

Racial Differences in Maternal Behaviors and Potential Factors Associated with Preterm Delivery in Mississippi

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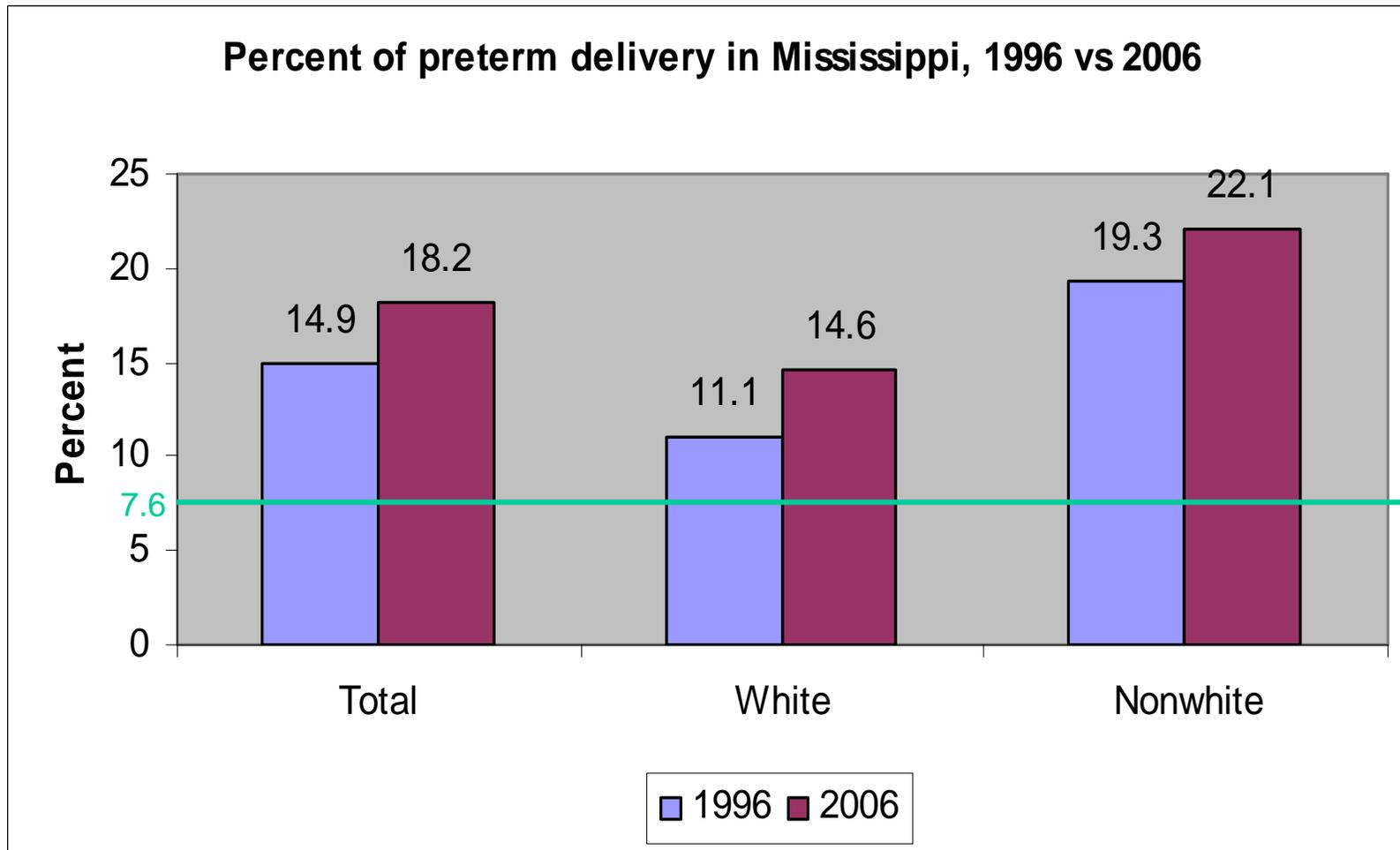
Background

- During 1997-2006, the average infant mortality rate (IMR) for Mississippi was 10.3 deaths /1000 live births.
- In 2005, the IMR = 11.4 deaths /1000 live births. It was the highest in the nation.
- During 1997-2006, low-birth-weight-, and very-low-birth-weight babies (<1500 g) accounted for 69% of all infant deaths in Mississippi.

Background

- Low birth weight and very low birth weight are proxy for preterm birth.
- In 2006, 58.6% of infant deaths were among babies with a gestational age of less than 37 weeks in Mississippi (compared to 36.5% in the nation).
- In 2006 , the infant mortality rate for babies born prematurely (< 37 weeks gestation) was about 9.4 times higher than those born full term in Mississippi.

Background



Study Questions

- Does the prevalence of select modifiable preconceptional and prenatal risk behaviors and stressful life events around the time of pregnancy differ between Non-Hispanic Blacks and Non-Hispanic Whites in Mississippi?
- Is there an association between modifiable preconceptional and prenatal risk behaviors, stressful life events around the time of pregnancy, and the risk of preterm birth among women in Mississippi?

Data

- **Data Source**
 - 2004 Mississippi Linked PRAMS- Birth Certificate Data
- **Study Population**
 - 1386 PRAMS Participants
 - 661 Non-Hispanic Whites
 - 690 Non-Hispanic Blacks
 - 35 Other
 - Racial comparisons limited to Non-Hispanic Whites and Non-Hispanic Blacks in analysis
- **Overall response rate – 70%**

Study Variables

- Socio-demographic
 - Race/Ethnicity*
 - Maternal Age*
 - Maternal Educational Level*
 - Marital Status*
 - Annual Household Income
- Stress-Related Events
 - Emotional Events
 - Financial Events
 - Partner-Associated Events
 - Traumatic Events
- Preconceptional & Prenatal
 - Pregnancy Intention
 - Multivitamin Use
 - Cigarette Use
 - Alcohol Use
 - Binge Alcohol Use
 - Prenatal Care Initiation
- Birth Outcome
 - Preterm Birth Status*

* Birth Certificate Data

Statistical Methods

- Basic univariate and bivariate statistical procedures used in the examination of the distribution of specified variables within the study population
 - Chi-square analysis provided the basis for the identification of statistically significant ($p < .05$) variation in the distribution of select variables by race/ethnicity
- Logistic regression methods utilized in the estimation of crude and adjusted associations between select variables and the risk of preterm birth
 - All multivariable logistic regression models included adjustment variables for race/ethnicity, maternal age, marital status, and annual household income
- All analyses completed utilizing STATA 9.0 statistical software, incorporating appropriate weighting variables to account for the complex PRAMS sampling design

Results

Table 1: Socio-demographic Characteristics by Race/Ethnicity, 2004 Mississippi PRAMS

	<u>Weighted Percentage Estimate</u>		
	Total Population Estimate (95% CI)	White Non-Hispanic Estimate (95% CI)	Black Non-Hispanic Estimate (95% CI)
Age §			
< 20 years	18.8 (16.3, 21.5)	14.8 (11.8, 18.4)	24.0 (19.9, 28.5)
20 – 24 years	31.8 (28.8, 35.0)	28.6 (24.7, 32.8)	36.4 (31.7, 41.4)
25 – 34 years	42.3 (39.1, 45.6)	49.1 (44.7, 53.6)	33.2 (28.7, 38.0)
≥ 35 years	7.1 (5.7, 8.9)	7.5 (5.5, 10.2)	6.4 (4.5, 9.1)
Educational Level §			
< 12 years	25.3 (22.4, 28.3)	22.5 (18.8, 26.6)	27.0 (22.8, 31.7)
12 years	29.1 (26.2, 32.1)	26.6 (22.9, 30.7)	32.6 (28.1, 37.4)
13 – 15 years	27.5 (24.7, 30.6)	26.0 (22.3, 30.0)	30.5 (26.1, 35.3)
16 years and over	18.1 (15.8, 20.7)	24.9 (21.4, 28.9)	10.0 (7.4, 13.3)
Marital Status §			
Not Married	47.4 (44.1, 50.7)	23.0 (19.3, 27.1)	76.9 (72.7, 80.6)
Household Income §			
< \$10,000	34.2 (31.0, 37.5)	19.8 (16.3, 23.8)	53.2 (47.9, 58.4)
\$10,000 – \$19,999	20.9 (18.2, 23.8)	18.6 (15.3, 22.4)	24.1 (19.9, 28.9)
\$20,000 – \$34,999	19.0 (16.5, 21.8)	23.0 (19.4, 27.0)	13.2 (10.1, 17.1)
\$35,000 – \$49,999	9.2 (7.5, 11.4)	13.0 (10.2, 16.3)	4.3 (2.7, 6.8)
≥ \$50,000	16.7 (14.4, 19.3)	25.7 (22.0, 29.7)	5.2 (3.4, 7.9)

Preconception Maternal Behaviors by Race, 2004 Mississippi PRAMS

Characteristic	All	White Non- Hispanic	Black Non- Hispanic	p-value ¹
<u>Preconception² Characteristics</u>				
Pregnancy Intention				
Unwanted/Mistimed	55.4	44.9	68.6	<.001
-Mistimed	37.7	32.7	44.1	
-Unwanted	17.7	12.3	24.6	
Not trying to get pregnant	64.5	54.2	78.2	<.001
Multivitamin Use				
No preconception use	59.2	57.7	62.8	
1-3 times per week	8.1	8.1	8.3	
4-6 times per week	4.7	4.6	4.0	
More than 6 times per week	28.0	29.6	24.9	

Characteristic	All	White Non- Hispanic	Black Non- Hispanic	p-value ¹
Preconception Cigarette Use				<.001
Any Cigarette Use	21.4	33.6	7.0	
<1 cigarette ³	1.0	1.8	0.1	
1-5 cigarettes	2.9	3.3	1.8	
6-10 cigarettes	6.4	9.5	2.7	
11-20 cigarettes	8.1	13.9	1.7	
21-40 cigarettes	1.5	2.6	0.2	
≥41 cigarettes	1.6	2.6	0.5	
Preconception Alcohol Use				
Any Alcohol Use	37.4	47.4	25.9	<.001
<1 drink ³	21.9	28.0	15.1	
1-3 drinks	9.6	11.5	7.6	
4-6 drinks	3.8	5.5	2.0	
7-13 drinks	1.2	1.4	0.4	
≥14 drinks	0.9	1.0	0.9	
≥ 1 Binging Episode ⁴	12.6	15.6	8.4	<.01

Characteristic	All	White Non- Hispanic	Black Non- Hispanic	p-value ¹
<u>Prenatal Characteristics</u>				
Prenatal Care				<.001
First trimester prenatal care	73.1	84.1	61.3	
Prenatal Cigarette Use²				<.001
Any Cigarette Use	13.9	21.4	5.2	
<1 cigarette ³	0.6	1.1	0.1	
1-5 cigarettes	5.8	9.0	1.9	
6-10 cigarettes	3.5	5.3	1.7	
11-20 cigarettes	2.7	4.5	0.8	
21-40 cigarettes	0.9	1.1	0.3	
≥41 cigarettes	0.5	0.5	0.5	
Prenatal Alcohol Use²				
Any Alcohol Use	4.8	4.7	4.8	
<1 drink ³	2.9	3.1	2.8	
1-3 drinks	1.2	1.3	1.2	
4-6 drinks	0.5	0.3	0.8	
7-13 drinks	0.1	0.0	0.0	
≥14 drinks	0.0	0.0	0.1	
≥ 1 Binging Episode ⁴	1.4	0.0	1.8	

Stress-Related Maternal Behaviors by Race, 2004 Mississippi PRAMS

Characteristic	All	White Non- Hispanic	Black Non- Hispanic	p-value ¹
<u>Stressful Event</u>				
Emotional Events				
Family illness	31.8	34.5	28.9	
Death of a close relative/friend	25.3	22.5	29.0	<.05
Financial Events				
Moved to a new address	35.7	40.7	30.1	<.01
Partner lost job	12.7	13.7	11.5	
Difficulty paying bills	28.7	29.5	28.0	
Respondent lost job	12.3	11.5	13.1	

Characteristic	All	White Non- Hispanic	Black Non- Hispanic	p-value ¹
Partner-Associated Events				
Separation/Divorce	12.6	12.9	12.3	
Increased domestic arguments	37.3	31.2	46.2	<.001
Partner did not want pregnancy	6.8	5.5	8.0	
Traumatic Events				
Homeless	1.8	1.5	2.0	
Physical fight	5.9	2.6	9.5	<.001
Respondent/partner incarceration	6.0	5.0	7.3	
Relative/friend drug or alcohol abuse	14.8	15.1	13.9	
Physical Abuse				<.001
Any physical abuse	10.2	6.8	14.7	
Preconceptional Only	5.1	4.3	6.0	
Prenatal Only	2.2	1.2	3.6	
Preconceptional & Prenatal	3	1.3	5.1	

Table 4: Percentage¹ of Women With a Live Birth Reporting the Occurrence of Stressful Life Events in the Year Prior to Delivery by Race/Ethnicity, 2004 Mississippi PRAMS

Percentage Experiencing ≥ 1 Stress-Related Event in Specified Category

	Total Population Estimate (95% CI)	White Non-Hispanic Estimate (95% CI)	Black Non-Hispanic Estimate (95% CI)
Any Stress-Related Event	77.2 (74.3, 79.8)	75.9 (71.9, 79.4)	79.3 (75.0, 83.1)
Emotional	40.3 (37.1, 43.6)	40.5 (36.2, 45.0)	40.3 (35.5, 45.4)
Financial	54.5 (51.2, 57.7)	57.1 (52.6, 61.4)	52.1 (47.0, 57.1)
Partner-Associated [§]	41.5 (38.3, 44.8)	36.0 (31.7, 40.4)	48.9 (43.9, 53.9)
Traumatic	21.1 (18.5, 23.9)	18.7 (15.4, 22.5)	23.3 (19.3, 27.8)

Racial Disparities

- Based on the demographic characteristics examined, a higher percentage of Non-Hispanic Black women were characterized by younger maternal ages, single marital status, lower educational levels, and lower annual household incomes in comparison to Non-Hispanic Whites.
- Documented racial/ethnic differences in modifiable preconceptional and prenatal risk behaviors and stressful life events around the time of pregnancy included:
 - Non-Hispanic Black women were more likely than Non-Hispanic White women to report preconceptional characteristics such as a mistimed or unwanted pregnancy, but were less likely to report engaging in preconceptional risk behaviors such as smoking and alcohol use.
 - Non-Hispanic Black women were more likely than Non-Hispanic White women to report prenatal characteristics such as late or no prenatal care, but were less likely to report engaging in prenatal risk behaviors such as smoking.
 - Non-Hispanic Black women were more likely than Non-Hispanic White women to report experiences of partner-associated stress around the time of pregnancy.

Adjusted Odds Ratios for Preterm Birth, 2004 Mississippi PRAMS

Maternal Behaviors	Preterm Births AOR (95%CI)¹
<u>Preconception² Characteristics</u>	
Pregnancy Intention	
Wanted	Referent
Unwanted/Mistimed	1.3 (0.9,1.9)
-Mistimed	1.4 (1.0,2.2)
-Unwanted	1.1 (0.6,1.7)
Multivitamin Use	
< 4 times per week	Referent
≥ 4 times per week	0.9 (0.6,1.3)

Maternal Behaviors	Preterm Births AOR (95% CI)¹
Preconception Cigarette Use	
No cigarette use	Referent
Any cigarette use	1.2 (0.8,1.8)
Preconception Alcohol Use	
No Binging Episode ³	Referent
≥ 1 Binging Episode	1.0 (0.6,1.6)

Maternal Behaviors	Preterm Births AOR (95%CI) ¹
<u>Prenatal Characteristics</u>	
Prenatal Care	
No First Trimester Prenatal Care	Referent
First Trimester Prenatal Care	0.8 (0.6, 1.3)
Prenatal Cigarette Use⁴	
No cigarette use	Referent
Any cigarette use	1.0 (0.7,1.6)
Prenatal Alcohol Use⁴	
No Binging Episode ³	Referent
≥ 1 Binging Episode	0.7 (0.2,3.1)
<u>Stress Related Events</u>	
No events reported	Referent
Any stress related event	1.0 (0.6,1.5)

Conclusion

- Multiple racial/ethnic differences in the estimated prevalence of modifiable preconceptional and prenatal risk behaviors and stressful life events around the time of pregnancy were documented in analysis.
- Although a higher adjusted odds of preterm birth was observed with factors such as having an unwanted/mistimed pregnancy; preconceptional and prenatal smoking, such findings were not statistically significant.

Limitations

- A limitation of the study is that PRAMS data are subject to recall bias because the data are self-reported and collected retrospectively.
- Additionally, women are likely to under-report risky behaviors such as alcohol consumption, binge drinking, and smoking during pregnancy.
- Exclusion of “other” race.
- Logistic regression was only adjusted for socio-demographic variables.
- Stratified analysis by race may provide more interesting results.

Public Health Implications

- Knowing factors associated with preterm delivery may elucidate directions for further investigation especially among Non-Hispanic African-American women.
- Be able to identify which subpopulation are at higher risk for preterm delivery in Mississippi.
- Mississippi just received \$1 million grant to curb high infant mortality in the delta region with focus on African-American women with a history of very-low-birth-weight delivery.

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