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Social determinants of health and preterm birth trends in Brazil and Canada

Determinantes sociais da saúde e tendências de nascimento prematuro no Brasil e no Canadá

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ABSTRACT *The rate of neonatal mortality has decreased in Canada and Brazil; however, premature birth continues to be the most important cause of neonatal morbid-mortality. Through a scan of the specific literature, this paper aims to shed light upon the social determinants of health underlying the increase of preterm birth in two countries which offer universal access to health care: Brazil and Canada. While prenatal care has been highly associated with lower rates of premature birth, we have found that the use of adequate prenatal care services is greatly influenced by aspects related to the social determinants of health, such as the educational level, socioeconomic status and mothers' age.*

KEYWORDS: *Social determinants of health, Premature birth, Prenatal care, Delivery of health care.*

RESUMO *O índice de mortalidade neonatal tem reduzido no Canadá e no Brasil; entretanto, o parto prematuro continua sendo a causa mais importante para a morbimortalidade neonatal. Através de uma revisão bibliográfica, este artigo objetiva destacar os determinantes sociais da saúde presentes no aumento do nascimento prematuro em dois países que utilizam o acesso universal à saúde: Brasil e Canadá. O acompanhamento pré-natal tem sido fortemente associado com baixos índices de nascimento prematuro. Assim, este artigo discute a forma como o acompanhamento pré-natal vem sendo influenciado pelos determinantes sociais da saúde, tais como nível educacional, status socioeconômico e idade materna.*

PALAVRAS-CHAVE: *Determinantes sociais da saúde, Nascimento prematuro, Cuidado pré-natal, Assistência à saúde.*

INTRODUCTION

The improved access to health care and better quality of high-risk obstetric and neonatal care has dramatically reduced infant and neonatal mortality (0 to 27 days old). This lower rate of infant and neonatal mortality has been used as an index of maternal child health and for international comparisons of population health status (IHE, 2007). However, studies show that rates of preterm birth (less than 37 weeks gestation) have also increased world-wide during the last 20 years.

Information about the preterm birth rate is limited in developing countries. Certain factors may have an impact on the statistical data of preterm birth in the world, which can mask the real incidence of this problem (LUMLEY, 2003), such as: a) lack of national criteria for the definition of preterm birth and/or low weight baby; b) uncertainty about the exact gestational age in completed weeks; c) lack of reliability in stillbirth and neonatal mortality registration; and d) under-registration of live births in rural areas. The failure to find criteria of registration and the real incidence of preterm birth imply a lack of knowledge about the etiologic determinants of preterm birth, making it difficult to prevent this trend. As a result, some interventions may actually have no impact in reducing the rate of preterm births.

The above setbacks are present in Brazil, where the preterm birth rate was considered to be 6.5% in 2004 (CNDSS, 2008). However, inconsistencies in statistical data are highlighted by Barros *et al.* (2005) and Silveira *et al.* (2008), who found an increase of preterm birth rate from 6.5% in private hospitals and 6.3% in public hospitals in 1982 to 12.1% and 17.2%, respectively, in 2004. In Ribeirão Preto (São Paulo State), the preterm

birth rate has increased from 6% in 1978 to 13.3% in 1994 (BETTIOL *et al.*, 2000) and, in Pelotas (Rio Grande do Sul State), from 6% in 1982 to 14.7% in 2005 (BARROS *et al.*, 1992; BARROS *et al.*, 2005; HORTA *et al.*, 1996). This rate may be higher in some of the less developed regions in Northeastern Brazil.

Canadian trends in preterm birth also indicate an increase from 6.3% in 1981 to 8.2% in 2004 and 8.3% in 2007 (CANADA, 2008; JOSEPH *et al.*, 1998). Nevertheless, among territories and provinces there are some disparities: Nunavut had the highest preterm birth rate overall at 10.8%, and the provinces of Alberta, Newfoundland and Labrador showed the second and third highest preterm birth rates at 8.7% and 9%, respectively, while New Brunswick and Prince Edward Island had the lowest rates (both at 7%) (CIHI, 2009).

The preterm birth indicator, also a pointer of population neonatal health, has become an important public health concern. About 75% of deaths that occur in the neonatal period are related to preterm birth. This situation may also contribute to both short and long-term morbidity. It is common for preterm babies to suffer increased rates of respiratory distress, temperature instability, and neurocognitive problems. Moreover, certain health issues often extend into adulthood like cerebral palsy, psychiatric illness, and ophthalmologic disorders (CIHI, 2009; GOLDENBERG; ROUSE, 1998; MCCORNICK, 1985).

In addition to the physiological impact, the economic consequences are also significant in terms of health care (high cost of neonatal intensive care, frequent hospitalizations during the first year of life, special education and long term care for children with physical and neurological disabilities), which is a concern for policy makers as well as for health care professionals (MORRISON, 1990).

Epidemiologic studies describe some obstetric causes that can lead to preterm delivery: 1) spontaneous

preterm labor with intact membranes; 2) spontaneous preterm labor with rupture of the membranes; 3) therapeutic induction of labor (GOLDENBERG *et al.*, 2008; KRAMER, 1997).

In general, about 30% of preterm deliveries are indicated on the basis of maternal or fetal risks. In cases where continuation of a pregnancy would lead to serious maternal or fetal risk, a caesarian section or induction is performed in order to improve obstetrical outcomes. Common reasons for medically suggested preterm delivery are hypertensive disorders, maternal bleeding, intrauterine growth restriction, and fetal distress (VALERO DE BERNABÉ *et al.*, 2004).

In Brazil, the increase in preterm deliveries was greater in the caesarean section group than in the vaginal delivery group. The rate of preterm birth delivery by caesarean section has increased from 30.3% in 1978 to 50.8% in 1994 (BETTIOL *et al.*, 2000). In Canada, more than one third (38.7%) of preterm births in 2006 were delivered by cesarean section, while 16.8% were induced (CIHI, 2009).

Conversely, according to epidemiologic studies, spontaneous labors are related to 70% of preterm delivery in both developed and developing countries. Precise explanations cannot be established in most cases. Some of the factors linked to spontaneous delivery are associated with social determinants of health, such as lower educational level, younger maternal age, and inefficient prenatal health care, as they are generally associated with lower socio-economic status (BRASIL, 2006a; CANADA, 2008; CIHI, 2009; KRAMER, 1997; VILLAR *et al.*, 2006).

Consequently, low socioeconomic status is an issue for public health in both places and is part of the social determinants of health. The latter term is defined as a complex construct involving social inequalities, usually measured by conditions in which people are born, grow, live, work, and age, including the available health care

system. The social determinants of health are mostly responsible for health inequities within and between countries (BARROS *et al.*, 2005; MARMOT, 2005).

Compared with the extensive literature and convincing evidence regarding biomedical aspects of preterm birth, relatively few reports have appeared concerning the relation between social determinants of health and preterm delivery, and particularly making comparisons between countries (KRAMER *et al.* 2000; BARROS *et al.*, 2005).

From this perspective, this paper aims to highlight the social determinants of health underlying the increase in preterm birth in two different countries that use universal access to health care: Brazil and Canada. Reflections about mother-infant health care in the public health field will also be discussed.

BIBLIOGRAPHIC SCAN

A large bibliographic scan was developed in this study. The bibliographic method used to search for English language references published after 1980 was the Cumulative Index to Nursing and Allied Health Literature (CINAHL), based on the following medical subject headings and logic: 'preterm/premature birth and Brazil', 'preterm/premature birth and Canada', 'incidence and preterm/premature birth and Brazil', 'incidence and preterm/premature birth and Canada', 'risk factors and preterm/premature birth and Brazil', and 'risk factors and preterm/premature birth and Canada'.

We found different data sources to highlight trends in Brazil and Canada. For the purpose of this analysis, information on preterm birth in Brazil was obtained mainly from publications in journals (ALMEIDA *et al.*, 2005; BARROS *et al.*, 1992; BARROS *et al.*, 2005; BARROS *et al.*, 2008; BETTIOL *et al.*, 2000; CARVALHO and GOMES,

2005; CNDSS, 2008; COUTINHO *et al.*, 2002; GWATKIN *et al.*, 2000; MONTEIRO *et al.*, 2000; SILVA *et al.*, 2001; SILVA *et al.*, 2003; SILVA *et al.*, 2006; SILVEIRA *et al.*, 2001; SILVEIRA *et al.*, 2008; VICTORA, 2001; VILLAR *et al.*, 2006), and from official documents (SINASC, 2009; IBGE, 2006; BRASIL, 2006a; BRASIL, 2006b).

Data on preterm birth in Canada was also obtained from articles in journals (ARMSON *et al.*, 2001; BUSHNIK; GARNER, 2008; GOLDENBERG *et al.*, 2008; HEAMAN *et al.*, 2001; JOSEPH *et al.*, 1998; JOSEPH *et al.*, 2002; KATZ; ARMSTRONG; LOGERFO, 1994; KRAMER, 1997; KRAMER *et al.*, 2000; KRAMER *et al.*, 2001; MUSTARD; ROOS, 1994; TOUGH *et al.*, 2002) and from official documents (CIHI, 2009; CANADA, 2008; IHE, 2007; CANADA, 2009).

RELATING SOCIAL DETERMINANTS OF HEALTH AND PRETERM BIRTH IN BRAZIL AND IN CANADA

Brazil is a developing country with a population of 182 million inhabitants. It is among the top ten countries with the highest Gross National Product in the world; however, it is also among the ten countries with the highest rate of inequality. As a result, social inequities affect the health and wellbeing of a significant percentage of the Brazilian population (LOBATO, 2000; UNDP, 2006).

Health care services have been moving toward universal coverage since the creation of the *Sistema Único de Saúde* (SUS, Unified Health System) by the 1988 Constitution. However, a two-tier system remains in Brazil with the private system (prepaid and private health insurance plans) being used by about one-third of the population in the middle and the upper classes (LOBATO, 2000; TRAVERSO-YÉPEZ, 2009).

Within this universal coverage system, infant mortality rate in Brazil has decreased from 37.9% in 1995 to 25.8% in 2005, with 65% of all infant deaths in the neonatal period. More than 90% of births occurred in hospitals or clinics, and 93% of pregnant women had at least one prenatal care visit (CNDSS, 2008; BARROS *et al.*, 2005).

On the other hand, Canada is one of the world's wealthiest nations, with a population of 32 million inhabitants, with a high per capita income, and it is one of the world's top ten trading nations. The Canadian national health insurance program, Medicare, is designed to ensure that all residents have reasonable access to medically necessary hospital and physician services. Statistical data shows that the infant mortality has decreased from 6.4 per 1,000 live births in 1991 to 4.9 per 1000 live births in 2003. Of all infant deaths, 65% were in the neonatal period. Indeed, 97.9% of births occurred in hospitals or clinics and 99.9% of women had at least one prenatal care visit (CANADA, 2008; UNDP, 2006).

Efforts to assess the causes of preterm birth in literature review have been focused on different aspects in Brazil and Canada. Biological factors such as multiple gestations, maternal age, cesarean section, maternal hypertension and diabetes, as well as ultrasound scan, were highly associated with preterm delivery in Canada (ARMSON *et al.*, 2001; JOSEPH *et al.*, 1998; JOSEPH *et al.*, 2002; KRAMER, 1997; HEAMAN *et al.*, 2001; TOUGH *et al.*, 2002).

In Brazil, bibliographic references tend to address social factors to assess causes of preterm birth, such as lack of prenatal care, low family income, teenage pregnancy and maternal schooling, as well as type of delivery (ARAGÃO *et al.*, 2004; BARROS *et al.*, 2005; CNDSS, 2008; SILVA *et al.*, 2006; VICTORA *et al.*, 2000; VILLAR *et al.*, 2006).

To follow, we will focus on prenatal care and other related social determinants of health in order to explore

how they are influencing preterm delivery and the well-being of mother and child in both countries.

PREGNANCY CARE

Early and equal access to prenatal care is a basic condition provided to every pregnant woman in both Canada and Brazil. The quantity and quality of prenatal care has been a popular subject of investigation by epidemiologists and clinical researchers over the last decade. Observational studies have reported strong associations between late entry into prenatal care and the occurrence of preterm birth both in Canada and in Brazil (ALEXANDER; KORENBROT, 1995; BARROS *et al.*, 2005; CARVALHO; GOMES, 2005; KOTELCHUCK, 1994; KRAMER, 1987).

The Society of Obstetricians and Gynecologists of Canada (SOGC) recommends women to have at least 12 prenatal care (PNC) visits: every 4 to 6 weeks in early pregnancy, every 2 to 3 weeks after 30 weeks' gestation, and every 1 to 2 weeks after 36 weeks' gestation. However, in Brazil, the recommendation from the World Health Organization is for women to have at least 6 visits in prenatal care during the pregnancy (GOLDANI *et al.*, 2004).

Although the average number of prenatal visits in Brazil has increased from 6.6 in 1982 to 8.3 in 2004, this number is still low in some sectors of society. It was reported that 83% of women have initiated prenatal care in the first trimester of pregnancy, but only 52% had up to seven prenatal visits in 2004. Studies examining maternal experiences on prenatal care have shown variable prevalence of adequate care, defined on a basis of a first consultation in the first 20 weeks of pregnancy and at least 6 consultations afterwards. In Juiz de Fora (Southeast region), 26.7% of women had adequate

prenatal care; in Pelotas (South region), 37%; and in São Paulo City (Southeast region), the rate went up to 69% of women (COUTINHO *et al.*, 2002; SILVEIRA *et al.*, 2001; MONTEIRO *et al.*, 2000).

A total of 0.2% of women from the Southeast region did not have a prenatal visit, and 3.9% of women from the Northern region had no prenatal care at all (BARROS *et al.*, 2005; SINASC, 2009; WEHBY *et al.*, 2009). About a third of those who failed to get care reported that they could not get an appointment as the reason. Other common reasons were that the doctor was unavailable, waiting time was too long, and that the specialized service or doctor needed was not available at the facility sought (BARROS *et al.*, 2005).

In Canada, the average number of prenatal care visits was 12.9 in 2008; 95% of women initiated care in the first trimester; 50.5% reported 11 to 15 visits; and 31.7% reported 5 to 10 visits. The average of visits ranged from low 10.6 in Nunavut and high 14.6 visits in Newfoundland and Labrador (CANADA, 2009). A study from Manitoba found that women who did not receive adequate prenatal care, which is defined using a combination of timing of first visit and number of visits, were more likely to live in poverty, experience highly stressed lives, and have low levels of self-esteem, as well as often being Aboriginal (HEAMAN *et al.*, 2005).

The majority of women (88.7%) indicated they obtained prenatal care as early as they wanted. For the remaining 11.3% of women, the two most common reasons for not getting prenatal care as early as they wanted were: the doctor/health care provider was unavailable (53%) and the doctor/health care provider would not start care earlier (30.2%) (CANADA, 2009).

With a universal health system, the conditions are laid for the prenatal care program to be offered widely. It is observed that both countries have prenatal care implemented in the universal primary care system, but there

are significant differences between Canada and Brazil. There are also geographic disparities in each country with prenatal care having lower coverage among low income populations. Barriers to the utilization of this service by the low-income population may, therefore, be influenced by socioeconomic status, educational level, and maternal age (KATZ; ARMSTRONG; LOGERFO, 1994; SILVA *et al.*, 2003; SOLAR; IRWIN, 2007), which will be further explored in the next sub-items.

SOCIOECONOMIC STATUS

Socioeconomic status has been defined by the degree of education, occupation and family income. Researchers have found an increased risk of preterm delivery for low socioeconomic status women (BARROS *et al.*, 2005; KRAMER *et al.*, 2000). The reasons for this trend are not clear, but they seem to be related to poorer quality and quantity of prenatal care, worse nutritional status, increased frequency of cigarette smoking, greater use of drugs, higher rates of growth retardation, higher frequency of genital-tract infection and sexual diseases, and higher levels of adverse psychological and physical damage (DEMISSIE *et al.*, 2001; MORRISON, 1990; SLATTERY; MORRISON, 2002).

Both in Canada and in Brazil, governments typically cover access to essential health care services like prenatal and maternity care. However, even with universal access to health care, women living in poor neighborhoods may not use health care resources effectively. Usually, mothers experiencing high levels of social stress are at increased risk of preterm birth. Exposure to objectively stressful conditions, such as housing instability and severe material hardship, has also been associated with preterm birth (GOLDENBERG *et al.*, 2008). Other related issues with the social determinants of health,

such as transport costs, child care costs, or time off work, can influence mothers to start prenatal care later or to be less compliant with prenatal advice or not use all available resources.

In Brazil, studies show a relation between preterm birth and socioeconomic status. In Ribeirão Preto (Southeast region), while the rate of preterm birth was 9.1% among mothers living in rich neighborhoods, this rate was 13.8% among mothers living in poor neighborhoods. In Pelotas (South region), the prevalence of preterm birth was higher in low income neighborhoods (19.8%) than in high income neighborhoods (13.5%) (BARROS *et al.*, 2007, SILVA *et al.*, 1998).

Socioeconomic inequities across the economic status were also evident in the coverage of prenatal care. Lack of prenatal coverage was around five times higher in the poorest neighborhoods than in the richest. For the total Brazilian population, the prevalence of inadequate prenatal care was 38.4% in 2004; however, 70.7% of these women were living in a household at or below the low-income cut-off and 13.6% were living in a high-income household (BARROS *et al.*, 2005).

In Canada, as neighborhood income increases, the preterm birth rate is slightly lower: the preterm rate was 8.6% for the poorest neighborhood, while it was 7.8% for the richest neighborhood (CIHI, 2009).

The first prenatal visit among Canadian women occurred on average at 7.5 weeks' gestation. However, women living in a household at or below the low-income cut-off were more likely to start prenatal care after the first trimester (9.3%) than women living in a household above the low income cut-off (3.8%) (CANADA, 2009).

Putting the evidence together, in both countries it is clear that the lower socioeconomic status does cause prenatal care visits to decrease, while the preterm birth rate tends to increase. Socioeconomic status greatly influences a person's life conditions and

behaviors, which may induce a higher or lower prevalence of preterm birth (BARROS *et al.*, 2005; SOLAR; IRWIN, 2007). This influence of socioeconomic status on preterm birth is, therefore, likely to be mainly indirect, through a number of more specific health determinants that are differently distributed across socioeconomic groups.

EDUCATIONAL LEVEL

A low maternal education level has also been consistently related to poor neonatal health outcomes. The mechanisms by which maternal education influences neonatal welfare are complex because they are also related to social determinants of health that lead to risky life conditions and behaviors. Statistical data has also proven that the number of prenatal visits decreases with lower educational level of mothers.

Although the illiteracy rate in Brazil has decreased from 15.3% in 1995 to 11% of the population in 2005, the rate of people with less than 4 years of education is 23.5%. This rate is higher at the Northeast region (36.3%) than in the Southeast (17.5%). Although the proportion of Brazilian mothers with 9 or more years of education increased from 25.3% in 1982 to 42.8% in 2004, there is a huge gap between regions. Thus, the rate of illiteracy among women in the Northeast region is 20% and in the South is 6.5%. Indeed, while 11.5% of Brazilian mothers had a university degree in Southeast, just 3.7% had the same educational level in the Northeast region (IBGE, 2006).

The low educational level of women has an important impact in prenatal care: on average 76% of illiterate mothers in Brazil have gone through less than 7 prenatal care visits in 2004, in contrast of 22% of mothers with high school degree (BRASIL, 2006b).

In Canada, the illiteracy rate in 2008 was 1%. In the last five years, there has been a decrease in the proportion of mothers with less than high school education who gave birth. In 2000, 13.4% of mothers who had delivered in the previous five years had not completed high school, compared to 8.4% of mothers in 2005. Reported rates of mothers with less than a high school education varied by province/territory: in 2005, rates ranged from a low of 5.5% in British Columbia to a high of 45.4% in Nunavut. Indeed, it was observed that women with less than a high school education (12.8%) were more likely to start prenatal care after the first trimester than women with a university degree (3.4%) (CANADA, 2008).

The knowledge and skills attained through education may affect a person's cognitive functioning, making them more receptive to health education messages or more able to communicate with and access appropriate prenatal care. On the other hand, measuring the number of years of education, or levels of attainment, may contain no information about the quality of the educational experience, especially in Brazil, where the socioeconomic position also influences the quality of the education likely to be received (SOLAR; IRWIN, 2007).

MATERNAL AGE

The age at which a woman becomes pregnant impacts her risk in giving birth to a preterm baby. Teenage mothers (less than 20 years) have a two-fold higher risk of having a preterm baby compared to adult mothers, and the neonatal and maternal mortality rates for teenage mothers are almost three-fold and two-fold higher than average aged mothers, respectively (BARROS *et al.*, 2005).

In Brazil, the average maternal age was 22.9 years in 2005. The rate of teenage mothers has increased from 9.1% in 1980 to 23% in 2001. The rate of teenage pregnancy varies between regions. The Northeast region had the highest rate of teenage mothers with 34.9% and, again, the Centre-east has the lowest rate with 7.9% (CNDSS, 2008).

The statistical data showed significantly higher rates of preterm birth (22.9%) between teenage mothers (aged < 18 years). However, studies have found that factors other than biological clearly played a role in this high rate: the youngest adolescent mothers tended to have low socioeconomic status, to be single, to use drugs and to display lower schooling. Indeed, a maternal age of less than 20 years is also a risk factor for inadequate use of prenatal care in Brazil: 58.22% of mothers younger than 20 had less than 7 prenatal visits (MACHADO, 2006; BRASIL, 2006a; SILVA *et al.*, 2003).

In Canada, unlike Brazil, the rate of teenage pregnancy has decreased steadily. The average maternal age in Canada was 29.3 years in 2005. The overall proportion of live births to teenagers aged 10 to 19 years declined from 6.8% in 1995 to 4.8% in 2004, with significant variations among regions. Among teens aged 10 to 17 years, provincial/territorial live birth rates varied from 1.5 per 1,000 females in Quebec to 34.6 per 1,000 females in Nunavut. This territory had the overall highest proportion of live births to teenage mothers at 24.4%, while Quebec had the lowest at 3.1% (CANADA, 2008).

Teenage mothers were more likely to start prenatal care after the first trimester (15.3%) compared to the average age (5.1%) and just 19.3% of young mothers in Canada reported taking folic acid compared to 67% of women aged 35-39 years. Younger mothers also tended to use family or friends as their most useful source of information (31%). They reported the highest proportion of pre-pregnancy smoking (54.7%) and 28%

still smoked during pregnancy. One-quarter (25%) of women aged 15-19 years reported drug use in the three months prior to pregnancy. Finally, teenage mothers consistently reported lower proportions of having sufficient information on each pregnancy-related topic (BUSHNIK; GARNER, 2008; CANADA, 2008).

Although teenage maternity is not an issue in Canada because of its lower rate, it has been demonstrated that teenage mothers tend to show some risk factors contributing to the poor outcomes: a disadvantaged social environment, biological immaturity, increased likelihood of social deprivation, inadequate prenatal care, physical and sexual abuse, drug use, and smoking. Teenage mothers are also more likely to experience curtailment or premature termination of their education (CANADA, 2008).

It is challenging to convince policymakers and society, especially in Brazil, that actions in health promotion to reduce health inequalities must start with ensuring child education and support systems. Improving the conditions where youth live and facilitating possibilities for a healthy development may certainly increase their participation in society minimizing the risks associated with early maternity (TRAVERSO-YÉPEZ; PINHEIRO, 2002).

DISCUSSION

Although it is evident observed that health status has been improved in both countries, inequities in health status persist between rich and poor groups in each society. Inequities are particularly severe in a country like Brazil, showing a significantly higher rate of in preterm birth (VICTORA *et al.*, 2000). Identifying socioeconomic risk factors and population characteristics that may be related to preterm birth can help to explain this increase

and, if addressed, may reduce the rise of this trend. The identified risk factors can also be useful for health care planning and decision-making in obstetrical practice, as well as for developing prevention measures.

Prevention of preterm birth is generally accepted as being an important neonatal challenge facing mother-infant health care. The above comparison between Canadian and Brazilian preterm rates shows that, in order to deal effectively with prevention of preterm delivery, we need to go beyond the biomedical approach. We need to adopt a conceptual model that focuses on the fundamental social determinants of health.

We have seen in the bibliographic research article that the socioeconomic status has a strong influence on mother-infant health. The lack of prenatal care or insufficient health conditions, highly influenced by socioeconomic status, has been associated with preterm birth in both countries. Recognizing the significant differences in socioeconomic conditions between Brazil and Canada, some common risks factors observed in both countries are:

- among low income women, the average number of prenatal visits in Canada was 12.9, while in Brazil it was 8.3;
- regarding the failure in starting the prenatal care, one of the main arguments was the difficulty of accessing prenatal health care;
- mothers living in a household at or below the low income cut-off were less likely to have adequate prenatal care and to start the care before the third month of gestation;
- mothers with less than 8 years of school were more likely to start the prenatal care after the third month of gestation and to have fewer lessprenatal visits;

- although in Canada the rate of pregnancy among teenagers has decreased to 4.8%, and in Brazil (due to higher social inequities) this rate has increased to 23%, in both cases, these young mothers tend to have low socioeconomic status and no partner support, are more likely to smoke and use drugs, and display lower schooling. They also have inadequate prenatal care and, consequently, have higher rate of preterm births.

Putting the risk factors together, the low coverage of preventive programs among the poorest does not seem to be caused just by difficulties in delivering services, considering the universal health care available that allows high access and utilization of services in general. Other issues associated with deprived living conditions seem to play an important role, showing the need to consider the strong influence of the social determinants of health on mother-child health in Brazil, as well in the low-income sectors of Canadian society.

Evidence points to the importance of representing the concept of social determinants to policymakers in ways that clarify the distinction between the social causes of health and the complexity of different aspects determining their distribution between more and less advantaged groups (SOLAR; IRWIN, 2007).

We propose postulate that policy makers should emphasize social determinants of health to implement interventions and policies in both developing and developed countries. In France (a country where the preterm birth rate has significantly decreased from 5.4 to 3.7% over a 12-year period), the preventive effort to reduce this trend was effective because the strategy for public health was to create social conditions for the entire population and not just a subgroup of women (either at risk or not) (PAPIERNIK; GOFFINET, 2004).

This raises the issue of state responsibility in creating spaces and conditions under which the

empowerment of disadvantaged communities and populations in risky situations can become a reality. This knowledge also implies that one way to decrease preterm birth rate might involve increasing women's awareness of the potential benefits of prenatal care. A multidisciplinary approach is needed in health promotion to reduce the rate of and to manage preterm birth:

- enhancement of epidemiologic surveillance and follow-up about rate of preterm birth and prenatal care rates;
- modification of prenatal care standards in Brazil in order to improve its quality;
- establishment of financial incentives from the government and other basic supports for families or single teenage mothers;
- expansion of efforts to screen for and treat non-medical risk-related conditions, such as substance abuse, physical abuse, nutritional deficiencies, and infant and child care educational needs. A comprehensive needs assessment is not only useful for the current pregnancy but also to the future health of mothers, infants and families;
- pursuit of efforts to evaluate investigate and guarantee the public of the effectiveness and appropriate timing of services provided. Feedback results are essential to decision makers and to the general population;
- empowerment of mothers, especially those living in socioeconomic deprivation, encouraging and supporting their active involvement in decision making and care. Community empowerment is also a process of enabling groups to develop the authority to act,

control, or influence consequences that are important to their members (ALEXANDER; KORENBROT, 1995);

- creation of an integrated model of health services that fully covers women care, preconception, prenatal, intrapartum, postnatal, and total baby care, with a focus on health promotion and primary and secondary disease prevention throughout the lifespan (IHE, 2007);
- monitoring and evaluation programs with an equity lens, repeating and expanding exercises such as the present study to cover other health programs.

CLOSING REMARKS

Reforming the health care system through the acknowledgment of the social determinants of health offers an opportunity to find a pathway to promote improvements in the health of infants and mothers and guarantee access and availability of high-quality health care. However, we must prepare for the difficult task of re-educating policymakers and the public regarding the value of prenatal care.

Prenatal care plays an important role that goes beyond the medical visit, as we are suggesting a kind of prenatal care that would enable mothers and health care professionals to critically reflect and integrate knowledge about the social determinants of health. This approach should facilitate not simply personal reflection upon behaviors but engagement with broader social-political issues, thus allowing for collective understandings and change.

Indeed, action on the social determinants of health is necessary not only to improve health in general but also because such improvement will indicate the moving of society in a direction of meeting basic human needs.

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REFERENCES

ALEXANDER, G.R.; KORENBROT, C.C. The role of prenatal care in preventing low birth weight. *The Future of Children*, v. 5, n. 1, p. 103-120, 1995.

ALMEIDA, S.D.; BARROS, M.B. Equity and access to health care for pregnant women in Campinas (SP), Brazil. *Revista Panamericana de Salud Pública*, v. 17, p. 15-25, 2005.

ARAGÃO, V.M. SILVA, A.A.M.; ARAGÃO, L.F. *et al.* Risk factors for preterm births in São Luis, Maranhão, Brazil. *Cadernos de Saúde Pública*, v. 20, n. 1, p. 57-63, 2004.

ARMSON, B.A.; DODDS, L.; CERVIN, C. *et al.* A preterm birth prevention project in Nova Scotia, Canada. *Maternal and Child Health Journal*, v. 5, n. 3, p. 189-197, 2001.

BARROS, A.J.D.; VICTORA, C.G.; CESAR, J.A. *et al.* Brazil: are health and nutrition programs reaching the neediest? Washington, DC: The World Bank; 2005.

BARROS, F.C.; HUTTLY, S.R.A.; VICTORA, C.G. *et al.* Comparison of the causes and consequences of prematurity and intrauterine growth retardation: a longitudinal study in southern Brazil. *Pediatrics*, v. 90, n. 2, pt. 1, p. 238-244, 1992.

BARROS, F.C.; VICTORA, C.; MATIJASEVICH, A. *et al.* Preterm birth, low birth weight, and intrauterine growth restriction in three birth cohorts in Southern Brazil: 1982, 1993 and 2004. *Cadernos de Saúde Pública*, v. 24, n. 3, p. S390-S398, 2008.

BETTIOL, H.; RONA, R.J.; CHINN, S. *et al.* Factors associated with preterm births in Southeast Brazil: a comparison of two birth cohorts born 15 years apart. *Paediatric and Perinatal Epidemiology*, v. 14, n. 1, p. 30-38, 2000.

BRASIL. Ministério da Saúde. Secretaria de Vigilância em Saúde. Departamento de Análise de Situação em Saúde. *Saúde Brasil 2006: uma análise da situação de saúde no Brasil*. Brasília, DF, 2006a.

_____. Ministério da Saúde. *PNDS 2006: Pesquisa Nacional de Demografia e Saúde da Criança e da Mulher*. Brasília, DF: 2006b.

_____. Ministério da Saúde. *Sistema de Informação de Nascidos Vivos*, SINASC. Brasília, DF: Centro Nacional de Epidemiologia, 2009. Available from: <http://portal.saude.gov.br/portal/saude/Gestor/visualizar_texto.cfm?idtxt=24455>. Cited: 2009 Jun. 6.

BUSHNIK, T.; GARNER, R. *The children of older first-time mothers in Canada: their health and development*. Statistics Canada: special surveys division, 2008.

CANADA. Ministry of Public Works and Government Services. *Canadian perinatal health report 2008*. Ottawa, 2008.

_____. Public Health Agency of Canada. *What mothers say: the Canadian maternity experiences survey*. Ottawa, 2009.

CANADIAN INSTITUTE FOR HEALTH INFORMATION, CIHI. *Too early, too small: a profile of small babies across Canada*. Ottawa: CIHI, 2009.

CARVALHO, M.; GOMES, M.A.S.M. A mortalidade do prematuro extremo em nosso meio: realidade e desafios. *Jornal de Pediatria*, v. 81, n. 1, p. S111-S118, 2005.

COMISSÃO NACIONAL SOBRE DETERMINANTES SOCIAIS DA SAÚDE, CNDSS CNSDS. *As causas sociais das iniquidades em saúde no Brasil*. Rio de Janeiro: FIOCRUZ, 2008.

COUTINHO, T.; TEIXEIRA, M.T.B.; DAIN, S. *et al.* Adequação do processo de assistência pré-natal entre as usuárias do Sistema Único de Saúde em Juiz de Fora-MG. *Revista Brasileira de Ginecologia e Obstetrícia*, v. 25, n. 10, p. 717-724, 2002.

DEMISSIE, K.; RHOADS, G.; ANANTH, C.V. *et al.* Trends in preterm birth and neonatal mortality among blacks and whites in the United States from 1989 to 1997. *American Journal of Epidemiology*, v. 154, p. 307-315, 2001.

GOLDANI, M.Z.; BARBIERI, M.A.; RONA, R.J. *et al.* Increasing pre-term and low-birth-weight rates over time and their impact on infant mortality in south-east Brazil. *Journal of Biosocial Science*, v. 36, p. 177-188, 2004.

GOLDENBERG, R.L.; CULHANE, J.F.; IAMS, J.D. *et al.* Epidemiology and causes of preterm birth. *Lancet*, v. 371, p. 75-84, 2008.

GOLDENBERG, R.L.; ROUSE, D. Prevention of premature birth. *The New England Journal of Medicine*, v. 339, n. 5, p. 313-320, 1998.

GWATKIN, D.; RUTSTEIN, S.; JOHNSON, K. *et al.* *Socio-economic differences in health, nutrition, and population in Brazil*. Washington, DC: The World Bank; 2000. Available from: < <http://siteresources.worldbank.org/INTPAH/Resources/IndicatorsOverview.pdf> >. Cited: 2009 Jun. 10.

HEAMAN, M.I.; BLANCHARD, J.F.; GUPTON, A.L. *et al.* Risk factors for spontaneous preterm birth among Aboriginal and non-Aboriginal women in Manitoba. *Paediatric and Perinatal Epidemiology*, v. 19, p. 181-193, 2005.

HEAMAN, M.I.; ELLIOTT, L.J.; BEAUDOIN, C. *et al.* Preventable feto-infant mortality: application of a conceptual framework for perinatal health surveillance to Manitoba perinatal outcomes. *Canadian Journal of Public Health*, v. 93, n. 2, p. S27-S32, 2001.

HEAMAN, M.I.; SPRAGUE, A.E.; STEWART, P.J. Reducing the preterm birth rate: a population health strategy. *Journal of Obstetric, Gynecologic, & Neonatal Nursing*, v. 30, n. 1, 2001.

HORTA, B.L.; BARROS, F.C.; HALPERN, R. *et al.* Baixo peso ao nascer em duas coortes de base populacional no sul do Brasil. *Cadernos de Saúde Pública*, v. 12, n. 1, p. 27-31, 1996.

INSTITUTE OF HEALTH ECONOMICS. *Consensus Statement on Healthy mothers – Healthy babies: how to prevent low birth weight*. Alberta, CA: IHE, v. 2, May 23-25, 2007.

INSTITUTO BRASILEIRO DE GEOGRAFIA E ESTATÍSTICA, IBGE. *Síntese de indicadores sociais*. Rio de Janeiro: IBGE, 2006.

JOSEPH, K.S.; DEMISSIE, K.; KRAMER, M. Obstetric intervention, stillbirth, and preterm birth. *Seminars in Perinatology*, v. 26, n. 4, p. 250-259, 2002.

JOSEPH, K.S.; KRAMER, M.S.; MARCOUX, S. *et al.* Determinants of preterm birth rates in Canada from 1981 through 1983 and from 1992 through 1994. *The New England Journal of Medicine*, v. 339, n. 20, p. 1434-1439, 1998.

KATZ, S.J.; ARMSTRONG, R.W.; LoGERFO, J.P. The adequacy of prenatal care and incidence of low birthweight among the poor in Washington State and British Columbia. *American Journal of Public Health*, v. 84, n. 6, p. 986-991, 1994.

KOTELCHUCK, M. The adequacy of prenatal care utilization index: its US distribution and association with low birthweight. *American Journal of Public Health*, v. 84, n. 9, p. 1486-1489, 1994.

KRAMER, M.S. Preventing Preterm Birth: are we making any progress? *Yale Journal of Biology and Medicine*, v. 70, p. 227-232, 1997.

_____. Determinants of low birth weight: methodological assessment and meta-analysis. *Bulletin of the World Health Organization*, v. 65, p. 663-737, 1987.

KRAMER, M.S.; PLATT, R.W.; WEN, S.W. *et al.* A new and improved population-based Canadian reference for birth weight for gestational age. *Pediatrics*, v. 108, n. 2, p. E35, 2001.

KRAMER, M.S.; SÉGUIN, L.; LYDON, J. *et al.* Socio-economic disparities in pregnancy outcome: why do the poor fare so poorly? *Paediatric and Perinatal Epidemiology*, v. 14, p. 194-210, 2000.

LOBATO, L. Reorganizing the Health Care System in Brazil. In FLEURY, S.; BELMARTINO, S.; BARIS E., editors. *Reshaping health care in Latin America: A comparative analysis of health care reform in Argentina, Brazil and Mexico*. Ottawa: IDRC. Available from: <http://www.idrc.ca/en/ev-35519-201-1-DO_TOPIC.html>. Cited: 2009 Jun. 12.

LUMLEY, J. Defining the problem: the epidemiology of preterm birth. *BJOG: an International Journal of Obstetrics and Gynaecology*, v. 110, n. 20, p. 3-7, 2003.

MACHADO, C.J. Impact of maternal age on birth outcomes: a population-based study of primiparous Brazilian women in the city of São Paulo. *Journal of Biosocial Science*, 2006; 38: 523-535.

MARMOT, M. Social determinants of health inequalities. *Lancet*, v. 365, p. 1099-1104, 2005.

MCCORNICK, M.C. The contribution of low birth weight to infant mortality and childhood morbidity. *The New England Journal of Medicine*, v. 312, p. 82-90, 1985.

MONTEIRO, C.A.; FRANCA JUNIOR, I.; CONDE, W.L. Evolução da assistência materno-infantil na cidade de São Paulo (1984-1996). *Revista de Saúde Pública*, v. 34, n. 6, p. 19-25, 2000.

MORRISON, J. Preterm birth: a puzzle worth solving. *Obstetrics & Gynecology*, v. 76, p. 5S-12S, 1990.

MUSTARD, C.A.; ROOS, N.P. The relationship of prenatal care and pregnancy complications to birthweight in Winnipeg, Canada. *American Journal of Public Health*, v. 84, n. 9, p. 1450-1457, 1994.

PAPIERNIK, M.D.; GOFFINET, F. Prevention of preterm births, the French experience. *Clinical Obstetrics and Gynecology*, v. 47, n. 4, p. 755-767, 2004.

SLATTERY, M.M., MORRISON, J.J. Preterm delivery. *Lancet*, v. 360, p. 1489-1497, 2002.

SILVA, A.A.; BARBIERI, M.A.; GOMES, U.A. *et al.* Trends in low birth weight: a comparison of two birth cohorts separated by a 15-year interval in Ribeirão Preto, Brazil. *Bulletin of the World Health Organization*, v. 76, n. 1, p. 73-84, 1998.

SILVA, A.A.; BETTIOL, H.; BARBIERI, M.A. *et al.* Which factors could explain the low birth weight paradox? *Revista de Saúde Pública*, v. 40, n. 4, p. 648-655, 2006.

SILVA, A.A.; COIMBRA, L.C.; SILVA, R.A. *et al.* Perinatal health and mother-child health care in the municipality of São Luis, Maranhão State, Brazil. *Cadernos de Saúde Pública*, v. 17, n. 6, p. 1413-1423, 2001.

SILVA, A.A.; SIMÕES, V.M.F.; BARBIERI, M.A. *et al.* Young maternal age and preterm birth. *Paediatric and Perinatal Epidemiology*, v. 17, p. 332-339, 2003.

SILVEIRA, D.S.; SANTOS, I.S.; COSTA, J.S. Atenção pré-natal na rede básica: uma avaliação da estrutura e do processo. *Cadernos de Saúde Pública*, v. 17, n. 1, p. 131-139, 2001.

SILVEIRA, M.F.; SANTOS, I.S.; BARROS, A.J.D. *et al.* Aumento da prematuridade no Brasil: revisão de estudos de base populacional. *Revista de Saúde Pública*, v. 42, n. 5, p. 957-964, 2008.

SOLAR, O.; IRWIN, A.A. *Conceptual framework for action on the social determinants of health*, 2007. Available from: <http://www.who.int/social_determinants/resources/csdh_framework_action_05_07.pdf>. Cited: 2009 Jun. 8.

TRAVERSO-YÉPEZ, M. The difficulties of dealing with social inequities at the Family Health Program in Natal, Brazil. *Critical Public Health*, v. 19, n. 2, p. 193-202, 2009

TRAVERSO-YÉPEZ, M, PINHEIRO, V. Adolescência, saúde e contexto social: esclarecendo práticas. *Psicologia & Sociedade*, v. 14, n. 2, p. 133-147, 2002.

TOUGH, S.; NEWBURN-COOK, C.; JOHNSTON, D. *et al.* Delayed childbearing and its impact on population rate changes in lower birth weight, multiple birth, and preterm delivery. *Pediatrics*, v. 108, n. 3, p. 399-403, 2002.

UNITED NATIONS DEVELOPMENT PROGRAMME, UNDP. Human Development Report. *Beyond scarcity*: power, poverty and the global water crisis. New York: Palgrave Macmillan. Available from: <<http://hdr.undp.org/hdr2006/>>. Cited: 2009 Jun. 10.

VALERO DE BERNABÉ, J.; SORIANO, T.; ALBALADEJO, R. *et al.* Risk factors for low birth weight: a review. *European Journal of Obstetrics, Gynecology, and Reproductive Biology*, p. 116, v. 1, p. 3-15, 2004.

VICTORA, C.G. Intervenções para reduzir a mortalidade infantil pré-escolar e materna no Brasil. *Revista Brasileira de Epidemiologia*, v. 4, n. 1, p. 63-69, 2001.

VICTORA, C.G.; VAUGHAN, J.P.; BARROS, F.C. *et al.* Explaining trends in inequities: evidence from Brazilian child health studies. *Lancet*, v. 356, n. 9235, p. 1093-1098, 2000.

VILLAR, J.; VALLADARES, E.; WOJDYLA, D. *et al.* Caesarean delivery rates and pregnancy outcomes: the 2005 WHO global survey on maternal and perinatal health in Latin America. *Lancet*, v. 367, n. 9525, p. 1819-29, 2006.

WEHBY, G.L.; MURRAY, J.C.; CASTILLA, E.E. *et al.* Prenatal care effectiveness and utilization in Brazil. *Health policy and planning*, v. 24, p. 175-188, 2009.

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