ORIGINAL ARTICLE

DEVELOPMENT OF MATERNAL INDICATORS FROM THE INFORMATION SYSTEM ON LIVE BIRTHS

EVOLUÇÃO DE INDICADORES MATERNOS A PARTIR DO SISTEMA DE INFORMAÇÃO SOBRE NASCIDOS VIVOS
EVOLUCIÓN DE INDICADORES MATERNOS A PARTIR DEL SISTEMA DE INFORMACIÓN SOBRE NACIDOS VIVOS

Flávia Baluz Bezerra de Farias Nunes[1], Isabella Cristina Cunha Carneiro[2], Patrícia Santos Prudêncio[3], Fabiana Villela Mamede[4]

ABSTRACT
Objectives: to outline the maternal characteristics and evaluate maternal health indicators through SINASC. *Method*: a retrospective, longitudinal study with a quantitative approach. The population consisted of 18,065 births in São Luís/MA in 2012 selected from the SINASC. In the data analysis, the Epi-info program was used. *Results*: it was found that 17.3% were adolescents; 65.9% had a partner; 80.5% had completed higher education; 84.13% had four or more antenatal visits; 51.54% underwent cesarean deliveries, and 11.94% were premature births. The proportion of live births to adolescent mothers was 17.30%, cesarean deliveries were 51.54%, and premature births was 11.94%. Prenatal coverage indicator for a minimum of four visits was 84.13%. *Conclusion*: the cesarean deliveries indicators and premature births were unfavorable highlighted, reflecting the importance of developing actions in prenatal care. *Descriptors*: Health Status Indicators; Prenatal Care; Childbirth; Obstetric Nursing.

RESUMO
Objetivos: delinear as características maternas e avaliar os indicadores de saúde materna por meio do SINASC. *Método:* estudo retrospectivo e longitudinal com abordagem quantitativa. A população foi constituída por 18.065 nascimentos ocorridos em São Luís/MA, no ano de 2012, selecionados a partir do SINASC. Na análise dos dados, utilizou-se o programa Epi-info. *Resultados:* verificou-se que 17,3% eram adolescentes; 65,9% tinham companheiro; 80,5% cursaram até o ensino superior; 84,13% realizaram quatro ou mais consultas pré-natais; 51,54% realizaram partos cesáreos; e 11,94% foram partos prematuros. A proporção de nascidos vivos de mães adolescentes foi 17,30%, de partos cesáreos 51,54% e de partos prematuros 11,94%. O indicador de cobertura pré-natal para o mínimo de quatro consultas foi 84,13%. *Conclusão:* os indicadores de partos cesáreos e partos prematuros tiveram destaque desfavorável, refletindo a importância do desenvolvimento de ações na assistência pré-natal. *Descritores:* Indicadores Básicos de Saúde; Cuidado Pré-Natal; Parto; Enfermagem Obstétrica.

RESUMEN
Objetivos: delinear las características maternas y evaluar los indicadores de salud materna por medio del SINASC. *Método:* estudio retrospectivo y longitudinal con enfoque cuantitativo. La población fue constituída por 18.065 nacimientos en São Luís/MA en el año 2012 seleccionados a partir del SINASC. En el análisis de los datos, se utilizó el programa Epi-info. *Resultados:* se verificó que 17,3% eran adolescentes; 65,9% tenían compañero; 80,5% cursaron hasta la enseñanza superior; 84,13% realizaron cuatro o más consultas pre-natales; 51,54% realizaron partos cesáreos y 11,94% fueron partos prematuros. La proporción de nacidos vivos de madres adolescentes fue 17,30%, de partos cesáreas fue 51,54%, y de partos prematuros fue 11,94%. El indicador de cobertura pre-natal para lo mínimo de cuatro consultas fue 84,13%. *Conclusión:* los indicadores de partos cesáreas y partos prematuros tuvieron destaque desfavorable, reflexionando la importancia del desarrollo de acciones en la asistencia pre-natal. *Descriptores:* Indicadores Básicos de Salud; Cuidado Pre-Natal; Parto; Enfermería Obstétrica.

[1]Nurse, Ph.D. Professor, Department of Nursing of the Federal University of Maranhão/UFMA. São Luís (MA), Brazil. E-mail: fbaluz@gmail.com; [2]Nurse, Graduated, Bachelor Degree in Nursing, Federal University of Maranhão/UFMA. São Luís (MA), Brazil. E-mail: isabelliknha@hotmail.com; [3]Nurse, Ph.D. student, Graduate Program in Public Health Nursing, Nursing School of Ribeirão Preto at the University of São Paulo/EERP-USP. Ribeirão Preto (SP), Brazil. E-mail: psprudencio@usp.br; [4]Nurse, Ph.D. Professor, Department of Maternal and Child Health, Graduate Program in Public Health Nursing, Nursing School of Ribeirão Preto at the University of São Paulo/EERP-USP. Ribeirão Preto (SP), Brazil. E-mail: famamede@eerp.usp.br

INTRODUCTION

Health indicators are instruments used in research to measure the health status of an individual or a population at all levels, by quantifying and evaluating information collected. The indicators are grouped into six thematic subgroups: demographic, socioeconomic, mortality, morbidity and risk factors, resources and coverage, and so it is used in the Indicators and Basic Data for Health - IDB, which comprises a broad set of indicators constructed from databases and surveys nationwide.[1]

The epidemiological analysis of health indicators enables the recognition and monitoring of the health system performance and health conditions of the population, and contribute to continuous improvement of access to care and quality of maternal and child health locally and nationally offered.[2]

When it comes to risk factors indicators, the indicator of the proportion of baby live born of adolescent mothers has aroused the interest of researchers in developing countries due to increased teenage pregnancy associated with poverty and low education as well as the negative perinatal outcomes. In a survey conducted in São Luís/MA, in 1997 and 1998 in a sample of 2,429 women to identify the main socioeconomic, demographic, anthropometric and behavioral and perinatal outcomes of teenage pregnancy it was concluded that high pregnancy rates in adolescence in the city, indicating the need to make appropriate policies to meet these women getting pregnant in unfavorable living conditions.[3]

As for the coverage indicators in women´s health[4], prenatal coverage is one of the main health indicators of SUS Primary Care, where the service involves a series of processes performed by other instances of primary care.[4]

The Federal Government has prepared the Program for Humanization of Prenatal and Birth (PHPN)[5], instituted by decree GM/n° 569 of 06/01/2000, which intends to seek an integrated obstetric care, skilled and humane with the active participation and associated with federal, state and municipal sectors. Also, priority to reduce the high rates of maternal mortality, neonatal and perinatal; improve coverage, access, and quality of prenatal services, delivery, postpartum and newborn, and expand strategies adopted in previous programs on care for pregnant women by the same body.[5]

Another indicator cover in the area of women´s health is the proportion of cesarean delivery. According to the World Health Organization[6], Brazil is shown with the largest number of cesarean deliveries in the world. There is the historical series of studies an increase in cesarean births rates in the decade 80-90; current rates are over 40% in all Brazil, with variations between regions in the North and Northeast, there are lower rates, while in the Southeast, South and Midwest, have become larger rates.[7] This finding in the State of Paraná, South of the country strengthens the evidence that this aspect can increase the risk of maternal and infant mortality.[8]

In Brazil, maternal and child health has been recognized as a priority decades ago, to present a quarter of infant deaths and nearly all maternal deaths resulting from the provision of inadequate care from the beginning of pregnancy to immediate postpartum.[9] A study conducted by the Ministry of Health in 2002[10] to evaluate the Program for Humanization of Prenatal and Birth demonstrated a lack of functional integration between the prenatal and delivery, among other important aspects of proper care during pregnancy and childbirth, essential to reducing maternal and child morbidity and mortality rates.

Mortality indicators are widely used to assess the health status of the population. Thus, maternal and infant mortality is indicators that reflect the quality of health care for women and children population. The Maternal Mortality Ratio (MMR) is associated with the poor provision of health services to this group, since family planning and prenatal care, to care for childbirth and the postpartum period. While the infant mortality coefficient reflects, in general, the conditions for socio-economic development and environmental infrastructure as well as access and quality of resources available for maternal health care and child population.[1]

Results of a study[11] with support in the results of the Ministry of Health[12], showed56% reduction in maternal mortality by direct causes, resulting from obstetric problems during pregnancy, childbirth and postpartum, and 33% increase in indirect, resulting from causes pre-existing conditions or that developed during pregnancy, from 1990 to 2007. It recorded although there was a decrease in maternal mortality in 1990 while the maternal mortality ratio (MMR) was 140 deaths per 100,000 births alive. In 2007, there was a considerable reduction in 75 deaths per 100,000 live births, nearly half of registered previously.[12]

Faced with the need to know and deepen the knowledge of maternal health reality and

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living conditions of a given region, it becomes relevant the study of the health indicators of the woman due to its effectiveness in action planning and execution of functional tactics aimed at quality of care.[13-4]

Thus, this study sought through the Live Birth Information System to:

- Outline maternal characteristics
- Assess maternal health indicators through SINASC
- Assess the health indicators related to prenatal care through the Live Birth Information System.

MÉTHOD

Article elaborated from the thesis << *Prenatal coverage Indicator: a spatial analysis of São Luis/MA* >> elaborating the Graduate Program in Public Health Nursing of Ribeirão Preto Nursing School, University of São Paulo/EERP-USP. Ribeirão Preto, Brazil. 2014.

Retrospective and longitudinal study with a quantitative approach. The survey was conducted in the city of São Luís, Maranhão state capital, located on an island located on the north coast of Maranhão with an area of 834.785 square kilometers, population of 1,014,837 inhabitants and a GDP per capita of 15381.99 reais Brazilian currency, considered macro-region of the State responsible for three municipalities, Chapadinha, Itapecuru Mirim and Rosário.[15] The research population was constituted of 18,065 births in 2012. The inclusion criteria were selected from SINASC, the births in 2012 in São Luis/MA as registered by mother's residence and the place of occurrence hospitals or other medical institutions of the municipality. The research excluded births that occurred at home, other places or unknown data about the place of occurrence, as well as the births occurred in other municipalities in the state of Maranhão.

Data collection occurred in August 2013, in the Health Municipal of São Luís, Health surveillance sector, located in São Luís city /MA, where the declarations of live births were available (LB) containing the selected variables. These data were collected and recorded by the principal investigator of the research.

The maternal and child variables of SINASC selected were maternal age, marital status, education, occupation, number of children killed in previous pregnancies, gestational age (preterm - less than 37 weeks of gestation, term - 37 to 41 weeks pregnancy and post-term - 42 weeks gestation or more), the number of consultations in the prenatal and delivery type.

For mother's indicators, pregnancy and childbirth in 2012, the proportion of teenage mothers were calculated (age <20 years), consultations on prenatal (less than four visits), hospital births, caesarean sections and preterm deliveries (gestational age <37 weeks) from live births this year, multiplied by 100. The data were made available in files compatible with Excel and then the indicators were calculated. The Epi-info program in the processing of descriptive data was used.

As for the ethical and legal aspects, the research was submitted to the Research Ethics Committee for Brazil Platform, national and unified basis of research involving human subjects´ records for all the CEP/CONEP system for consideration. It was subsequently approved under number 292317 protocol, according to Resolution 466/2012 regarding the Guidelines and Norms Regulating Research Involving Human Beings. Moreover, it was approved by the Health Municipal of São Luís to collect the Live Birth Information System data (SINASC).

The study used secondary data bank of information and did not involve the direct participation of mothers and newborns, releasing the Statement of Consent Form (TCLE).

RESULTS

In this study, it was found that in 2012 18,065 births were recorded in SINASC in the city of São Luís - MA, results that will be discussed the maternal characteristics and maternal indicators.

Table 1. Socioeconomic characteristics of mothers of live births in 2012. São Luís/MA, 2012.

Maternal Characteristics	n	%	CI 95%
Age			
10 to 19 years old	3125	17.3	16.8 – 17.9
20 to 34 years old	13275	73.5	72.8 – 74.1
35 years old or more	1665	9.2	8.8 – 9.7
Marital status			
Single	5593	31.0	30.3 – 31.6
Married	4245	23.5	22.9 – 24.1
Widow	28	0.2	0.1 – 0.2
Separated/divorced	62	0.3	0.3 – 0.4
Stable Union	7668	42.4	41.7 – 43.2
Ignored	469	2.6	2.4 – 2.8
Education			
Without education	57	0.3	0.2 – 0.4
Elementary school (≤ 9 years of study)	384	2.1	1.9 – 2.3
High school (10 to 12 years of study)	2808	15.5	15.0 – 16.1
Higher education (≥ 13 years of study)	14548	80.5	79.9 – 81.1
Ignored	268	1.5	1.3 – 1.7
Occupation			
Not remunerated	10514	58.2	57.5 – 58.9
Remunerated	5517	30.5	29.9 – 31.2
Without occupation	5	0.0	0.0 – 0.1
Ignored	2029	11.2	10.8 – 11.7
TOTAL	**18065**	**100**	

Table 1 describes the socioeconomic characteristics of mothers, finding that most women (73.5%) were 20-34 years old and 17.3% adolescent mothers aged 10 to 19 years old; 65.9% of women were living with a partner; as the mother's education, 80.5% had higher education; 58.2% had paid work.

Table 2. Care characteristics of mothers of live newborns. São Luís/MA, 2012.

Maternal characteristics	n	%	IC 95%
Stillbirths			
None	12725	70,4	69,8 – 71,1
1 to 3 kids	3282	18,2	17,6 – 18,7
4 to 6 kids	48	0,3	0,2 – 0,4
7 and more	9	0,0	0,0 – 0,1
Ignored	2001	11,1	10,6 – 11,5
Gestational age			
Pre-term	2157	11,9	11,5 – 12,4
Term	11885	65,8	65,1 – 66,5
Post-term	893	4,9	4,6 – 5,3
Ignored	3130	17,3	16,8 – 17,9
Prenatal consultations			
None	848	4,7	4,4 – 5,0
From 1 to 3	2007	11,1	10,7 – 11,6
From 4 to 6	7451	41,2	40,5 – 42,0
7 and more	7747	42,9	42,2 – 43,6
Ignored	12	0,1	0,0 – 0,1
Childbirth			
Vaginal	8642	47,8	47,1 – 48,6
Cesarean	9310	51,5	50,8 – 52,3
Ignored	113	0,6	0,5 – 0,8
TOTAL	18065	100	

Table 2 shows that 70.4% of pregnant women have had children dead in previous pregnancies; 42.9% of pregnant women had seven or more prenatal consultations; 65.8% of mothers had their children with comprised gestational age 37-41 weeks (term); 51.5% of women underwent cesarean delivery.

There were maternal indicators identified in six years with the proportion of teenage mothers, the number of prenatal visits, hospital births, cesarean deliveries and premature deliveries of live births in 2012 in São Luis/MA, as shown in Table 3.

Table 3. Evolution of maternal indicators in the city studied. São Luís/MA, 2012.

Health indicators	2007	2008	2009	2010	2011	2012*
Proportion of live births of teenage mothers	21,15	19,68	18,29	17,42	17,70	17,30
Proportion of live births by number of prenatal visits (four visits or more)	82,34	81,91	85,04	85,76	84,01	84,13
Proportion of hospital births	99,65	99,67	99,81	99,77	99,56	99,68
Proportion of cesarean deliveries	43,08	45,41	47,40	49,53	49,89	51,54
Proportion of premature births	4,91	5,27	5,07	5,61	11,55	11,94

Source: Indicators and Basic Data - IDB 2011(DATASUS, 2012).

In 2012, it was found that the proportion of live births to teenage mothers in São Luís/MA was 17.30%, and compared to the last five years, there is a slight decrease of 3.85%, and in 2010 and 2011, they remained about 2012.

Prenatal coverage indicator, considering the minimum number of four visits, obtained a percentage result of 84.13% in 2012. Over the past five years, the increase in prenatal clinics remained, which indicates an improvement in maternal and child care, which in turn reduces maternal and child mortality.[16]

Regarding the proportion of hospital births, there were 99.68% of hospital births in 2012, held in the last five years. Of them, 51.54% were identified as cesarean deliveries; 11.94% recorded as premature births, which represents an important increase compared to the past five years, compared to 2007 record with 4.91%.

DISCUSSION

It was observed in this study that the highlight of births occurred was of adolescent mothers, as well as in the study conducted in Rio Grande, in Rio Grande do Sul[17], which showed that 20.2% of births occurred were teenage mothers under 20 years old, showing that the frequency of adolescent mothers is common even in cities in southern Brazil.

The marital status of the verified mothers in this study is similar to the result of the study[18] in Latin America and the Caribbean on obstetric care and its severe complications, when describing the characteristics of the women interviewed in Brazil in 1996, standing out women living with a partner in 60.1%; then those that have never been married, so single with 30.6% and 1.0% divorced.

The variable of mother´s education observed in this study compared to the results of the study[19], there is a difference of fewer years of education, that is considered low (less than eight years of education) 43.1% of the mothers of Sarandi city (PR).

The paid occupation results of this study differ from the research developed[20] in São Paulo in 2008 to identify the social representations of the maternity in women with high-risk pregnancies, which noted 59% of women with remuneration and 41% had no paid occupation.

It was observed in this study, a low percentage of women with children dead in previous pregnancies, as well as in another study conducted in São Luís[16] in 2006-2010 period, in which most of the mothers (70.1%) did not have children stillbirths and 21.5% of mothers had a history of previous stillbirths.

The percentage of preterm births in the present study compared to another study[16] held in the same city, which showed 5.7% of preterm births in 2010, it is noticed an increase of 6.2% between 2010 and 2012, which confirms further that maternal and child health is the focus of research aimed at improving care.

A survey conducted in São Luís/MA (1997-8)[21] obtained prenatal care coverage of 89.5%; of them, 62.9% were related to pregnant women who were five or more prenatal visits and 60.2% equivalent to those who began prenatal care in the first trimester of pregnancy. It should be considered that the number of prenatal visits, besides being a weight indicator of maternal and child health is one of the determining factors for the vitality of the newborn and reflects positively on the service quality provided to pregnant women.[13]

Concerning the type of delivery, both our findings and the results of research carried out at the Hospital das Clínicas of Porto Alegre[22], which obtained the rate of vaginal delivery in 67.5% and 32.5% of cesarean deliveries, they are far beyond what is recommended by the Ministry of Health and the World Health Organization (WHO), which determine respectively by 25% and 15% of the total number of cesarean deliveries in a health service.[9]

As for the slight reduction in live birth occurrences of adolescent mothers in São Luís, it was found that it is necessary to profile the knowledge of teenagers in a region so that goals and actions are outlined to collaborate with the immediate reduction in the number of teenage mothers, as well as

the negative effects entailed by that fact to these young people.[23] It is worth noting that early motherhood affects teenage mother performance in studies, leading to quit school.[24]

The prevalence of hospital births observed in this study strengthens the scientific evidence that hospital birth is considered a contributing factor in reducing maternal and neonatal mortality, by providing greater security to the professional staff and the woman in labor, ensuring skilled and qualified professionals tailor conduct obstetric and neonatal care at delivery, using equipment and technologies in possible complications, ensuring this way, immediate assistance in obstetric and neonatal complications.[25-6]

It is stressed the importance of labor and humanized birth, with a devaluation of natural birth in birth centers, due to the higher level of surgical birth in a hospital. It was also stated that one should not deny how technological advances help reduce maternal and fetal risk, making the safe delivery, however, it is observed as a result of the depreciation of the emotional and social aspects involved in the deliveries.[28]

Regarding the cesarean births in São Luís, it stands out as an important risk factor for maternal mortality and resulting in complications such as puerperal infection, infection at the surgical site, bleeding, increased risk of cardiac arrest, anesthetic complications, difficult recovery, prolonged hospitalization, hysterectomy, among others, it is important to an effective strategy for reducing this high number of cesarean deliveries, seeking to optimize the quality of life for mothers and reduce hospital costs.[22-28-9]

The Ministry of Health created the Stork Network in June 2011[26], seeking a guarantee of service quality, safe and humane for all women, with an emphasis on natural childbirth, besides the health coverage of children up to the first two years.[30]

As for the increase in premature births recorded in São Luís, that evidenced aspect is considered as an important risk factor for neonatal mortality and public health problem due to its focus over the years, which implies the need for an effective action in improving the quality of prenatal care.[31]

Such aspects identified in this study reflects a bit of a status of reproductive health care in Brazil, which presents an epidemiological picture with high rates of maternal and perinatal mortality, with indiscriminate use of interventions that are easily checked in cesarean rates, resulting in a bad quality of obstetric care.[32]

Negative basic indicators of maternal health entail increased maternal and child morbidity and mortality. Thus, it is evident that early adequate precise and resolute prenatal care generates positive results in maternal and child health. In this context, it is emphasized the importance of the incentive care humanization policies, education in training midwives to train professionals able to understand the human dimension of care, actively participating in the transformation of maternal and perinatal care. This incentive is based on the belief that these professionals can positively affect maternal and perinatal indicators[32].

The role of nurses contribute to the achievement of an effective prenatal care to transfer the necessary and accurate information about pregnancy; they must act to ensure the early detection of pregnancy risks, adoption of systems of reference and counter reference, educational development activities to achieve better maternal and child outcomes.

CONCLUSION

It was possible to outline the maternal characteristics and evaluate maternal health indicators through SINASC in 2012 in São Luís/MA and evaluate health indicators related to prenatal care.

Socioeconomic characteristics of mothers and care were analyzed, as well as the 2007 maternal indicators 2012 São Luís/MA. Among the maternal indicators analyzed, there was an increase in the cesarean delivery in the last six years, considering it as an important risk factor for the development of maternal and newborn complications. This finding reflects the need and importance of reducing these indicators through the encouragement of public health policies and implementation of health programs that encourage normal and humanizing delivery, thus promoting the reduction of maternal and child morbidity and mortality rates.

As for the increase observed premature labor indicator in those years, there is a need to improve the interventions in prenatal care, as well as the increase in prenatal coverage, the number of prenatal visits and effective interventions and accurate prenatal and delivery to improve mother and child health indicators.

It is noted from the findings of this study that greater efforts are needed in the field of public health through the adoption of actions and public health strategies aimed at

maternal and child care to improve health indicators.

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Correspondence

Flávia Baluz Bezerra de Farias Nunes
Av. dos Portugueses, s/n
Complexo Pedagógico Paulo Freire
Campus Universitário do Bacanga
Bairro Itaqui-Bacanga
CEP 65085-580 — São Luís (MA), Brazil