



ORIGINAL ARTICLE

# Impact of maternal diabetes mellitus on mortality and morbidity of very low birth weight infants: a multicenter Latin America study<sup>☆,☆☆</sup>



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## KEYWORDS

Very low birth weight;  
Diabetes mellitus;  
Morbidity;  
Mortality;  
Neonatal;  
Network

## Abstract

**Objectives:** To compare mortality and morbidity in very low birth weight infants (VLBWI) born to women with and without diabetes mellitus (DM).

**Methods:** This was a cohort study with retrospective data collection (2001–2010, n = 11.991) from the NEOCOSUR network. Adjusted odds ratios and 95% confidence intervals were calculated for the outcome of neonatal mortality and morbidity as a function of maternal DM. Women with no DM served as the reference group.

**Results:** The rate of maternal DM was 2.8% (95% CI: 2.5-3.1), but a significant (p = 0.019) increase was observed between 2001-2005 (2.4%, 2.1-2.8) and 2006-2010 (3.2%, 2.8-3.6). Mothers with DM were more likely to have received a complete course of prenatal steroids than those without DM. Infants of diabetic mothers had a slightly higher gestational age and birth weight than infants of born to non-DM mothers. Distribution of mean birth weight Z-scores, small for gestational age status, and Apgar scores were similar. There were no significant differences between the two groups regarding respiratory distress syndrome, bronchopulmonary dysplasia, intraventricular hemorrhage, periventricular leukomalacia, and patent ductus arteriosus. Delivery room mortality, total mortality, need for mechanical ventilation, and early-onset sepsis rates were significantly lower in the diabetic group, whereas necrotizing enterocolitis (NEC) was significantly higher in infants born to DM mothers. In the logistic regression analysis, NEC grades 2-3 was the only condition independently associated with DM (adjusted OR: 1.65 [95% CI: 1.2 -2.27]).

**Conclusions:** VLBWI born to DM mothers do not appear to be at an excess risk of mortality or early morbidity, except for NEC.

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**PALAVRAS-CHAVE**

Muito baixo peso;  
*Diabetes mellitus*;  
 Morbilidade;  
 Mortalidade;  
 Neonatal;  
 Redes

## Impacto da *diabetes mellitus* maternal sobre a mortalidade e morbidade de crianças com muito baixo peso ao nascer: um estudo em diversos centros da América Latina

**Resumo**

**Objetivos:** Comparar mortalidade e morbidade em crianças de muito baixo peso (MBP) filhas de mães com e sem *diabetes mellitus* (DM).

**Métodos:** Estudo de coorte com coleta retrospectiva de dados (2001 - 2010, n = 11.991) da rede NEOCOSUR. Odds ratios ajustados foram calculados para mortalidade e morbidade neonatal em função da DM materna. Mulheres sem DM serviram como grupo de referência.

**Resultados:** A taxa de DM materna foi 2,8% (IC 95% 2,5-3,1), mas um aumento significativo ( $p = 0,019$ ) entre 2001-2005 (2,4%) e 2006-2010 (3,2%) foi observado. As mães com DM eram mais propensas a terem recebido um curso completo de esteróides pré-natais que as sem DM. Os bebês de mães diabéticas tinham uma idade gestacional e peso ao nascer um pouco maior do que crianças filhas de não DM. Distribuição dos z escores de peso ao nascer, pequeno para idade gestacional e escores de Apgar foram semelhantes. Não houve diferenças significativas entre os dois grupos em termos de síndrome do desconforto respiratório, displasia broncopulmonar, hemorragia intraventricular, leucomalácia periventricular e persistência do ductus arteriosus. Mortalidade na sala de parto, mortalidade total, necessidade de ventilação mecânica e as taxas de sepse neonatal precoce foram significativamente menores no grupo diabético, enquanto enterocolite necrosante (NEC) foi significativamente maior em recém-nascidos de mães diabéticas. Em análises de regressão logística NEC foi a única condição independentemente associada com DM (OR ajustado 1,65 [IC 95% 1,21 -2,27]).

**Conclusões:** Crianças de MBP de mães com DM não têm aumento do risco de mortalidade ou morbidade precoce, exceto NEC.

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**Introduction**

Diabetes mellitus (DM) is the most common medical condition causing complications during pregnancy. It is estimated that 0.2% to 0.3% of all pregnancies are complicated by pregestational DM, and another 1% to 5% by gestational DM.<sup>1</sup>

Numerous studies indicate that the rates of perinatal complications among diabetic women are still substantially higher than those of the general population.<sup>2</sup>

Although there has been considerable progress in the care of diabetic pregnant women, the risk of premature delivery remains high.<sup>3</sup> The exact incidence of prematurity in the pregnant diabetic women is controversial. A large series reported that 36% of infants born to mothers with gestational DM or those with pre-existing insulin-dependent DM were born before term, compared to 9.7% in the general population.<sup>4</sup>

Adequate pre-conceptual and gestational care reduces the frequency of congenital malformations and improves pregnancy outcomes.<sup>5</sup>

Despite substantial reductions in morbidity and mortality rates achieved with recent advances in neonatal care, prematurity remains the single most important determinant of neonatal morbidity in diabetic pregnancies.<sup>6</sup> Although a large number of investigators have examined the influence of various perinatal risk factors on the outcome of very low birth weight infants (VLBWI), studies that specifically has focused on the outcome of VLBWI born to diabetic mothers are scarce.<sup>7-9</sup> Furthermore, most of these data were from centers with a special interest in diabetes and pregnancy

and no difference was observed between pre-gestational and gestational DM.

The present study aimed to compare mortality rates and early and late morbidity rates in VLBWI born to women with and without DM in a regional birth cohort over a ten-year period.

**Methods****Data collection**

The NEOCOSUR South American Network (<http://www.neocosur.org/neocosur/>) is a voluntary nonprofits association of neonatal intensive care units (NICUs) from six South American countries (Argentina, Brazil, Chile, Paraguay, Peru, and Uruguay), whose primary objective is to improve neonatal health. Briefly, this network provides a continuously updated database that prospectively gathers information from all live-born VLBWI (birth weight ranging from 500 g to 1,500 g) from the participating centers.

A structured form is completed for each infant using pre-defined diagnostic criteria on maternal demographic details, pregnancy history and antenatal care, delivery, infant's status at delivery, diagnoses, procedures and complications during hospitalization, and outcome at discharge. Since 2001, data is prospectively and routinely collected and entered online at the NEOCOSUR Network Center. The data have been extensively validated, and the analyses of subsets have been reported in many articles to date.<sup>10,11</sup>

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