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Comparing Maternal Indicators among Black Women to White and Hispanic Women in Colorado: An Analysis of Pregnancy Risk Assessment Monitoring System (PRAMS) Survey Data

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Introduction

The Colorado Pregnancy Risk Assessment Monitoring System (PRAMS) is an ongoing, population-based surveillance system conducted by the Colorado Department of Public Health and Environment (in collaboration with the Centers for Disease Control and Prevention) that was started in 1997. The system provides extensive perinatal data that is generalizable for all births in Colorado. It can be used to help explain the high rates of low birth weight for all births and births among major ethnic and racial groups. In addition to the identification of characteristics that can affect pregnancy outcomes, Colorado PRAMS data demonstrate that health disparities continue for perinatal outcomes for people of color compared to Whites.¹ While the annual PRAMS survey contains adequate information for Whites and Hispanics, the results do not allow in-depth analyses for Black² women, who represent a small segment of the population in the state, and who are at the highest risk for poor perinatal health behaviors and outcomes. Therefore, an African American PRAMS survey was developed in 2002 as part of Colorado's enhanced PRAMS activities. This one-time survey was designed to better assess perinatal health and maternal attitudes and behaviors of Black women residing in Colorado.

Methodology

The African American PRAMS survey was sent to all African American/Black women who had given birth in Colorado between July and December of 2002 (1,321 women). The survey was completed by mail, or over the phone if there was no response to the mail survey. The final results of the survey consisted of a weighted sample of 823 women (62% response rate). For comparison, results were taken from Colorado's statewide 2002 PRAMS survey of all women and limited to the same six-month time period. This sample had 792 completed responses for Whites and 290 completed responses for Hispanics. Black and *Other* racial categories were excluded: Black because of the use of the African American PRAMS (a more thorough data set on behaviors of Black mothers before, during, and after pregnancy) and *Other* because there was a low number of respondents in the statewide Colorado PRAMS survey. Thirty-seven variables were tested to determine if significant differences existed between the responses for Blacks

compared to Whites and Hispanics. Ninety-five percent confidence intervals (CIs) were calculated, and significance was determined by examining overlap of the CIs between Blacks versus Whites and Hispanics. All analyses were performed using *SAS 9.1* statistical software.

Results

Demographics

Table 1 shows demographic characteristics of survey respondents.

Table 1. Demographic characteristics of mothers who gave birth, by race/ethnicity, Colorado 2002

Demographic	Black		Hispanic		White	
	%	95% CI	%	95% CI	%	95% CI
Residence (a)						
Denver metro	74.0	(71.0-77.1)	68.8	(63.7-73.9)	56.6	(54.1-59.0)
Other metro	24.5	(21.5-27.4)	20.7	(16.3-25.1)	29.2	(27.0-31.3)
Rural	1.5	(0.7-2.3)	10.5	(8.0-13.0)	14.3	(13.1-15.4)
Married	45.8	(42.3-49.2)	61.8	(54.6-69.0)	81.7	(78.2-85.1)
Maternal age						
15-19 yrs	17.0	(14.5-19.6)	14.4	(9.7-19.1)	7.6	(5.2-10.0)
20-24 yrs	33.8	(30.6-37.1)	27.4	(20.7-34.1)	17.0	(13.8-20.2)
25-34 yrs	40.5	(37.1-43.9)	48.8	(41.1-56.5)	56.3	(51.9-60.6)
35+ yrs	8.6	(6.7-10.6)	9.4	(4.6-14.2)	19.1	(15.7-22.5)
Maternal education						
<12 yrs	17.1	(14.5-19.7)	50.2	(42.5-57.9)	8.1	(5.7-10.4)
12 yrs	42.4	(38.9-45.8)	33.5	(26.2-40.9)	26.6	(22.7-30.5)
>12 yrs	40.5	(37.1-43.9)	16.3	(10.9-21.7)	65.3	(61.1-69.5)
Poverty Guidelines						
Below 185% FPL	59.0	(55.6-62.4)	67.2	(60.1-74.3)	32.9	(28.8-37.0)
Above 185% FPL	31.7	(28.5-34.9)	17.5	(11.7-23.4)	62.5	(58.2-66.7)
Unknown	9.3	(7.3-11.4)	15.2	(10.0-20.5)	4.6	(2.7-6.5)

Confidence Interval

a. *Denver metro* includes Adams, Arapahoe, Boulder, Broomfield, Denver, Douglas, and Jefferson counties; *Other metro* includes El Paso, Larimer, Mesa, Pueblo, and Weld counties; *Rural* includes all other counties

Residence

In each racial/ethnic group, the majority resided in the Denver metro area. A total of 74.0 percent of Black women resided in Denver, compared to 68.8 percent of Hispanic women and 56.6 percent of White women. A total of 14.3 percent of White women lived in rural Colorado, compared to 10.5 percent of Hispanic women and only 1.5 percent of Black women. Significant differences were seen between Black women and White and Hispanic women in the rural category, as well as between Black and White women in Denver.

Marital status

Black women in this sample were less likely to be married (45.8%) than Hispanic women (61.8%) or White women (81.7%). The differences were significant between all three groups.

Maternal age

Mothers in the sample were grouped into four categories by age: 15-19, 20-24, 25-34, and 35 years and older. The majority of all women fell into the 25-34 age category (40.5% for Black women, 48.8% for Hispanic women, and 56.3% for White women). Overall, Black and Hispanic women tended to have more births in the 15-19 year old category (17.0% and 14.4%, respectively) than White women (7.6%), and also had fewer births in the 35-and-older category (8.6% for Black women and 9.4% for Hispanic women) than White women (19.1%). For each age category, significant differences existed between Black women and White women. In contrast, there was no significant difference between Black and Hispanic women for any age group.

Maternal education

Mothers giving birth were categorized according to educational level: those with less than 12 years of education (i.e., those who had not completed high school); those with 12 years of education (completed high school); and those with more than 12 years of education (includes some type of college, college graduate, or professional school). For Black women, 17.1 percent had less than 12 years of education, whereas 50.2 percent of Hispanic women and 8.1 percent of White women had less than 12 years of education. In this sample, 42.4 percent of Black women had 12 years of education, compared to 33.5 percent of Hispanic women and 26.6 percent of White women. In the highest level of education category, 40.5 percent of Black women had more than 12 years of education, compared to 16.3 percent of Hispanic women and 65.3 percent of White women. For less than 12 years of education, significant differences were observed between Black women and Hispanic and White women. For those with 12 years of education, significant differences were observed between Black women and White women, but not between Black and Hispanic women. For more than 12 years of education, significant differences were seen among all racial groups.

Poverty status

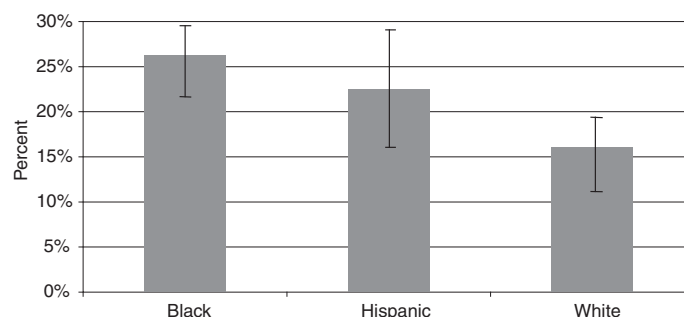
Poverty guidelines are issued every year to reflect the minimum amount of income that a family needs for basic necessities such as food, clothing, and shelter. In this sample, the federal poverty level (FPL), set at 185 percent, is observed, and cases were divided into below or above the 185 percent FPL or noted as a status of *unknown*. Nearly six in ten (59.0%) Black women were below 185 percent of the FPL compared to three in ten (32.9%) White women. Two-thirds (67.2%) of Hispanic women were below 185 percent of the FPL. A significant difference was observed between Black and White women, but not between Black and Hispanic women.

Maternal Behaviors and Characteristics

Timeliness of prenatal care

Seeking prenatal care at the appropriate time is important for a healthy pregnancy and baby. Early and adequate prenatal care can identify various health problems, such as mothers who are at risk of delivering prematurely. When asked if prenatal care was received as early as wanted, 26.2 percent of Black women stated that it was not, compared with 22.5 percent of Hispanic women and 16.0 percent of White women (Figure 1). The difference between Black and White women's experience was statistically significant.

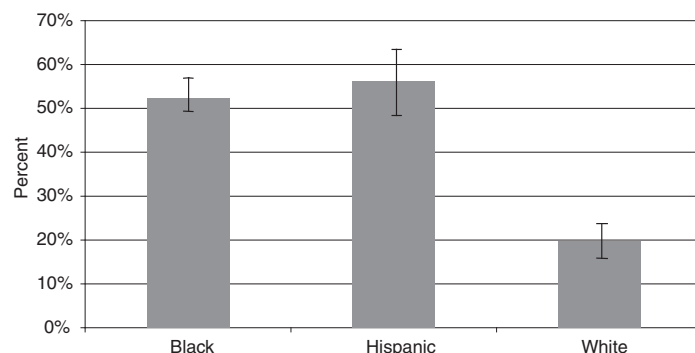
Figure 1. Women reporting that prenatal care was not received as early as wanted, by race/ethnicity, Colorado PRAMS, 2002



Prenatal care paid for by Medicaid

Figure 2 shows the proportion of women whose prenatal care was paid for by Medicaid. Just over half of Black (52.4%) and Hispanic (56.3%) women were covered by Medicaid, more than double the proportion found among White women (19.7%). A statistically significant difference was observed between Black and White women but not between Black and Hispanic women.

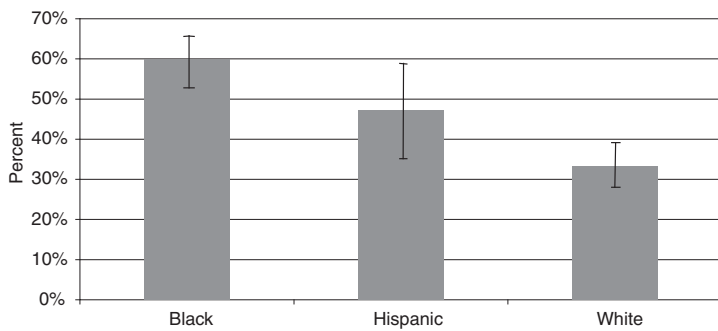
Figure 2. Prenatal care paid for by Medicaid by race/ethnicity, Colorado PRAMS, 2002



Births resulting from unintended pregnancy

Unintended pregnancy is defined as *those births that are unwanted (pregnancy not wanted at any time) or mistimed (pregnancy not wanted until some time in the future) at the time of conception*. Women who experience unintended pregnancies may be at risk for late or inadequate prenatal care, often smoke or drink because they may be unaware that they are pregnant, and have an increased chance of having a baby with low birth weight. In Figure 3, unintended pregnancy is shown for each racial category. Approximately 60.0 percent of Black women

Figure 3. Unintended pregnancy by race/ethnicity, Colorado PRAMS, 2002

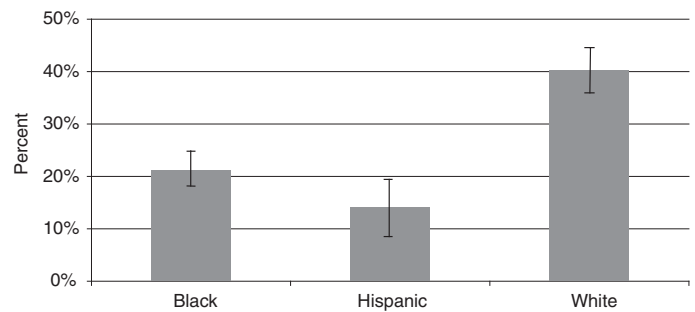


did not intend to conceive when they did compared to 47.1 percent of Hispanic women and 33.2 percent of White women. The difference between Black and White women is significant. Table 2 provides data by race/ethnicity on different health topics that health care workers discussed with their patients during prenatal care visits. Regarding the use of birth control after delivery, significantly more Black women reported such a discussion than Hispanic women (85.9% vs. 76.3%, respectively), but there was no significant difference between the experience of Black women and White women (85.9% vs. 83.3%, respectively).

Multivitamin use during pregnancy

Research suggests that multivitamin use before and during pregnancy can diminish diet-related deficiencies of certain micronutrients and can potentially prevent preterm birth. When asked about multivitamin use during pregnancy, nearly half as many Black (21.1%) as White (40.2%) women stated that they took a multivitamin everyday. Hispanic women were less likely (14.1%) than Black women to take a daily multivitamin, although the difference between the two groups was not significant. (Figure 4).

Figure 4. Mothers who took multivitamins everyday during pregnancy by race/ethnicity, Colorado PRAMS, 2002



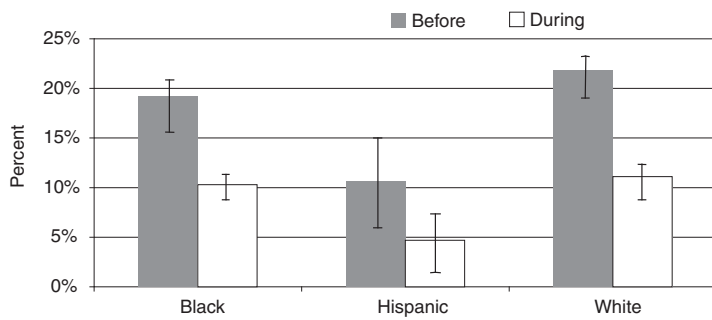
Smoking before and during pregnancy

Smoking during pregnancy has been proven to be detrimental to the health of the fetus, including increased risk of low birth weight. In this sample, smoking three months before pregnancy and the last three months of pregnancy were both examined (Figure 5). It was found that 19.2 percent of Black women smoked before pregnancy, compared to 10.6 percent of Hispanic women and 21.8 percent of White women. Approximately ten percent (10.3%) of Black women smoked during the last three months of pregnancy compared to 4.7 percent of Hispanic women and 11.1 percent of White women. The difference was significant between Black women and Hispanic

Table 2. Health topics that health care workers discussed with patients by race/ethnicity, Colorado PRAMS, 2002

Health care worker discussed:	Black		Hispanic		White	
	%	95% CI	%	95% CI	%	95% CI
Smoking	77.0	(74.1-80.0)	66.5	(59.1-73.9)	66.2	(62.0-70.5)
Alcohol	78.2	(75.3-81.1)	69.1	(61.8-76.3)	68.5	(64.3-72.7)
Breastfeeding	88.2	(85.9-90.4)	71.4	(64.2-78.7)	81.5	(77.9-85.0)
Abuse	51.9	(48.3-55.4)	48.9	(41.2-56.6)	33.4	(29.1-37.6)
Postpartum birth control use	85.9	(83.4-88.4)	76.3	(69.6-83.1)	83.3	(80.0-86.7)

Figure 5. Cigarette smoking before and during pregnancy by race/ethnicity, Colorado PRAMS, 2002



women for both periods of smoking. There was no significant difference at either time between Black women and White women. For all racial/ethnic categories, the percentage of women who currently smoke (after pregnancy) was greater than the percentage that smoked during the last three months of pregnancy (16.5%, 6.9%, and 14.0% for Black, Hispanic and White women, respectively), but not as great as the percentage of women who smoked the three months before pregnancy.

Black women were more likely to report that a health care worker talked to them about smoking during pregnancy (77.0%) than were Hispanic women (66.5%) or White women (66.2%) (Table 2). The difference was significant between Black and White women, but not between Black and Hispanic women.

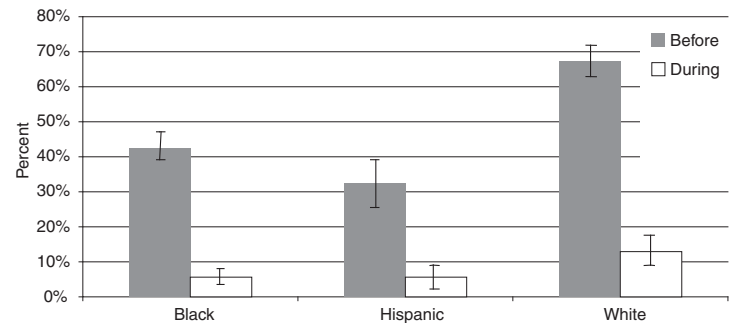
Drinking before and during pregnancy

Like smoking during pregnancy, drinking can have many adverse health effects on a fetus. Fetal alcohol syndrome (FAS), a disease characterized by physical and mental disabilities and social or behavioral problems, can result from alcohol use during pregnancy.

Black women were more likely (42.5%) than Hispanic women (32.3%) and significantly less likely than White women (67.4%) to drink three months before pregnancy (Figure 6). During the last three months of pregnancy, Black women were significantly less likely to drink than White women (5.6% vs. 12.9%, respectively) but just as likely to drink as Hispanic women (5.6%). The majority of women who drank during their pregnancy reported having one or fewer drinks per week.

Health care workers (Table 2) were more likely to talk about alcohol use during pregnancy to Black women (78.2%) than to White (68.5%) or Hispanic (69.1%) women. Although they were more likely to talk to Black women than to Hispanic women about alcohol, the difference was not significant.

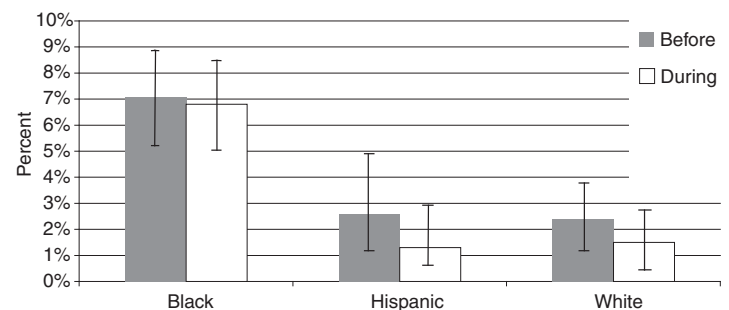
Figure 6. Drinking alcohol before and during pregnancy by race/ethnicity, Colorado PRAMS, 2002



Physical abuse before and during pregnancy

Physical abuse is defined as a husband or partner pushing, hitting, slapping, kicking, choking, or physically hurting their wife or partner before or during pregnancy. Among the PRAMS respondents, Black women were more likely (7.1%) than Hispanic women (2.6%) or White women (2.4%) to report abuse before pregnancy by their husband or partner and more likely (6.8%) to report abuse during pregnancy by their husband or partner than were Hispanic (1.3%) or White (1.5%) women (Figure 7).

Figure 7. Abuse (by husband or partner) before and during pregnancy by race/ethnicity, Colorado PRAMS, 2002



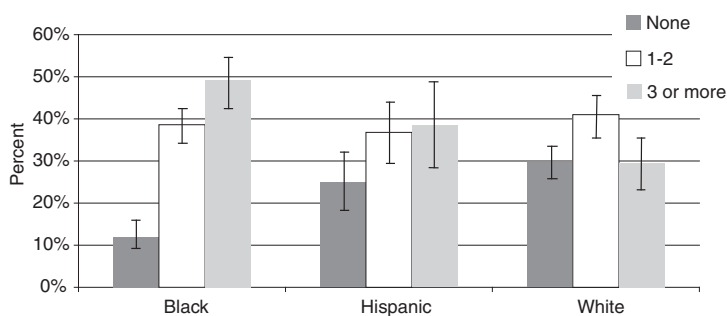
The differences between the experience of Black women and White or Hispanic women were statistically significant for both before pregnancy and during pregnancy. Health care workers were significantly more likely to discuss abuse with Black

women (51.9%) than with White women (33.4%), but little difference was found when Black women were compared to Hispanic women (48.9%).

Stress during pregnancy

Stress is known to cause many health problems in general, and stress during pregnancy can be detrimental to not only the mother but the fetus as well. Figure 8 shows the number of stressors that respondents reported during their pregnancies. The types of stress included moving, unpaid bills, arguments with partner or husband, hospitalization of a family member, job loss, death of a family member or friend, family problems with alcohol or drugs, separation or divorce from spouse, homelessness, jail, physical fighting, and partner not wanting the pregnancy.

Figure 8. Total number of stressors during pregnancy by race/ethnicity, Colorado PRAMS, 2002



As shown in Figure 8, Black women had a larger number of stressors during pregnancy than Hispanic or White women.³ Nearly half (49.3%) of Black women had 3 or more stressors while they were pregnant, compared to 38.4% of Hispanic women and 29.5% of White women. The difference in the proportion of Black women and White women with three or more stressors was significant.

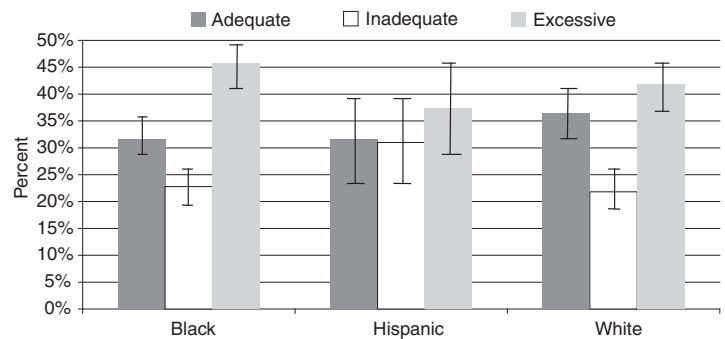
Maternal weight gain during pregnancy

Inadequate weight gain during pregnancy has been identified as a common problem among women in Colorado, with about one in four women failing to gain adequately during pregnancy. Although gaining too much weight during pregnancy can lead to serious health problems such as gestational diabetes, gaining too little weight can be problematic as well and is associated with an increased incidence of low birth weight. The Institute of Medicine uses body mass index measures in combination with pregnancy

weight gain to yield categories of inadequate, adequate, and excessive weight gain.

As shown in Figure 9, about one in four women gained an inadequate amount of weight during pregnancy, (Black, 22.8%; Hispanic, 31.0%; White, 21.8%). About one in three women in each racial category gained an adequate amount of weight (Black, 31.6%; Hispanic, 31.6%; White, 36.4%). The category with the most women for all racial/ethnic groups was among those who gained an excessive amount of weight (Black, 45.6%; Hispanic, 37.4%; White 41.7%). No differences were significant among racial/ethnic groups in any of the weight gain categories.

Figure 9. Weight gain during pregnancy by race/ethnicity, Colorado PRAMS, 2002

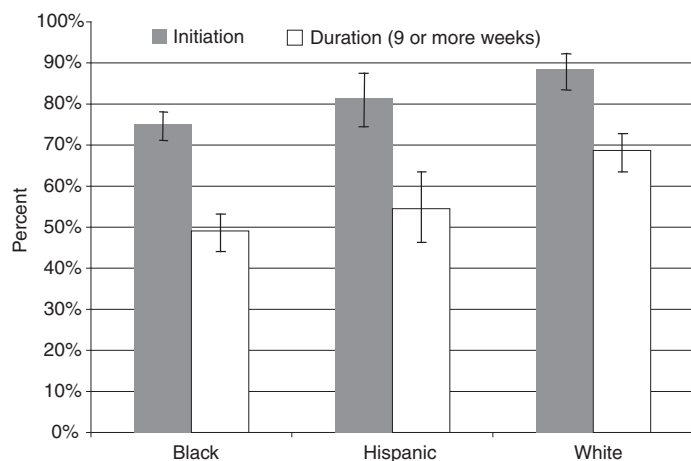


Breastfeeding initiation and duration

Breastfeeding is the most nutritious form of feeding for infants and promotes bonding between the mother and infant. Black women were less likely than both Hispanic women and White women to have ever breastfed their infant. Figure 10 shows that 75.2 percent of Black women breastfed their infant compared to 81.4 percent of Hispanic women and 88.5 percent of White women, with a statistically significant difference between Black and White women.

Health care workers were more likely to discuss breastfeeding with Black women (88.2%) than either Hispanic women (71.4%) or White women (81.5%) (Table 2). Differences in health care worker discussions were all significant between Black and White women and between Black and Hispanic women.

Figure 10. Breastfeeding initiation and duration by race/ethnicity, Colorado PRAMS, 2002

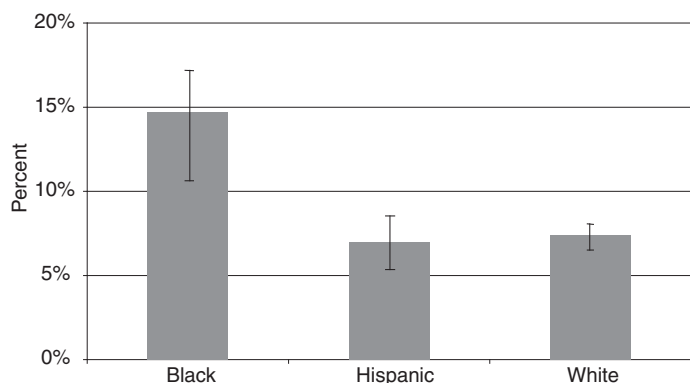


When respondents were asked how many weeks they breastfed their infant, 49.1 percent of Black women said nine or more weeks, compared with 54.5 percent of Hispanic women and 68.7 percent of White women. A statistically significant difference in duration at nine or more weeks was observed between Black and White women, but not between Black and Hispanic women.

Low birth weight

Infants born weighing 5 pounds, 8 ounces or less are at an increased risk for neurological and developmental impairment or disability as well as death in the first year of life. Infants born to Black mothers had a significantly higher rate (14.7%) of low birth weight compared to infants born to White (7.4%) or Hispanic mothers (7.0%) (Figure 11).

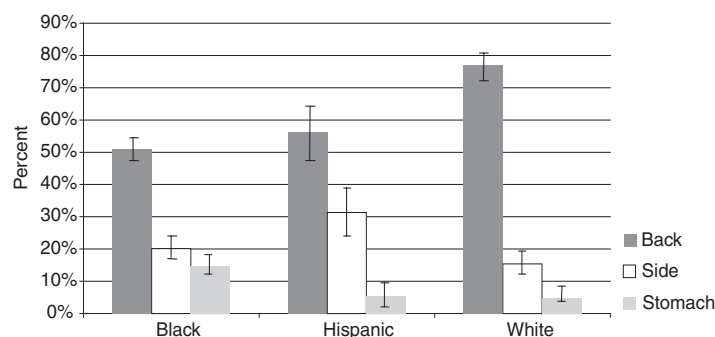
Figure 11. Low birth weight by race/ethnicity, Colorado PRAMS, 2002



Infant sleeping position

Research has shown that placing infants on their backs to sleep decreases the chance of SIDS (Sudden Infant Death Syndrome). Figure 12 shows the three sleeping positions that were assessed in the PRAMS survey. The majority of women in each racial/ethnic category put their infants to sleep on their backs. How-

Figure 12. Infant sleeping position by race/ethnicity, Colorado PRAMS, 2002



ever, Black women were least likely to put their infants on their backs (51.0%) compared to Hispanic women (56.1%) or White women (77.1%). Black women were also more likely to put their infants on their stomach (14.6%) than Hispanic (5.3%) or White women (4.8%). Mothers are increasingly placing their babies on their sides, especially older infants, and this has been proven to be not as safe as infant back sleeping. Twenty percent of Black mothers placed their infants on their side, compared to 31.3 percent of Hispanic women and 15.4 percent of White women. The difference between Black women and White women is significant for infant back sleeping, and significant differences were observed between Black women and both Hispanic and White women for infant stomach sleeping. Regarding side sleeping, there was no significant difference between Black and White women but a difference was observed between Black and Hispanic women.

Conclusion

Health disparities between Black women and White women are very apparent in this analysis of 2002 data. The rate of unintended pregnancy is double that for White women; the level of stress is measurably higher compared to White women; physical abuse affects a far greater proportion of Black women than either White or Hispanic women; smoking rates are high (although not different from the rates for White women); and Medicaid is the source of prenatal care payment for at least half of Black women, a level almost triple the proportion for White women. Black infants are twice as likely to be born low birth weight compared to either White or Hispanic infants; they are less likely to be breastfed; and they are much less likely to be put to sleep on their backs, the appropriate position to reduce the risk of SIDS.

Health care workers address many of the issues facing Black mothers: they are more likely to discuss smoking, alcohol use, breastfeeding, and abuse with Black women compared to White women, and more likely to discuss breastfeeding and birth control compared to Hispanic women. However, Black women are no more likely to smoke than White women and are less likely to use alcohol. Black rates of unintended pregnancy are much higher than among Hispanic women, and Black rates of breastfeeding are lower.

The African American/Black PRAMS survey in 2002, combined with the annual PRAMS survey of all women, provides a unique opportunity to review disparities in that year. The overall PRAMS project allows continuous monitoring of health behaviors so that appropriate interventions can be designed with the purpose of improving the health of all pregnant women and infants in Colorado, especially those that are most vulnerable.

Additional Information

For more information on PRAMS, visit:
PRAMS, Centers for Disease Control and Prevention,
<http://www.cdc.gov/PRAMS/index.htm>

PRAMS, Colorado Department of Public Health and
Environment, <http://www.cdphe.state.co.us/hs/prams/>

Appendix

What is statistical significance?

In statistics, the term “significant” means, “probably true; a result that is not likely to be due to chance.” Therefore, a result that is considered statistically significant means that the likelihood of it being due to chance only is relatively low. A level of 95 percent is typically used to determine if a value reflects a significant difference, although any percent can be used. This means that researchers are 95 percent sure that a result is statistically significant, meaning that there is a 5 percent chance that the result is due to chance. When examining statistical significance for two different groups, such as the case in the 2002 PRAMS data, when a statistically significant result is obtained, this can be interpreted as a 95 percent chance that the two groups are statistically different and that there is only a 5 percent chance that this difference is due to random chance.

(Footnotes)

¹ “White” is specifically defined as “non-Hispanic White”

² “Black” is specifically defined as “non-Hispanic Black”

³ The African American/Black PRAMS contained an additional stressor (“did husband threaten you during pregnancy”) that was removed to adequately compare results to the statewide PRAMS.