Maternal Risk Factors And Their Association With Perinatal Outcomes in Florida

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INTRODUCTION

If infant health can be viewed as a potential predictor for long-term individual health, then preventative health measures should be focused toward such. This early focus usually takes the form of vaccinations and other periodic evaluations to screen for growth and other childhood illnesses. However, these interventions do not take place early enough to have the most positive effect on the life of a child. It is for this purpose that an emphasis is placed upon the importance toward fetal development and interventions to improve maternal health. Importantly infant birth weight is a strong predictor of morbidity and mortality; thus variables such as maternal delivery weight (or gestational weight gain), maternal age, maternal smoking, maternal race and gestational age are important spotlights to examine. A review of the literature demonstrates multiple studies have focused toward maternal factors and their impact on birth weights. According to Reichman and Panini (1997), who examined data from New Jersey, increased maternal age demonstrated significance in the likelihood of an infant born with low birth weight. Other studies have reaffirmed that increased maternal age was a predictor for low birth weights, particularly for black mothers; they also noted that maternal smoking also increased the risk for low birth weights, which was compounded if the mother was also older (Rich-Edwards, Buka, Brennan & Earls, 2003; Zheng et al., 2016). Ananth and Platt (2004) reported that maternal smoking risked decreased fetal growth; however, gestational age was a much stronger predictor for infant mortality. Ota et al. (2010) found that maternal weight at delivery in terms of gestational weight gain was a strong predictor of infant birth weights. Finally, Wise (2003) found disparities in birth weight among infants born to non-Hispanic Black women. He found that black infants were two or more times more likely to have low and very low birth weights compared to infants born to women of other race and ethnic groups

METHODS

- The study was conducted using data from the Florida Pregnancy Risk Assessment Monitoring System (PRAMS). In 2013, 2,447 new mothers were invited to participate in Florida PRAMS and 1,320 completed the survey, for a response rate of 53.9%. The 2013 Florida PRAMS sample represents 215,194 live births born to Florida residents during 2013. Data from a sample of 1218 participants were used in this study. SPSS Software (V.24) (IBM) was used for all statistical analyses. We investigated the influence of maternal weight at delivery, mother's age, history of smoking, and gestational age on infant weight at birth. Data were analyzed using a multilevel logistic regression analysis to assess the effects of the predictor variables on infant weight at birth.
- This study received approval from the UWF Institutional Review Board IRB 2018-051.

RESULTS

Two-thirds of the mothers were White non-Hispanic (66%) and most had health insurance (69%). Less than half of the mothers reported having had prenatal care during their pregnancy, and almost all of them (92%) reported no history of smoking. Almost 10% of the mothers did not have a high school diploma. Mothers without health insurance and with a history of hypertension were more likely to have low birth weight babies compared to their counterparts. (See figure and table 1).

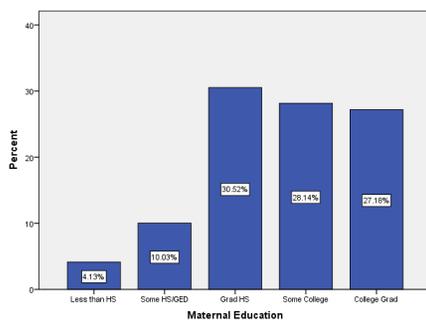*Figure 1.* Maternal Educational Level

Table 1

Characteristics of mothers with low birth weight babies

| Characteristics	(N)	%	OR	(CI)
Smoking history			1.3	(.862.-2.05)
Yes	89	(7.8)		
No	1045	(92.2)		
Health Insurance			.98	(.76 - 1.26)
Yes	371	(47.3)		
No	168	(47.7)*		
Prenatal Care			1.3	(1.05-1.65)
Yes	262	(48.0)		
No	267	(41.2)		
Maternal Diabetes			.71	(.39-1.29)
Yes	19	(39.6)		
No	519	(47.7)		
Maternal Hypertension			3.9	(2.5-6.2)
Yes	85	(75.9)**		
No	453	(44.2)		

*P ≤ 0.05, ** P ≤ 0.001

RESULTS

The sample was relatively young ($M = 28$, $SD = 6.18$); The average maternal weight was 180 pounds ($SD = 37.63$) and the average infant weight was 2866 grams ($SD = 797.47$). Thirty five percent of the infants were considered low birth weight (less than 2,500 g, irrespective of gestational age). The gestational age in weeks was ($M = 37.17$, $SD = 3.27$) (See table 2).

Table 2. Maternal and Infant Characteristics

	M	SD	Minimum	Maximum
Maternal age (years)	28.8	6.18	16	47
Maternal weight (pounds)	180.0	37.63	90	360
Gestational age (weeks)	37.17	3.27	20	43
Infant Weight (grams)	2866.81	797.47	120	5500

Multilevel regression analysis was used to investigate the influence of maternal weight at delivery, mother's age, history of smoking, and gestational age on infant weight at birth. The results of the regression indicated the predictor variables explained 68% of the variance in infant weight ($R^2 = 0.680$, $F = 578.755$, $p > .000$). Maternal weight at delivery ($t = 6.525$, $p > .000$), mother's age ($t = 2.488$, $p = .013$), history of smoking ($t = 2.351$, $p = .019$), and gestational age ($t = 47.589$, $p > .000$) all significantly contributed to infant weight at birth (See figure 2 and table 3).

Figure 2. Scatterplot with regression line of the multilevel logistic regression analysis.
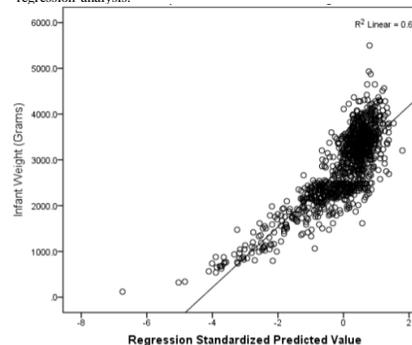
RESULTS

Table 3

Summary of Logistic Regression Analysis for variables predicting infant weight at birth

Predictor	B	SE B	β	t	*p
Gestational age	198.072	4.162	.816	47.589	.000
Maternal age	5.554	2.232	.043	2.488	.013
Maternal weight	2.396	.367	.112	2.351	.000
Smoking history	119.001	50.613	.040	6.525	.019

Multiple linear regression coefficients. Dependent Variable: Infant weight (grams)

*$p < .05$.

CONCLUSIONS

If infant health can be viewed as a potential predictor for long-term individual health, then preventative health measures should be focused toward such. Emphasis should be placed upon the importance toward fetal development and interventions to improve maternal health. This study had some strengths as well as limitations. The considered strengths are: a) it is a population-based study with a robust sampling methodology and a large sample size that is representative of the women in Florida who have delivered live-born infants (b) it uses state-level data that are representative of the women delivering live-born infants, potentially reflecting different social and cultural practices and behaviors that may have an impact on perinatal outcomes. Some of the potential limitations include: a) this is a cross-sectional survey, and therefore causality may not be able to be inferred. Data were self-reported; therefore, they may be subject to recall and information (social desirability) bias.

We hope the results of this study will provide insights about maternal healthcare practices among Florida women that will help health care providers and policy makers to start a conversation on the importance of adopting healthy behaviors in order to have a positive impact on their newborns health.

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