,** Philadelphia, Pennsylvania, mar., 2005, Session #151. Available: <<http://paa2005.princeton.edu/download.aspx?submissionId=51746>>.
3. BERQUÓ, Elza; CAVENAGHI, Suzana M. Mapeamento sócio-econômico e demográfico dos níveis de fecundidade no Brasil e sua variação na última década. In: **Encontro Nacional de Estudos Populacionais**, 14, Caxambu. Anais do XIV Encontro Nacional de Estudos Populacionais, Campinas: ABEP (CD-ROM). sept, 2005. Also available: <http://www.abep.nepo.unicamp.br/site_eventos_abep/PDF/ABEP2004_471.pdf>.
 4. STERN, Claudio; MEDINA, Gabriel. Adolescencia y salud en México. In: OLIVEIRA, Maria Coleta (org.) **Cultura, adolescência, saúde: Argentina, Brasil, México.** Campinas: Consórcio de Programas em Saúde Reprodutiva e Sexualidade na América Latina (CEDES/COLMEX/NEPO-UNICAMP), 1999, p. 98-160.
 5. SOUZA, Marcelo Medeiros Coelho de. A maternidade nas mulheres de 15 a 19 anos como desvantagem social. In: VIEIRA, Elizabeth Meloni; FERNANDES, Maria Eugênia Lemos; BAILEY, Patrícia; MCKAY, Arlene (org.). **Seminário Gravidez na Adolescência.** Rio de Janeiro: Associação Saúde da Família – Projeto de Estudos da Mulher no Brasil, p. 74-91, 1998.
 6. HEILBORN, Maria Luiza; BOZON, Michel; AQUINO, Estela; KNAUTH, Daniela. **Por uma abordagem socioantropológica dos comportamentos sexuais e reprodutivos da juventude no Brasil: a construção da pesquisa GRAVAD.** Rio de Janeiro, 2000.
 7. HEILBORN, Maria Luiza; SALEM, Tânia; KNAUTH, Daniela; AQUINO, Estela; BOZON, Michel; RODHEN, Fabíola; VICTORA, Ceres; McCALLUM, Cecília; BRANDÃO, Eliane. Aproximações socioantropológicas sobre a gravidez na adolescência. **Horizontes Antropológicos**, n. 17, 2002.
 8. COSTA, Elizabeth Cristina; GOTLIEB, Sabina Léa Davidson. Estudo epidemiológico do peso ao nascer a partir da Declaração de Nascido Vivo. **Revista de Saúde Pública**, v. 32, n. 4, p. 328-34, jun. 1998.
 9. MILLER, Hugh S.; LESSER, Karen B.; REED, Kathryn L. Adolescence and very low birth weight infants: a disproportionate association. **Obstetrics & Gynecology**, v. 87, n. 1, jan. 1996.
 10. NOGUEIRA DA GAMA, Silvana Granado; SZWARC WALDB, Maria do Carmo Leala; FILHAC, Mariza Miranda Theme. Gravidez na adolescência como fator de risco para o baixo peso ao nascer no Município de Rio de Janeiro, 1996 a 1998. **Revista de Saúde Pública**, v. 35, n. 1, fev. 2001.
 11. EISNER V, BRAZIE JV, PRATT MV, HEXTER AC. The risk of low birth weight. **American Journal of Public Health**, n. 69, p. 997-93, 1979.
 12. LIZO, Cesar L. P.; AZEVEDO-LIZO, Zuleika; ARONSON, Elizabeth; SEGRE, Conceição A. M. Relação entre ganho de peso materno e peso do recém-nascido. **Jornal de Pediatria**, v. 74, n. 2, p. 114-18, 1998.
 13. ROTH, J.; HENDRICKISON, J.; STOWELL, D. W. The risk of teen mothers having low birth weight babies: implications of recent medical research for school health personnel. **Journal of School Health**, n. 68, p. 271-5, 1998.
 14. HOFFMAN, Saul D. Teenage childbearing is not so bad after all... or is it? A review of the new literature. **Family Planning Perspectives**, v. 30, n.5, p. 236-39, sep./oct. 1998.
 15. ROGERS, Mary M.; PEOPLES-SHEPS, Mary D.; SUCHINDRAN Chirayath. Impact of a social support program on teenage prenatal care use and pregnancy outcomes. **Journal of Adolescent Health**, v. 19, n. 2, p. 132-3, 1996.
 16. MARIOTONI, Gladys Gripp Bicalho; BARROS FILHO, Antônio de Azevedo. A gravidez na adolescência é fator de risco para o baixo peso ao nascer? **Jornal de Pediatria**, v. 74, n. 72, p. 107-13, 1998.
 17. SOBREIRO, Bernardo P.; SIELBURGUER, Maria Angélica S.; GARCÍAS, Gilberto de L.; ROTH, Maria da Graça M. Recém-nascidos de mães adolescentes: um estudo comparativo entre estratos de renda familiar. **Jornal Brasileiro de Ginecologia**, v. 102, n. 11-2, p. 451-5, nov./dez. 1992.
 18. AQUINO, Estela; HEILBORN, Maria Luiza; KNAUTH, Daniela; BOZON, Michel; ALMEIDA, Maria Conceição; ARAÚJO, Jenny; MENEZES, Greice. Adolescência e reprodução no Brasil: a heterogeneidade dos perfis sociais. **Cadernos de Saúde Pública**, n. 19, supl. 2, p. 377-88, 2003.
 19. CALAZANS, Gabriela. Cultura adolescente e saúde: perspectivas para investigação. In: OLIVEIRA, Maria Coleta (org.) **Cultura, adolescência, saúde: Argentina, Brasil, México.** Campinas: Consórcio de Programas em Saúde Reprodutiva e Sexualidade na América Latina (CEDES/COLMEX/NEPO-UNICAMP), 1999, p. 44-97.
 20. GUPTA, Neeru; LEITE, Iúri da Costa. Adolescent fertility behavior: trends and determinants in Northeastern Brazil. **Family Planning Perspectives**, v. 325, n. 3, p. 125-130, sept. 1999.
 21. PINTO E SILVA, João Luiz. Gravidez na adolescência: desejada x não desejada. **Femina**, v. 26, n. 10, p. 825-30, nov. 1998.

22. OLAUSSON, Petra Otterblad; CNATTINGIUS, Sven; HAGLUND, Bengt; RINGBÄCK, Weitof. Teenage childbearing and long-term socioeconomic consequences: a case study in Sweden. **Family Planning Perspectives**, v. 33, n. 2, mar./apr. 2001.
23. MILLER, Frank C. Impact of adolescent pregnancy as we approach the new millennium. **Journal of Adolescent Gynecology**, n. 13, p. 5-8, 2000.
24. CAMARANO, Ana Amélia. Fecundidade e anticoncepção da população de 15 a 19 anos. In: VIEIRA, Elisabeth Meloni; FERNANDES, Maria Eugênia Lemos; BAILEY, Patrícia & McKAY, Arlene (org.): **Seminário Gravidez na Adolescência**. Rio de Janeiro: Associação Saúde da Família, 1988, p. 35-46.
25. CHOMITZ, Virginia Rall, CHEUNG, Lilian W.Y.; LIEBERMAN, Ellice. The role of lifestyle in preventing low birth weight. **The future of children**. 2003. Available: <http://www.futureofchildren.org/information2826/information_show.htm?doc_id=79889>.
26. LERENO, Isabel; GOMES, Carla; FARIA, Paula. Mães adolescentes: alguns aspectos da sua inserção social. **Arquivos de Medicina** (Revista de Epidemiologia), n. 10, supl. 4, p. 9-14.
27. CORRÊA, Sônia; ÁVILA, Maria Betânia. Direitos sexuais e reprodutivos – pauta global e percursos brasileiros. In: BERQUÓ, Elza (org.). **Sexo & Vida: panorama da saúde reprodutiva no Brasil**. Campinas, SP: Editora da Unicamp, 2003. p. 17-78.
28. ALENCAR A. C. Jr. **Projeto Diretrizes: Assistência Pré-Natal**. Federação Brasileira das Sociedades de Ginecologia e Obstetrícia. Available: <http://www.amb.org.br/projeto_diretrizes/100_diretrizes/ASSISTEN.PDF>.
29. American Institute of Medicine, Committee to Study the Prevention of Low Birthweight, Division of Health Promotion and Disease Prevention. **Preventing Low Birthweight**. Washington, D.C: National Academy Press, 1985. i-xii, 284 p.
30. WHO – World Health Organization. **Antenatal care – Report of a Technical Working Group**. Geneva, 31 oct./ 4 nov. 1994.
31. **Centro Colaborador da Organização Mundial da Saúde para a Classificação de Doenças em Português**, 1993. Available: <<http://www.fsp.usp.br/~cbcd/cidWeb.htm>>.
32. SECRETARIA DE POLÍTICAS DE SAÚDE / MINISTÉRIO DA SAÚDE. Programa de Humanização no Pré-natal e Nascimento [Instituído pelo Ministério da Saúde, através da Portaria/GM n. 569, de 1/6/2000]. **Cartilha de Informações para Gestores e Técnicos**.

Available:

<<http://www.saúde.gov.br/sps/areastecnicas/mulher/Cartilha.htm>>.

33. CHANDRA, P. C.; SCHIAVELLO, B. Ravi; WEINSTEIN, F.B. Hook. Pregnancy outcomes in urban teenagers. **International Journal of Gynecology & Obstetrics**, n. 79, p. 117-22, 2002.
34. PINOTTI, José Aristodemo; FAÚNDES, Aníbal. **A mulher e seu direito à saúde: por uma política de Saúde no Brasil**. Editora Manole: São Paulo, 1988.
35. YODER, Bradley A.; YOUNG, Martin K. Neonatal outcomes of teenage pregnancy in a military population. **Obstetrics & Gynecology**, v. 90, n. 4, part 1, p. 500-6, oct. 1997.
36. UNGER, Jennifer B.; MOLINA, Gregory B.; TERAN, Lorena. Perceived consequences of teenage childbearing among adolescent girls in an urban sample. **Journal of Adolescent Health**, v. 26, n. 3, p. 205-12, 2000.
37. STERN, Claudio. Teen pregnancy as a social problem: a critical perspective. **Salud Pública de México**. v. 39, n. 2, p. 137-43, mar./apr. 1997.

Acknowledgments

This work was supported by Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) and Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (Capes). Financial support to attend IUSSP XXV International Population Conference was granted by French National Organizing Committee (NOC) and International Union for the Scientific Study of Population (IUSSP). The authors wish to thank their research advisors Maria Isabel Baltar da Rocha and Maria Coleta Ferreira Albino de Oliveira for stimulating comments on the course of this work.

Correspondence:

Humberto Corrêa
AC UNICAMP
Caixa Postal 6189
CEP 13083-970 Campinas, SP
Brazil

humberto@nepo.unicamp.br
gal@nepo.unicamp.br