

High Level of Maternal Glycated Hemoglobin and Low Birth Weight

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Abstract

Background: The present study investigated the possible association between elevated maternal glycated haemoglobin levels (HbA1c%) and infants with low birth weight (LBW).

Methods: This case-control study included 1,142 women admitted to three public hospitals in the northeast region of Brazil. The participants were classified based on their glycaemic levels, using glycated haemoglobin

methodologies in this research area are rare; therefore, the present study investigated the possible association between elevated glycaemia during pregnancy and LBW.

Materials and Methods

A case-control study was conducted with mothers of live neonates from March 2011 to January 2012 at Dom Malan Hospital, Professor Fernando Figueira Institute of Integrated Medicine (Instituto de Medicina Integral Professor Fernando Figueira, IMIP), Petrolina, Pernambuco (PE); Inácia Pintos dos Santos Hospital, Feira de Santana, Bahia (BA); and Municipal Maternity Hospital of Juazeiro, Juazeiro, BA, Brazil.

The research ethics committees of Professor Fernando Figueira Institute of Integrated Medicine and State University of Feira de Santana approved this study (no. 2215/11 and 048/2009, respectively), in accordance with the Helsinki Declaration as revised in 2013. All of the participants signed an informed consent document.

To compose the group of cases, mothers of neonates with LBW (below 2,500 g) up to 7 days after delivery who remained at the participating hospitals at the time of recruitment were invited to participate. Following the

group of cases had a higher frequency of women younger than 35 years old compared with the control group (Table 1).

Characteristics	CASES* (329)	CONTROLS** (813)	P***
	n (%)	n (%)	
Maternal age			
10-35 years old	299 (90.9)	748 (92.0)	<0.01
>35 years old	30 (9.1)	65 (8.0)	
Maternal educational level			
>4 years of formal schooling	40 (12.2)	117 (14.4)	0.32
4 years of formal schooling	289 (87.8)	696 (85.6)	
Family income			
1 or more times the equivalent of the minimum wage	206 (62.6)	540 (66.4)	0.22
<1 time the equivalent of the minimum wage	123 (37.4)	273 (33.6)	
Maternal occupation during pregnancy			
Paid job	164 (49.8)	393 (48.3)	0.64
Homemaker/student/unemployed	165 (50.2)	420 (51.7)	
Marital status			
Married/stable union	173 (52.6)	470 (57.8)	0.1
Single/widowed/divorced	156 (47.4)	343 (42.2)	
Maternal race/skin colour			
Brown/Black	286 (86.9)	689 (84.7)	0.34
White/Asian	43 (13.1)	124 (15.3)	
Household density			
4 individuals	198 (60.2)	484 (59.5)	0.83
>4 individuals	131 (39.8)	329 (40.5)	
*Mothers of live neonates with weights <2,500 g			
**Mothers of live neonates with weights ≥ 2,500 g			
***P = p-value, significance level = 0.05			

Table 1: Maternal sociodemographic characteristics corresponding to cases and controls, Pernambuco/Bahia, Brazil (n= 1,142).

Relative to reproductive history, lifestyle, prenatal care, and other variables, some variables were considered for multivariate analysis. A logistic regression model was used to analyze the association between maternal characteristics and the outcome of interest. The analysis was adjusted for confounding factors. The results are presented in Table 1. The variables included in the model were maternal age, educational level, family income, maternal occupation during pregnancy, marital status, maternal race/skin colour, and household density. The results show that maternal age was significantly associated with the outcome (p < 0.01). Other variables were not significantly associated with the outcome (p > 0.05).

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Characteristics	CASES* (329)	CONTROLS** (813)	P***
	n (%)	n (%)	
Primiparity			
No	188 (57.2)	347 (42.7)	<0.01
Yes	141 (42.8)	466 (57.3)	
History of LBW neonates			
Yes	27 (8.2)	69 (8.5)	0.87
No	302 (91.8)	744 (91.5)	
History of preterm neonates			
Yes	16 (4.9)	58 (7.2)	0.15
No	313 (95.1)	755 (92.9)	
Smoking during pregnancy			
Yes	23 (7)	53 (6.5)	0.77
No	306 (93.0)	760 (93.5)	
Drinking during pregnancy			
Yes	33 (10.1)	104 (12.8)	0.19
No	296 (89.9)	709 (87.2)	
Number of prenatal care visits			
<6 visits	192 (58.4)	520 (64.0)	0.07
6 visits	137 (41.6)	293 (36.0)	
Urinary tract infection			
Yes	127 (38.6)	346 (42.6)	0.21
No	202 (61.4)	467 (57.4)	
Arterial hypertension			
Yes	57 (17.3)	120 (14.8)	0.27
No	272 (82.7)	693 (85.2)	
Preeclampsia			
Yes	11 (3.3)	29 (3.6)	0.85
No	318 (96.7)	784 (96.4)	
Body mass index before pregnancy			
>18.5	234 (71.1)	687 (84.5)	<0.01
18.5	95 (28.9)	126 (15.5)	
Prematurity			
<37 weeks	91 (27.7)	177 (21.8)	0.03
37 weeks	238 (72.3)	636 (78.2)	
High-risk pregnancy			

Yes	92 (28.0)	183 (22.5)	0.05
No	327 (72.0)	630 (77.5)	

*Mothers of live neonates with weights <2,500 g

**Mothers of live neonates with weights ≥ 2,500 g

***P=p-value, significance level 0.05

Discussion

According to the results of the present study, from the logistic regression, no association was found between high maternal glycated haemoglobin levels and LBW. The results did not show an association between the various levels of elevated maternal glycated haemoglobin and LBW even after adjusting for confounders such as maternal age, smoking during pregnancy, body mass index before pregnancy, arterial hypertension, number of prenatal care visits, and maternal occupation during pregnancy. However, for postpartum women with a higher level of glycated hemoglobin (Group IV), there was an increase in the epidemiological measurement that should be disregarded, in principle, since the number of women was lower when compared to the other groups. The confidence interval presented was wider, indicating a greater imprecision of this

finding. The absence of an association corroborates the results from other studies, including classic studies that found that elevated glycaemia during pregnancy is associated with higher birth weight, rather than

