

Introduction

- Group B Streptococcus is a bacterium that is present in the lower gastrointestinal and genital tracts, Group B Streptococcus can lead to urinary tract infections, amniotic fluid infections, and preterm labor within the mother as well as pneumonia, septicemia, or even meningitis within the child.
- A portion of the scientific community has also theorized that the inflammatory patterns and occurrence of preeclampsia may be influenced by GBS presence. Previous studies on the relationship between GBS colonization and preeclampsia prevalence have not drawn a conclusive result.² The incidence of preeclampsia is highest amongst African American females, and Group B Strep is also found in this same demographic at much higher rates.
- The purpose of this study was to explore whether a relationship existed between GBS presence and the incidence of preeclampsia. This study specifically focused on African American women as this demographic has a higher prevalence of GBS colonization and preeclampsia, which would allow for a more meaningful statistical analysis between these two variables. It was hypothesized that a statistically significant relationship would exist between Group B Strep presence and preeclampsia incidence.

Study Design

- This was a retrospective cross-sectional study consisting of 8,019 Black women who were enrolled and gave birth between January 2010 and December 2017 at SUNY Downstate University Hospital. The data results represented here are from 2010-2017, as data from 2018-2023 is still being analyzed. Certain patients involved in the study sample were excluded based on confounding criteria such as those with chronic hypertension, gestational diabetes, and type II diabetes.
- There were two different definitions used by SUNY Downstate University Hospital over the course of the study period, as the American College of Obstetricians and Gynecologists altered their definition in 2013. For the period of 2010 to 2012, preeclampsia was described as hypertension after 20 weeks of gestation as well as proteinuria. In terms of the period from 2013 to 2023, an altered definition of preeclampsia was used, where proteinuria was not necessary for a preeclampsia diagnosis in the presence of symptoms such as increased liver enzymes, hematological complications, renal dysfunction, and central nervous system symptoms.
- Covariates were analyzed to determine their potential for acting as confounders within the study. In terms of statistical analyses, a χ^2 test was used to determine confounding status, and a logistic regression was used to gauge the extent of a possible association between GBS status and preeclampsia development. Odds ratios were used to report results, and 95% confidence intervals were used.

Model of Statistical Analyses	Odds Ratio (95% CI)
Crude Model	
GBS+	0.46 (0.31-0.67)
GBS-	Referent
Adjusted Model	
GBS+	0.47 (0.32-0.70)
GBS-	Referent
Covariates in the Adjusted Model	
BMI, kg/m ²	
Underweight and Normal (<25.0)	Referent
Overweight (25.0-30.0)	0.85 (0.61-1.19)
Obese (>30.0)	1.31 (1.05-1.63)
Age group, year	
<20	Referent
20-29	0.91 (0.65-1.29)
30-40	0.76 (0.53-1.09)
>40	0.82 (0.47-1.44)
HSV	
Positive	0.22 (0.07-0.68)
Negative	Referent

Table 1. Crude and adjusted odds ratios of GBS status and Preeclampsia

Results

- The study population was 8,019 Black women, of which 12% were positive Group B Streptococcus. There were no significant differences in terms of smoking status and maternal age between women who did have GBS colonization and those who did not. GBS positive women were less likely to have preterm birth, be nulliparous, and be obese. However, they were more likely to be positive for HSV and HIV.
- The results revealed that GBS positive women were 54% less likely to be diagnosed with preeclampsia (odds Ratio, 0.46; 95% *CI*, 0.31–0.67). No covariate was determined to be confounding using the 10% change-in-estimate criterion. The backward selection method using a *P* < 0.250 for positive confounding status yielded BMI, maternal age, and HSV status as confounders. Taking these into consideration, women with GBS colonization were 53% less likely to be diagnosed with preeclampsia (odds ratio, 0.47; 95% *CI*, 0.32–0.70).

Discussion

- This cross-sectional study concluded that Black women with a positive test for GBS colonization were 53% less likely to have preeclampsia compared to those who did not have GBS colonization. One mechanism by which this may be plausible is through the interaction of GBS induced inflammatory response and the sterile inflammation involved in preeclampsia, with one effectively negating the other's effects.¹
- Sterile inflammation in preeclampsia has been linked to elevated levels of damage-associated molecular patterns, increased placental endoplasmic reticulum stress, and dysfunctional autophagy. GBS itself has also been linked with reduced autophagy in vaginal epithelial cells which leads to increased infection.¹
- In order to gain a deeper insight into the link between GBS colonization and preeclampsia as well as the possible effects of factors such as COVID, data on patients that gave birth from 2018-2023 is currently being collected and analyzed.

References

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