ORIGINAL ARTICLE

Mother-infant indicators in adolescence and youth: Sociodemographic, prenatal, delivery and newborns

Maria Conceição O. Costa,1 Carlos A. T. Santos,2 Carlito L. Sobrinho,2 Juliana O. Freitas,3 Karine A. S. L Ferreira3

Abstract

Objective: the aim of this study was to show the characteristics and the associations between the maternal age and the aspects of the gestation, delivery and live births of adolescent and young adult mothers in Feira de Santana, state of Bahia, Brazil.

Methods: a cross-sectional epidemiological study was carried out with a population of live births and adolescent mothers (10-16 and 17-19 years) and young adult mothers (aged 20-24 years). The information on 5279 live births was obtained through the Information System of Live Births (SINASC-1998). Study variables were classified into sociodemographic (age, educational level/schooling and sex of the newborn) and were associated with pregnancy, delivery, and the health status of newborns. Data were processed using prevalence rate and multivariate analysis. Logistic regression was used to control confounding factors (prenatal and gestational age), and to establish an association between maternal age and birth weight.

Results: in 1998, 21.6% of all the live births in Feira de Santana were born from adolescents. 51.2% of mothers did not finish junior-high school or elementary school. The result of the prevalence rate and adjusted odds ratio indicated increased prevalence of illiteracy, no prenatal examination, low birth weight and low prevalence of adequate birth weight in the 10-16 age group in comparison to the other age groups studied. The logistic regression showed a positive association between maternal age and low birth weight. A large number of fields were not filled out in SINASC database.

Conclusions: the study showed a high prevalence of live births, low educational level/schooling, increased risks of illiteracy, no prenatal examinations, low birth weight, and inadequate newborn weight, especially in the 10-16 age group, in comparison to other age groups.


Introduction

In Brazil, teenagers represent a considerable parcel of the population. According to the National Committee on Population and Development, Brazil had a population of 156.7 million inhabitants in 1996, of which, 34.2 million were adolescents (10-19 years old),1 In Feira de Santana, a city in the state of Bahia, the adolescents represent 24.5% (110,528) out of 450,487 inhabitants.2

The major determinants for the increase in adolescent fertility in the past 30 years is linked to the early beginning of sexual life in different socioeconomic contexts and to the frequent association of this behavior with misinformation or inadequate knowledge about reproductive health and contraception, added to the restricted participation of the family, schools, and health centers in sexual education. Adolescents rely on their peers as the main source of information on sexuality and, although they are still at a growth and developmental stage, they effectively contribute to the increased delivery and birth rates in different countries.3,4
In 1996, the National Research on Health and Demography, carried out by the BEMFAM (Civil Association for Family Welfare), showed that fertility has decreased in approximately 30% in Brazil during the past 10 years in all age groups, with the exception of the adolescent group. The research on Family Health in Northeastern Brazil, carried out by BEMFAM, found that, in the State of Bahia, approximately 25% of women in their fertile age range are adolescents, one in every five adolescents is considered sexually active, and 13% have children.

In developing countries, adolescent pregnancy and motherhood, and the high rates of perinatal and infant mortality are part of a larger social context, resulting from precarious life and health conditions for most of the population. Some studies on adolescent pregnancy and motherhood show that low educational level and limited professional qualifications, in addition to the abandonment by the partner or family, are considered risk factors for the health of adolescents and their children, especially in the absence of prenatal care.

The Information System of Live Births (SINASC) is part of the Vital Statistics Group established in March 1990 by the Ministry of Health. SINASC has a Statement of Live Birth form, with sociodemographic information about mothers, in addition to other variables related to pregnancy, delivery, and health status of newborns, which allows building an epidemiological profile of mother-infant health in different places, also helping the Health System to adopt policies that meet the demands of each population.

The Statement of Live Birth consists of three copies: one belongs to the Regional Board of Health, and the other two are handed to the mother for the birth registration of the newborn at a Registrar’s Office and for the first medical appointment of her child at the Health Service. Thus, SINASC provides statistical information on the mother and her child, and also provides information to the Registrar’s Office for the issue of a birth certificate, and to the Health System for the registration of the mother and her child in the Health Service. SINASC was implemented in Feira de Santana in 1996; however, the data were organized according to health institutions only in 1998, thus allowing us to conduct this study on the city’s health indicators.

The objective of this study was to point out characteristics, and simple and multiple associations between maternal age and aspects of pregnancy, delivery, and live births, regarding adolescent and young adult mothers from Feira de Santana, Bahia.

Methods

A cross-sectional epidemiological study was carried out with a population of live births and adolescent mothers aged between 10 and 19 years, and young adult mothers aged 20-24 years. The information on 5279 live births was obtained through the Information System of Live Births (SINASC-1998). In this study, the total population was considered as the sample and thus, statistical inference tests were applied, with the aim of using the data from Feira de Santana as an standard for other populations with similar features.

 Mothers were subdivided in groups according to their age: adolescents when aged 10-19, and young adults when aged 20-24. Adolescents were subdivided in two groups (10-16 and 17-19 years) after observing that the profile of women up to the age of 16 years contrasted with those who were older, as described in the literature.

In our study, the variables were classified as sociodemographic (age, educational level/schooling of mothers, and sex of the newborn), and associated with pregnancy (frequency of prenatal care), delivery (type), and status of birth (weight, gestational age, and Apgar score at 5 minutes). In terms of level of education/schooling, mothers were classified as illiterate, having incomplete primary education, complete primary education, or secondary education. Adherence to prenatal care was evaluated according to the number of appointments, considering 3 categories: no prenatal care, insufficient (less than 6 appointments) and sufficient (more than 6 appointments) prenatal care, following the Ministry of Health recommendation.

Delivery was classified into 3 types: vaginal, cesarean, and forceps delivery. As for gestational age, newborns were classified into premature (less than or equal to 36 weeks); term (greater than 36 and less than 42 weeks) and post-term (greater than or equal to 42 weeks), according to Capurro’s method. As for birth weight, newborns were classified into light (less than or equal to 2,500g), inadequate (2,501-3,000g) and adequate (greater than 3,000g), as recommended by WHO. The Apgar score at 5 minutes was classified by the score of points less than 7 and greater than or equal to 7.

Data were collected by NEPA (Center of Studies and Research on Childhood and Adolescence) trained researchers, using the Statement of Live Birth issued by SINASC in 1998, and were stored in EPI-INFO 6.0 and SPSSWIN 9.0 programs.

The sample was described through sociodemographic variables and those variables related to pregnancy, delivery, and newborn health status. Using bivariate statistical analysis (Prevalence Rate - PR), we obtained associations between maternal age and the other variables (level of education/schooling, type of delivery, prenatal care, gestational age, and birth weight). For multivariate analysis, we used logistic regression, expressing the results in odds ratio. Thus, we obtained the power of association between the cause variable (maternal age) and outcome variables (low, inadequate, and adequate weight of the newborn), adjusted in terms of confounding factors (prenatal care and gestational age), maintained in the model. The level of significance established by statistical tests was 5% or a P value less than 0.05.
Results

In the present study, we observed that, out of 10,164 live births in Feira de Santana in 1998, 2,194 were born to adolescent mothers, and 3,085 born to young adult mothers, corresponding to 21.6% and 30.4% of live births, respectively, according to the data obtained from SINASC-1998.

With regard to the level of education/schooling (Table 1), most mothers had not finished junior-high school or elementary school (51.2%); this rate was higher among adolescents. The highest illiteracy rate (7.8%) was observed in individuals aged between 10 and 16 years. This variable was not recorded in 17% of the SINASC forms.

The calculation of the prevalence rate (PR) for illiteracy among the age groups (Table 4) revealed an increased prevalence of 23% and 31% in individuals aged between 10 and 16 years when compared to those between 17-19 and 20-24 years of age, respectively, with no statistically significant differences. As far as junior-high school or elementary school education is concerned, the same calculation revealed an increased prevalence of respectively 10% and 32% for those aged between 10-16 years who had not finished their studies, and those aged 17-19 and 20-24 years, with statistically significant differences.

The results concerning the frequency of prenatal care (Table 2) showed that most pregnant women (31%) did not have sufficient prenatal care (less than 6 appointments) and only 29.6% received sufficient prenatal care, as established by the Ministry of Health. Among those mothers who did not have prenatal care (14.2%), the highest prevalence occurred among adolescents and, among those who received insufficient prenatal care, the lowest prevalence occurred in the 10-16 age group. Still regarding this variable, it is important to emphasize that 25.2% of SINASC-1998 forms were not filled out.

The calculation of the prevalence rate for prenatal care showed that absent prenatal examinations among adolescents aged 10-16 years was 10% higher when compared to adolescents aged 17-19 years, and 32% higher when compared to those in the 20-24 age group, with statistically significant difference (young adults).

The prevalence of vaginal deliveries among the age groups did not present any significant difference. Vaginal delivery occurred in 78.2% of pregnant women, with similar prevalence rates among the three age groups. The frequency of C-sections (19.2%) presented a higher prevalence among young adults (22%). Forceps deliveries occurred in only 0.2% of the patients.

Birth weight data (Table 3) showed that 55.8% of newborns had adequate weight (greater than 3,000g), with a higher prevalence among young adults (20-24 years). We verified that newborns of adolescent mothers, in both age groups, presented a higher prevalence of low (less than or equal to 2,500 g) and insufficient (2,501-3,000g) weight than young adults. The sum of low and insufficient weight values (47.3%) was higher than the sum of adequate weight values (45.9%) in the 10-16 age group.

The calculation of the prevalence rate for newborn weight showed that children born to adolescent mothers aged 10-16 years presented a prevalence rate of low weight 9% higher than those born to mothers aged 17-19 years, and a prevalence rate 33% higher than those born to 20-24-year-old mothers (Table 4), with no statistically significant difference. The same calculation used for inadequate weight revealed a prevalence rate 19% and 34% higher among infants born to mothers aged 10-16 years than those born to mothers aged 17-19 and 20-24 years, respectively. In this case, there was statistically significant difference.

Full-term gestation accounted for 86.9% of the cases, with similar prevalence rates among the three age groups.

Table 1 - Distribution of level of education among adolescent and young adult mothers, according to age, Feira de Santana, 1998

<table>
<thead>
<tr>
<th>Maternal Age</th>
<th>Illiterate</th>
<th>Primary incomplete</th>
<th>Primary complete</th>
<th>Secondary education</th>
<th>University degree</th>
<th>Ignored</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>#</td>
<td>%</td>
<td>#</td>
<td>%</td>
<td>#</td>
<td>%</td>
<td>#</td>
</tr>
<tr>
<td>10 – 16</td>
<td>57</td>
<td>9.7</td>
<td>364</td>
<td>61.7</td>
<td>48</td>
<td>8.1</td>
<td>9</td>
</tr>
<tr>
<td>17 – 19</td>
<td>126</td>
<td>7.9</td>
<td>898</td>
<td>56.0</td>
<td>195</td>
<td>12.2</td>
<td>116</td>
</tr>
<tr>
<td>20 – 24</td>
<td>228</td>
<td>7.4</td>
<td>1,442</td>
<td>46.7</td>
<td>349</td>
<td>11.3</td>
<td>526</td>
</tr>
<tr>
<td>Total</td>
<td>411</td>
<td>7.8</td>
<td>2,704</td>
<td>51.2</td>
<td>592</td>
<td>11.2</td>
<td>651</td>
</tr>
</tbody>
</table>

Table 2 - Distribution of prenatal care frequency of adolescents and young adults according to maternal age, Feira de Santana, 1998

<table>
<thead>
<tr>
<th>Maternal age</th>
<th>No appointment</th>
<th>Insufficient</th>
<th>Sufficient</th>
<th>Ignored</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>#</td>
<td>%</td>
<td>#</td>
<td>%</td>
<td>#</td>
</tr>
<tr>
<td>10 – 16</td>
<td>98</td>
<td>16.6</td>
<td>174</td>
<td>29.5</td>
<td>153</td>
</tr>
<tr>
<td>17 – 19</td>
<td>251</td>
<td>15.6</td>
<td>484</td>
<td>30.2</td>
<td>461</td>
</tr>
<tr>
<td>20 – 24</td>
<td>399</td>
<td>12.9</td>
<td>980</td>
<td>31.8</td>
<td>947</td>
</tr>
<tr>
<td>Total</td>
<td>748</td>
<td>14.2</td>
<td>1,638</td>
<td>31.0</td>
<td>1,561</td>
</tr>
</tbody>
</table>


The prevalence rate for prematurity was 5% and 7% higher among infants born to 10-16-year-old mothers, compared to those born to mothers aged 17-19 and 20-24 years, respectively. No statistically significant differences were observed.

The multivariate analysis of newborn weight considering maternal age, with control of confounding factors (prenatal care and gestational age) (Table 5), showed prevalence of low weight 18% higher among infants born to 10-16-year-old mothers than that of infants born to mothers aged 20-24 years, with no statistically significant difference. However, the prevalence of inadequate weight was 38% higher for newborns whose mothers were in the 10-16 age group than that of newborns of mothers aged 17-19 years, and 61% higher when compared to the 20-24 age group, with statistically significant differences. The same calculation used for adequate weight showed a prevalence 25% and 61% lower among newborns in the 10-16 age group when respectively compared to newborns in the 17-19 and 20-24 age groups, with statistically significant differences.

The result of Apgar score at 5 minutes showed that 27% of newborns had a score greater than 7; however, the analysis and the calculation of simple and multiple associations were damaged, since 68.2% of this variable was not recorded on SINASC forms.

The distribution of newborns according to sex showed a percentage of 51.5% for males and 48.4% for females, with similar percentage among age groups.

Table 3 - Weight distribution of infants born to adolescent and young adult mothers, according to maternal age, Feira de Santana, 1998

<table>
<thead>
<tr>
<th>Maternal age</th>
<th>≤ 2,500 g</th>
<th>2,501-3,000g</th>
<th>&gt;3,000g</th>
<th>Ignored</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>#</td>
<td>%</td>
<td>#</td>
<td>%</td>
<td>#</td>
</tr>
<tr>
<td>10 – 16</td>
<td>68</td>
<td>11.5</td>
<td>211</td>
<td>35.8</td>
<td>271</td>
</tr>
<tr>
<td>17 – 19</td>
<td>169</td>
<td>10.5</td>
<td>482</td>
<td>30.1</td>
<td>863</td>
</tr>
<tr>
<td>20 – 24</td>
<td>276</td>
<td>8.9</td>
<td>820</td>
<td>26.6</td>
<td>1,811</td>
</tr>
<tr>
<td>Total</td>
<td>513</td>
<td>9.7</td>
<td>1,514</td>
<td>28.7</td>
<td>2,945</td>
</tr>
</tbody>
</table>

**Table 4** - Prevalence rate (PR) for maternal data (illiteracy, incomplete primary education, and absence of prenatal care) and for newborns (low and inadequate weight), according to maternal age (10-16 age group compared to the 17-19 and 20-24 age group), Feira de Santana, 1998

<table>
<thead>
<tr>
<th>Maternal age</th>
<th>Illiterate</th>
<th>Primary incomplete</th>
<th>No prenatal care</th>
<th>Low weight</th>
<th>Inadequate weight</th>
<th>Prematurity</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 – 16</td>
<td>1.23 [0.91-1.66]</td>
<td>1.10 [1.02-1.19]*</td>
<td>1.07[0.82-1.40]</td>
<td>1.09[0.84-1.43]</td>
<td>1.19[1.04-1.36]*</td>
<td>1.05[0.68-1.64]</td>
</tr>
<tr>
<td>17 – 19</td>
<td>1.31 [0.99 –1.72]</td>
<td>1.32 [1.23-1.42]*</td>
<td>1.28 [1.05-1.57]*</td>
<td>1.33[0.99-1.77]</td>
<td>1.34[1.19-1.52]*</td>
<td>1.07 [0.71-1.62]</td>
</tr>
<tr>
<td>10 – 16</td>
<td>1.31 [0.99 –1.72]</td>
<td>1.32 [1.23-1.42]*</td>
<td>1.28 [1.05-1.57]*</td>
<td>1.33[0.99-1.77]</td>
<td>1.34[1.19-1.52]*</td>
<td>1.07 [0.71-1.62]</td>
</tr>
</tbody>
</table>

* Statistically significant at 5%

**Discussion**

Early motherhood has been considered a factor that drives adolescent mothers away from school; however, we know that other social and economic factors can interfere with the process of education and professional qualification in different socioeconomic levels,7,8,11

In this study, the high prevalence (56%) of adolescent mothers aged 17-19 years who did not finish junior-high school or elementary school goes against the age limits established by the Ministry of Education and Culture for primary education (7 to 14 years old), and for secondary education (15 to 19 years old). These results are in accordance with those obtained through other studies, which revealed rates higher than 70% for incomplete primary education among pregnant women and adolescent mothers.10,11,19

Still considering the level of education, it is important to mention that there was an increased lack of information in our study, thus showing that health professionals have to correctly feed data into the Vital Information Systems. These systems expose social demands and subsidize intervention strategies.

Prenatal care is widely recognized as one of main determinants for the normal evolution of gestation. According to the PAISM (MS) - Programa Assistência Integral a Saúde da Mulher (Women’s Health Program for Total Medical Assistance), adequate prenatal care must consist of at least 6 appointments; however, it is worth emphasizing that the quality of such assistance includes early adherence, follow-up of uterine growth curves, periodic evaluation of vital parameters, and other essential requirements, which demand technical qualification and integration of health professionals.14,20,21 The results of our investigation are in accordance with those of other studies, in which there was a high rate of late adherence and lack of prenatal care among adolescents.12,20,23

Different factors explain why adolescents lack or have late adherence to prenatal care. Among these factors are the difficulty in accepting pregnancy, family hardships, as well as misinformation about the importance of prenatal care, a situation that is worsened when the adolescent is abandoned by her family and /or partner.4,7,8,22

Results concerning vaginal delivery, in the present study, are in accordance with those of other studies, which did not point out differences among adolescents and adults under the same living conditions.22,23 Some studies presented rates of vaginal delivery between 36 to 63% among adolescents.8,11,24 With regard to cesarean delivery, it is important to emphasize that, although, in our study, the rate has exceeded the adequate limit established by WHO (15%), this result is in accordance with national estimates such as the National Research on Demography and Health, which showed an increase of the C-section rate from 31.6% to 36.4% between 1986 and 1996.5

The data on birth weight obtained through our investigation are in accordance with those of other studies, which showed higher rates of low and inadequate weight among newborns of adolescents aged up to 16 years old. In the U.S.A., Stevens-Simon & McAnarney, 1988,25 observed 13.8% of low weight among adolescents aged up to 15 years old, 9.3% in the 17-19 age group, and 5.8% in the 25-29 age group; in Campinas, SP, Bicalho-Mariotoni & Barros Filho, 199526 found 16.6% of low weight in the group of newborns of adolescents aged up to 15 years old and 11.4% in those aged up to 19 years old; in Belém, Costa et al, 1999,11
Table 5 - Adjusted odds ratio for low*, inadequate and adequate newborn weight, according to maternal age (10-16 age group compared to the 17-19 and 20-24 age group), Feira de Santana, 1998

<table>
<thead>
<tr>
<th>Maternal age</th>
<th>Low weight</th>
<th>Inadequate weight</th>
<th>Adequate weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 – 16</td>
<td>0.97 [0.68-1.38]</td>
<td>1.38 [1.12-1.17]</td>
<td>0.75 [0.61-0.92]</td>
</tr>
<tr>
<td>17 – 19</td>
<td>1.18 [0.84-1.66]</td>
<td>1.61 [1.34-1.99]</td>
<td>0.61 [0.50-0.73]</td>
</tr>
<tr>
<td>10 – 16</td>
<td>1.18 [0.84-1.66]</td>
<td>1.61 [1.34-1.99]</td>
<td>0.61 [0.50-0.73]</td>
</tr>
</tbody>
</table>

* Prenatal care and gestational age.
† Statistically significant at 5%.

verified that the sum of low and inadequate weight rates was higher (51.6%) than that of adequate weight (48.4%) among newborns of mothers aged up to 16 years old.

Over the last two decades, studies have tried to clarify the interference of different factors with neonatal results. Studies have shown that newborns of adolescent mothers have anthropometric characteristics that resemble those born to adult mothers, under the same living conditions. However, infants born to younger adolescents (10-16 years old) present higher prevalence of inadequate (2,501-3,000g) and low (less than or equal to 2,500g) weight and lower prevalence of adequate weight (greater than 3,000g), when compared to those born to adult mothers with the same living conditions. Among the factors that may interfere with neonatal results, we have low maternal prepregnancy weight, inadequate weight gain, and intercurrent events during pregnancy associated with family hardships or relationship problems with partner, which have impact on self care. Other factors are stunted growth (body composition, reproductive organs) and low gynecological age among adolescents up to 15 years old, which may hinder the transfer of nutrients to the embryo, due to utero-placental insufficiency.

The results of our study are in agreement with the data presented in the literature, regarding the prevalence of low and adequate weight and term and preterm gestational age. In Campinas, SP, the data collected by SINASC in 1995 showed a general prematurity rate of 6.2%, of which 7.6% corresponded to infants born to adolescent mothers; among the mothers of low-weight or premature newborns, 22.8% and 25.9% were, respectively, adolescents. No increased risk associated with maternal age was observed.

As for Apgar score at 5 minutes, 68.2% of the data were not recorded, thus interfering with data analysis. This result shows the little importance given by health professionals in maternity wards to the Statement of Live Birth form. There is a general consensus that the adequate filling out of this form is extremely important for perinatal care, allowing for the reduction of mortality rates. In addition, it is crucial for the register of vital data, which help the health system with the reorganization of practices aimed at improved mother-infant assistance. The Statement of Live Birth form is an important source of information about the health of both pregnant women and newborns, and about the assistance provided by health services.

The nonexistence of data shows that health professionals must be convinced of the importance of recording every piece of information they gather from patients. The lack of information interferes with the interpretation and analysis of vital data, which, in their turn, may be used to establish public policies and basic measures in order to assure the health of both mother and child during pregnancy, delivery, and puerperium.

Conclusions

The results showed a high prevalence of live births, illiteracy, low level of education, and absence of prenatal care among adolescents in both age groups.

Newborns of 10-16-year-old mothers presented higher prevalence and possibility of inadequate weight, and lower prevalence and possibility of adequate weight, when compared to infants born to mothers who belonged to the other age groups studied.
Considerations about the statistical model and results

In terms of experimental design, we should consider the relation of determination of the variables through a cross-sectional study; however, in this study, the lack of time dimension was partially overcome by the characterization of the prepregnancy period in relation to delivery and live birth.

Another aspect that deserves consideration, as far as the control of confounding factors is concerned, is the scientific consistency of the findings. This control was performed through multivariate analysis and coincided with the data presented in the literature.

Considerations about intervention proposals

This study yielded the following proposals:

- Necessity to make health professionals aware of how important the correct filling out of SINASC forms is;
- Investment by health services in specific policies for the early adherence of the adolescent mother to prenatal care, post-delivery assistance, and family planning;
- Implementation of policies by health services to instruct adolescents about their responsibility to prevent early and unplanned pregnancy and also instruct them about the consequences.

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References
