MATERNAL SUPPORT IN THE DELIVERY ROOM AND BIRTHWEIGHT AMONG AFRICAN-AMERICAN WOMEN

Antoine Alexandra Lespinasse, MD; Richard J. David, MD; James W. Collins, MD, MPH; Arden S. Handler, DrPH; and Stephen N. Wall, MD

Mattapan, Massachusetts and Chicago, Illinois

Objectives: We performed a hospital-based case control study of African-American mothers to explore the relationship between maternal support by a significant other in the delivery room and very low birthweight (VLBW).

Methods: We administered a structured questionnaire to mothers of VLBW (less than 1,500 g; N=104) and normal birthweight (greater or equal to 2,500 g; N=208) infants.

Results: The odds ratio for VLBW comparing women without social support in the delivery room to those with a companion was 3.5 (2.1–5.8). Several traditional risk factors were not associated with VLBW, but older maternal age and perceived racial discrimination were.

Conclusions: Maternal support in the delivery room or factors closely associated with it significantly decreases the odds of delivering a VLBW infant for African-American women. (*J Natl Med Assoc.* 2004;96:187–195.)

Key words: very low birthweight (VLBW) ♦ African-American women ♦ social support

INTRODUCTION

Preterm delivery remains a major cause of morbidity and mortality in the United States, with African Americans bearing a disproportionate share of this adverse outcome. In 1997, urban mothers of African-American infants, compared with mothers of non-Hispanic white infants were 145% more likely to experience the death of a baby before the infant's first birthday[1]. Most of these deaths occur among infants of very low birthweight (VLBW)[2], that is, at weights below 1,500 g. Almost all such births are preterm, and they occur almost three times more frequently among African-American women than their white counterparts for reasons that are still incompletely understood.[3,4]

Known risk factors for VLBW include unwanted conceptions, poor nutrition, and insufficient prenatal care.[3,4] Other implicated risk factors are maternal age less than 20 years, single marital status, low income, and not having graduated from high school[5,6]. Research over several years comparing racial groups while attempting to control for socioeconomic status resulted in the paradoxical finding of a wider black–white gap among women in birth outcomes with fewer risk factors.[6-8] For

 From Mattapan Community Health Center (Lespinasse), Mattapan, MA; the Division of Neonatology, John H. Stroger Hospital of Cook County (Lespinasse, David), and the Department of Pediatrics, College of Medicine, University of Illinois at Chicago (David), Division of Neonatology, Children's Memorial Hospital (Collins), Department of Pediatrics, Northwestern University School of Medicine (Collins), Community Health Sciences, University of Illinois School of Public Health (Handler), and the Pediatrics–Section of Neonatology, University of Chicago, MC 6060 (Wall)Chicago, IL. Send correspondence and reprint requests for *J Natl Med Assoc.* 2004;96:187–195 to: Antoine Alexandra Lespinasse, MD, Mattapan Community Health Center, 1425 Blue Hill Avenue, Mattapan, MA 02126; phone: (617) 898 1900; fax: (617) 296 5408; e-mail: LespinasseD@aol.com

example, Kleinman and Kessel[6] reported that the black–white relative risk for VLBW was 3.4 among low-risk women, compared to 1.7 among high-risk mothers.

The failure of the socioeconomic model to eliminate observed racial disparities has led some researchers to suggest a possible genetic mechanism for these differences.[9,10] However, theoretical[11,12] and empirical studies[13,14] of the genetic theory of racial disparities in health and birthweight have largely discredited that approach.

Comparing women of different races while controlling for socioeconomic status is not logically possible if race is acknowledged to be a social construct rather than a genetic category.[15] Race designation is more appropriately seen as an integral part of the person's social status. Thus, researchers have begun to move beyond the traditional socioeconomic and genetic models to more contextual analyses in order to explain the black–white gap in preterm birth.[16,17] Preliminary studies support the view that the greater risk of preterm delivery among African-American women is embedded in their social context.[18-20]

In response to this understanding we have undertaken an investigation of several social factors in African-American women and their role in the delivery of VLBW infants. The primary focus of the larger project of which the present report is a part was the impact of perceived racial discrimination on black VLBW risk. Results have been reported elsewhere[21]. In the present study, we explored various indicators of social support to determine whether such support offers a protective effect to African-American women experiencing psychosocial stress. We also evaluated possible direct effects of social support on the pregnancy outcome under study, since prior work has indicated such an effect in other populations[22-25].

METHODS

We carried out a case-control study from 1996 to 1999 at Cook County Hospital and the University of Chicago Hospital. The Institutional Review Boards at both sites approved the study. Cases were 104 African-American mothers of VLBW infants (less than 1,500 g) who were recruited from the admission logbooks of the newborn intensive-care units of each hospital. Controls were 104 African-American mothers of normal birthweight (NBW) (greater or equal to 2,500 g); healthy infants ("healthy controls"); and 104 African-American mothers of NBW, sick infants who required assisted ventilation or other major life support ("sick controls"). The healthy controls were recruited from the labor and delivery logbooks and were chosen if admitted near the same date as the cases; sick controls were identified from NICU logbooks. Each case-control set came from the same hospital.

Maternal race was self-defined. We excluded mothers of twins, mothers of babies with congenital malformations, and mothers of babies who died shortly after birth. The study involved extensive in person interviews conducted in the hospital within three days after delivery. Informed consent was obtained from all mothers prior to the interviews, which were conducted by trained African-American women interviewers in privacy. The interview was based on a questionnaire that included questions in seven different categories: pregnancy; prenatal care and delivery; social and home environment; employment; discrimination and unfair treatment; pregnancy and stress; and racism, experience, and response. Interviewers also collected personal data, such as maternal age, marital status, education, household income, prenatal care, parity, and tobacco and alcohol use, during the current pregnancy. Mothers were given a stipend of $10.00 for their participation whether or not they completed the interview.

A modified "Life Events Inventory"[26] was used to assess stress in pregnancy. Life events, such as serious health problems in the mother, death of a significant other, homelessness and job loss, among other things, were reviewed. The original questionnaire explored 24 possible stressful life events, out of which 19 items had sufficient response completeness in our data for analysis. We also asked about perceived racial discrimination at school, in getting a job, at work, in getting medical care, or in getting service at a restaurant or a store, using a format similar to that described by Krieger[27]. Prenatal care was deemed poor if it started in the second or third trimester. Poor and no prenatal care were combined into one category.

Support in the delivery room was assessed by a series of questions during the interview and was defined as the presence of one or more person—chosen by the mother—present in the delivery room at her request. The mother's relationship with her partner and relatives and aspects of emotional and practical support were explored through a series of

Table 1. Characteristics of the African-American Mothers of Very-Low-Birthweight and Normal-Birthweight Infants

Variable	Percent of 104 VLBW Cases	Percent of 208 NBW Controls	OR	95% CI
Maternal Age				
Less than 19 (vs all older)	27	31	0.8	0.5–1.4
30 or older (vs all younger)	28	17	1.9*	1.0–3.3
Maternal Education <12 years	31	39	0.7	0.4–1.2
Not married or living together	59	64	0.9	0.6–1.5
Late or no prenatal care	31	39	0.7	0.4–1.7
Parity				
First pregnancy vs all others	48	49	0.9	0.6–1.5
Fourth or higher pregnancy vs less	14	15	0.9	0.4–1.7
Cigarette smoking	30	21	1.6	0.9–2.8
Alcohol use	18	15	1.2	0.7–2.3
Income <$11,000	42	49	0.8	0.4–1.4
Did not want the pregnancy	35	43	0.7	0.4-1.1
Undesirable timing of pregnancy	63	65	0.9	0.5-1.6
Stressful life events				
One or more vs none	83	74	1.7	0.9–3.2
Exposure to racial discrimination				
1 or more domain vs none	56	40	1.9*	1.2–3.0
3 or more domains vs none	19	8	2.7*	1.3–5.4
No companion in delivery room	56	27	3.5*	2.1–5.8

*P<0.05

11 questions mostly taken from the Maternal Social Support Index of Pascoe[28,29]. Three additional questions explored religious beliefs and practices.

We used two control groups of NBW babies in order to evaluate the possibility of recall bias associated with having a newborn in intensive care. When the sick controls (normal BW infants in the NICU) were compared against the healthy baby controls, we found no difference for the key variables of interest. Thus, we combined all NBW infants for the subsequent analyses reported here.

Statistical analysis first examined the relationship of a number of previously reported risk factors to VLBW. Then the responses to each of the social support (including delivery room support) and religion questions were evaluated both for their direct association with VLBW and, in the case of delivery room support, for its possible ability to modify the effect of other risk factors, such as stressful life events. Confounding was evaluated by stratification. Data analysis was accomplished using SAS for Windows, Version 6.12[30] and dEPID, version 2.11 (Centers for Disease Control).

RESULTS

Three-hundred-twelve African-American women were interviewed. These included 104 cases, mothers of VLBW infants, and 208 controls, whose infants were of NBW. Approximately 5% of women approached as potential controls declined to participate. The refusal rate among potential cases was less than 2%.

Table 1 presents the characteristics of the African-American mothers of VLBW and NBW infants. Several risk factors that have been associated with increased risk of preterm birth in previous studies were found to have odds ratios (OR) for VLBW close to or less than 1.0. These included maternal age of 19 or younger, education of 11 years or less, low income, being unmarried, receiv-

ing late or no prenatal care, being of first or of very high parity, and having an undesired pregnancy. Maternal age of 30 or above was associated with a significant increased risk. Alcohol use, cigarette smoking, and experiencing one or more stressful life events during pregnancy were associated with moderate but not statistically significant increased odds of birthweight below 1,500 g.

In contrast, exposure to perceived racial discrimination in one or more areas of experience and being alone in the delivery room—that is, not having a family member or other support person present at the time of birth—were associated with a two- and three-and-a-half-fold increase in the odds of VLBW, respectively. Among women with a companion in the delivery room, the baby's father was the only support person present for 35% of the mothers of NBW infants and 21% of the mothers of VLBW infants. The maternal grandmother was the sole support person present for 17% of the mothers of NBW infants, compared to 13% of the mothers of VLBW infants. Both father and grandmother were present for 4% of the mothers with NBW and 2% for the mothers of VLBW infants.

Social Support and Religion

To further explore the role of social and cultural context in VLBW, we analyzed responses to 11 questions about social support from friends and family and three questions concerning religion. Results are reported in Table 2. No OR, whether for tangible or emotional support, was significantly different from unity, and only two exceeded 1.5. Thus, none is likely to be a significant predictor of VLBW. Of all the questions considered, mothers "not satisfied with the talks with an adult support person" yielded the highest OR at 3.2. The point estimate would suggest a strong effect, but the prevalence was very low—5% and 2% for mothers of VLBW and NBW, respectively. Therefore, the confidence interval (CI) was quite wide. The second highest OR (1.7) was for "no relatives seen daily" and was somewhat more common. As shown in Table 2, the majority of the mothers of VLBW and NBW infants did belong to a religious denomination. However, half of the mothers in each group rarely attended religious services. All ORs for religious variables were less than 1, and none reached statistical significance.

Analysis of Support in the Delivery Room

Since the mothers of VLBW and NBW infants appeared similar in regard to social support with the exception of their support in the delivery room, we considered the characteristics of the mothers who were alone in the delivery room versus those accompanied by a companion, looking for possible confounding factors. One possibility was the existence of administrative or medical circumstances separating the mother from her family, such as emergency transport to another hospital. Omitting the transferred women did not change the result; however, (OR for VLBW among nontransported 'alone' women was 3.5 [2.0–6.4]). Also, we did observe that women in one of our two hospitals were, on average, 60% more likely to be without a support person in the delivery room than women delivering at the other facility, possibly reflecting differences in hospital policies or in the populations served. However, when we looked at the association between VLBW and 'alone' at the two hospitals, it was nearly identical (3.0 and 3.5, respectively).

Another potential source of confounding could be variables known to be associated with VLBW, which may have been unevenly distributed between women with and without delivery room support. Indeed, Table 3 shows that the mothers without a support person in the delivery room were significantly more likely to have had late to no prenatal care, to be 30 years or more of age, of high parity, to have an unwanted pregnancy, or to have experienced one or more stressful life events during pregnancy.

Confounding by the factors noted above was ruled out, however. When we looked at the VLBW odds for mothers with and without delivery room support at each level of the potential confounding factors, we found that most values were similar to the crude OR of 3.5 found in the unstratified sample.

As a final aspect of the analysis of delivery room support, we looked for a moderating impact of social support on the VLBW risk associated with other factors. These results appear in Table 4. Theoretically, one benefit of social support should be to reduce the impact of stress by buffering its adverse psychophysiologic effects. If this were the case, we might expect the increased risk of VLBW associated with stressful life events, for example, to be lessened for individuals with a strong social support system in place. Our data did not support this theory. Thus, when VLBW ORs for the two strata of women ('alone' and 'not alone') were

Table 2. Relation Among Social Environment, Religion, and Birthweight

Variable	Percent of 104 VLBW Cases	Percent of 208 NBW Controls	OR	95% CI
Lived in your neighborhood less than two years	35	30	1.3	0.8 –2.0
Mother alone in the home versus with one or more adults	19	15	1.4	0.7- 2.6
Where do most family live out of town versus in town	72	63	1.5	0.9-2.5
Relatives other than children seen daily (0 or 1 versus >1)	16	10	1.7	0.8-3.4
People to take care of children if needed for few hours (0 or 1 versus >1)	13	20	0.7	0.4–1.4
Get a car ride in few hours (no versus yes)	11	12	0.8	0.3–2.1
Number of people to count on in times of need (0 or 1 versus >1)	12	11	1.1	0.6–2.4
Satisfaction with how partner let her know how he feels (not satisfied vs satisfied)	21	20	1.1	0.6–2.0
Other adults with whom mother has regular talks (no versus yes)	10	16	0.6	0.3–1.2
Satisfaction with these talks (not satisfied versus satisfied)	5	2	3.2	0.8–13.8
Religious denomination (none versus Baptist and others)	18	26	0.6	0.4–1.1
How religious are you? (not very versus very)	31	42	0.6	0.4-1.0
How often attend religious services (rarely versus often)	50	50	0.9	0.6-1.6

compared to the unstratified group OR for two such stressors—stressful life events and racial discrimination—the VLBW risk for the women with social support was higher than for the women without support. However, because of the small sample size, most OR values fall within the CIs of the other strata.

DISCUSSION

Our study found that among African-American women giving birth at two large hospitals, being unaccompanied by a family member or other support person at the time of delivery was associated with a more than three-fold increase in the odds of having a baby of VLBW. Women who ended up without this aspect of support at the time of delivery tended to be older and to have received less prenatal care than women accompanied by a companion in the delivery room. These women were also more likely to have had four or more pregnancies and reported a higher rate of stressful life events. Over half of the unsupported mothers characterized the pregnancy as unwanted. Absent support at delivery may thus be a useful marker for a cluster of social stressors which exert an adverse effect on pregnancy outcome. Differential exposure of African-American women to psychosocial stress measured in novel ways may prove useful in understanding the disproportionately poor outcomes of black women giving birth in the United States.

African-American infant mortality is now more than twice as high as U.S. white infant mortality, the relative risk having grown from 1.6 to 2.5 over the past half century[31,32]. The rate of VLBW births among African Americans continues to be 2.8 times higher than whites,[32] a fact of key importance, since two-thirds of the racial disparity in first-year death rates can be attributed to the VLBW gap[2]. The major study by Kempe et al.[33] showed that African-American women experience 2.5 to 3.4 times the prevalence of the main medical causes of VLBW so that no single clinical intervention can be expected to close the racial gap. They concluded that "comprehensive preventive strategies" are called for. In addition, a study by Berg et al.[34] found that "the traditional risk factors were not associated with VLBW delivery in black women, and Wise[35] stated

that "the bulk of disparate infant mortality occurs in the mainstream of women who are not teenagers, who receive some prenatal care, and who do not use illicit drugs." This has led to a growing body of research exploring the role of psychosocial factors in the etiology of VLBW and preterm birth among African Americans[36-45]. More recently, a biological link between prenatal psychosocial factors and their effects on maternal–placental–fetal neuroendocrine parameters, and, consequently, birth outcomes have been demonstrated.[46]

In a classic early study of social support, Norbeck and Anderson[47] demonstrated a significant relationship between partner support and length of gestation in a group of low-income African-American women. A recent review[22] noted positive associations between social support during pregnancy and birth outcomes in six of eight relevant studies involving a range of populations and social support instruments. Different dimensions of social support have been measured, such as the categories of social embeddedness, perceived social support, and enacted social support employed by Barrera[48]. However, none of these prior investigations used a case-control design focused on VLBW as the outcome measure. We used that approach in the present study to gain more understanding of the impact of social support on this uncommon but potentially very damaging outcome. Our categories of "emotional" and "tangible" support approximate two of Barrera's categories, but we found no consistent association of our subjects' questionnaire responses and birthweight. The physical presence of a support person at the time of delivery, however, was very strongly associated with the birth outcome under study.

How might the social support be expected to differ between white and black women in the United States? Data from the 2000 U.S. Census indicate that the percentage of African-American women who are married has decreased from 62% in 1950 to 36% in 2000. Among white women, the percentage married was 66% in 1950 and 57% in 2000[49]. Thus, the rate ratio for being unmarried for African-American women compared with white women increased from 1.1 in 1950 to 1.6 in 2000. Our study findings were consistent, with only 38% married. Availability of a support person in pregnancy and at delivery is clearly not contingent on marriage, but observed racial differentials in marriage rates may be reflective of more general patterns of social behavior. There are a number of reasons to expect African-American families to encounter more obstacles in providing support to mothers. Many obstacles, ranging from employers' absentee policies to transportation access, are closely related to income, and we know from earlier work that African-American mothers in Chicago are 3.5 times as likely to reside in the poorest neighborhoods[7]. Moreover, black women in their 40s and 50s—the grandmothers—are more likely to have medical problems than white women of the same age—problems that could interfere with their support role for their daughters throughout pregnancy and at delivery[50]. Finally, African Americans are 50–70% more likely to be in the Armed Forces and over 600% more likely to be incarcerated as whites in this country[51,52]—two stark but very real causes for differential availability of support persons during pregnancy and at delivery. Indeed, fully 16% of the women in our study had partners who were incarcerated during the pregnancy, with a somewhat higher proportion among the women who ended up alone in the delivery room (OR 1.5 [0.8–2.8]).

To our knowledge, this is the first study showing such a robust association between social support by a significant other in the delivery room and birthweight outcomes. Literature exists that documents a reduction of acute labor problems by the presence of a companion in the delivery room,[53-55] but our finding addresses a different question. The outcome in our study was birthweight below 1,500 g, and all such cases were premature. Length of gestation was not significantly affected by events at the time of delivery, but the presence of a supportive person at that critical time appears to be a marker for longer-range social processes that, in turn, impacted the length of gestation. A variety of questions about social support, religious beliefs, and family structure were poor predictors of VLBW in our study, although some were associated with the presence or absence of a support person at the time of delivery.

One potential problem with using the presence of a support person in the delivery room as a marker for social support is the possibility that exclusion could come about for other reasons, possibly even reasons associated with premature delivery. For example, perhaps the mothers were alone because premature labor was unexpected or because they were transferred to another facility due to preterm labor. Our data did not support this interpretation, since the rate of support persons at

Table 3. Characteristics of African-American Mothers Alone and Not Alone in the Delivery Room

Variable	Percent of 'Alone' Mothers	Percent of 'Not Alone' Mothers	OR	95% CI
Maternal Age				
Less than 20 years	24	32	0.7	0.4–1.1
30 or older	27	18	1.7	0.9-3.0
Maternal education <12 years	39	34	1.2	0.7–1.9
Not married or living together	66	65	1.0	0.6–1.7
Late or no prenatal care	45	31	1.8*	1.1–3.0
Parity				
First pregnancy versus all others	36	55	0.5*	0.3–0.7
Fourth or higher pregnancy versus less	21	12	1.9*	1.0–3.8
Cigarette smoking	28	23	1.3	0.8–2.3
Alcohol use	17	17	1.0	0.6–2.0
Income <$11,000	47	47	0.9	0.5–1.8
Did not want the pregnancy?	54	34	2.4*	1.5–3.8
Undesirable timing of pregnancy	54	64	0.7	0.3–1.3
Stressful life events (one or more versus none)	86	73	2.1*	1.1–4.1
Exposure to racial discrimination				
One or more domain versus none	48	45	1.1	0.7–1.8
Three or more domains versus none	12	12	0.9	0.5–2.0

*P<0.05

delivery was the same for inborn and transported mothers, but such confounding is certainly possible, especially in light of the unexpectedly high OR associated with having a companion in the delivery room. A similar concern would be the possibility that support persons might be barred from the delivery room in critical situations by policies in place in some hospitals. Indeed, in the two hospitals in this study, one was known to have more restrictive visiting policies; therefore, support in the delivery room was less frequent for women giving birth there, compared to the other study site. However, when we analyzed results for women in the two hospitals separately, the odds of VLBW associated with being without a support person in the delivery room was unaffected. Future studies using this outcome measure would be strengthened by collecting more detailed information about support persons, to distinguish women with a family member waiting in the hall from others with no identified support person to notify.

In our study, the African-American women who were 30 or older were more likely to give birth to a VLBW infant, and a disproportionate number of these older women were without a support person at delivery. This finding appears to parallel the worsening birth outcomes among older African-American women described by Geronimus. She noted that the health of African-American women may begin to deteriorate in early adulthood as a physical consequence of cumulative socioeconomic disadvantage, such as ongoing exposure to environmental lead[56]. She suggested the term "weathering" to describe this phenomenon[57]. The association of maternal age over 30 and lack of social support in the delivery room, along with other behavioral and psychosocial risk factors, such as unwantedness of the pregnancy and poor prenatal care, suggests the possibility of a nonphysical dimension to the weathering effect in black women.

Work on unraveling the complex and multilayered effects of racial disadvantage in health in this country entered a new phase in the early 1990s with the paradigm shift from the socioeconomic

Table 4. Modifications of the Effects of Stress Variables on VLBW Risk by the Presence or Absence of a Delivery Room Support Person

Variable	All subjects (N=312) OR	95% CI	Alone in DR (N=111) OR	95% CI	Not Alone in DR (N=194) OR	95% CI
Stressful life events (one or more)	1.7	0.9-3.2	0.7	0.2-2.0	1.9	0.8-4.8
Perceived racism (one or more)	1.9*	1.2-3.0	1.7	0.8-3.7	1.9*	1.0-3.9
Perceived racism (three or more)	2.7*	1.3-5.4	1.6	0.5-5.2	2.2*	1.0-4.8

*p<0.05

versus genetic dichotomy to a more contextualized approach to social mechanisms[17]. Our study suggests that focus on social mechanisms sometimes means more than just asking for a report of perceptions but may also be strengthened by noting certain objective markers of actual social networks, such as the provision of support at a critical juncture. Attention to the broader social, economic and policy environment as it impacts black and white women in different ways may eventually lead to effective interventions in the ongoing effort to eliminate racial disparities in health.

REFERENCES

1. Hogue CJR, Vasquez C. Toward a strategic approach for reducing disparities in infant mortality. *Am J Public Health.* 2002; 92:552-556.

2. Iyasu S, Becerra J, Rowley D, et al. Impact of very low birthweight on the black–white infant mortality gap. *Am J Prev Med.* 1992;8:1333-1347.

3. Hogue CJR, Yip R. Preterm delivery: can we lower the black infant's first hurdle? *JAMA.* 1989;262:548-550.

4. Hogue CJR, Hargraves MA. Preterm birth in the African-American community. *Semin Perinatol.* 1995;19:255-262.

5. Lieberman E, Ryan KJ, Monson RR, et al. Risk factors accounting for racial differences in premature birth. *N Engl J Med.* 1987;317:743-748.

6. Kleinman JC, Kessel SS. Racial differences in low birthweight. *N Engl J Med.* 1987;317:749-753.

7. Collins JW, David RJ. The differential effect of traditional risk factors on infant birthweight among blacks and whites in Chicago. *Am J Public Health.* 1990;80:679-681.

8. Schoendorf KC, Hogue CJR, Kleinman JC, et al. Mortality among infants of black as compared with white college-educated parents. *N Engl J Med.* 1992;326:1522-1526.

9. Hulsey T, Levkoff A, Alexander G. Birthweights of infants of black and white mothers without pregnancy complications. *Am J Obstet Gyn.* 1991;164:229-302.

10. Goldenberg R, Cliver S, Cutter G, et al. Black–white differences in newborn anthropometric measurements. *Obstet Gynecol.* 1991;78:782-788.

11. Cooper R, David R. The biological concept of race and its application to public health and epidemiology. *J Health Polit Law*. 1986;11:97-116.

12. Cooper RS, Kaufman JS, Ward R. Race and genomics. *N Engl J Med.* 2003;348:1081-1082.

13. David RD, Collins JW. Differing birthweight among infants of U.S.-born blacks, African-born blacks, and U.S.-born whites. *N Engl J Med.* 1997;337:1209-1214.

14. Collins JW, David RJ. Race and birthweight: the biracial example. *Am J Pub Health.* 1993;83:1125-1129.

15. Marks J. Human biodiversity: genes, race, and history. Aldine de Gruyter, New York, 1995.

16. David RJ, Collins JW. Bad outcomes in black babies: race or racism. *Ethn Dis.* 1991;1:236-244.

17. Rowley DL, Hogue CJR, Blackmore AC, et al. Preterm delivery among African-American women: a research strategy. *Am J Prev Med.* 1993;(6 Suppl.):1-6.

18. Boone MS. Social and cultural factors in the etiology of low birthweight among disadvantaged blacks. *Soc Sci Med.* 1985; 20:1001-1011.

19. Ramsey CN, Abell TD, Baker LC. The relationship between family functioning life events, family structure, and the outcome of pregnancy. *J Fam Pract.* 1986;22:521-527.

20. Emanuel I, Hale CB, Berg CJ. Poor birth outcomes of American black women: an alternative explanation. *J Public Health Policy.* 1989;10:299-308.

21. Collins J, David RJ, Handler A, et al. Very low birthweight in African-American infants: effect of lifetime exposure to interpersonal racial discrimination. *Pediatr Res.* 2003;53:441A.

22. Feldman PJ, Dunkel-Schetter C, Sandman CA, et al. Maternal social support predicts birthweight and fetal growth in human pregnancy. *Psychosom Med.* 2000;62:715-725.

23. Oakley A. Social support in pregnancy: the "soft" way to increase birthweight? *Soc Sci Med.* 1985;21:1259-1268.

24. Collins NL, Dunkel-Schetter C, Lobel M, et al. Social support in pregnancy: psychosocial correlates of birth outcomes and postpartum depression. *J Pers Soc Psychol.* 1993;65:1243-1258.

25. Oakley A, Rajan L, Grant A. Social support and pregnancy outcome. *Br J Obstet Gynecol.* 1990;97:155-162.

26. Cochrane R, Robertson A. The life events inventory: a

measure of the relative severity of psychosocial stressors. *J Psychosom Res.*1973;17:135-139.

27. Krieger N. Racial and gender discrimination: risk factors for high blood pressure. *Soc Sci Med.* 1990;30:1273-1281.

28. Pascoe JM, Loda FA, Jeffries V, et al. The association between mothers' social support and previous stimulation to their children. *J Dev Behav Pediatr.* 1981;2:15-19.

29. Pascoe JM, Ialongo NS, Horn WF, et al. The reliability and validity of the maternal social support index. *Fam Med.* 1988; 20:271-276.

30. SAS Language: Reference. Version 6, 1st edition. SAS Institute, Cary, NC 1990.

31. Centers for Disease Control and Prevention, National Center for Health statistics. National Vital Statistics System; Vital statistics of the United States, Vol. II, Mortality, Part A, for data years 1950–1993. Available at: http://www.cdc.gov/nchs/data/hus/table/2001/01hus023.pdf. Accessed on May 19, 2003.

32. MacDorman MF, Minino AM, Strobino DM, et al. Annual summary of vital statistics—2001. *Pediatrics.* 2002;110:1037-1052.

33. Kempe A, Wise PH, Barkan SE, et al. Clinical determinants of the racial disparity in very low birthweight. *N Engl J Med.* 1992;327:969-973.

34. Berg CJ, Wilcox LS, d'Almada PJ. The prevalence of socioeconomic and behavioral characteristics and their impact on very low birthweight in black and white infants in Georgia. *Matern Child Health J.* 2001;5:75-84.

35. Wise PH. Confronting racial disparities in infant mortality: reconciling science and politics. *Am J Prev Med.* 1993;9(6 suppl):7-16.

36. McLean DE, Hatfield-Timajchy K, Wingo PA, et al. Psychosocial measurement: implications for the study of preterm delivery in black women. *Am J Prev Med.* 1993;9(6 Suppl):39-81.

37. Orr ST, James SA, Miller CA, et al. Psychosocial stressors and low birthweight in an urban population. *Am J Prev Med.* 1996;12:459-466.

38. Hoffman S, Hatch MC. Stress, social support, and pregnancy outcome: a reassessment based on recent research. *Pediatr Perinat Epidemiol.* 1996;10:380-405.

39. Collins JW, David RJ, Symons R, et al. African-American mothers' perception of their residential environment, stressful life events, and very low birthweight. *Epidemiology.* 1998;9:286-289.

40. Barbosa GA. The association of life events to gestational age at delivery among low-income, urban, African-American women. *J Perinatol.* 2000;20:438-442.

41. Dole N, Savitz DA, Hertz-Picciotto I, et al. Maternal stress and preterm birth. *Am J Epidemiol.* 2003;157:14-24.

42. Orr ST, James SA, Prince CB. Maternal prenatal depressive symptoms and spontaneous preterm births among African-American women in Baltimore, MD. *Am J Epidemiol.* 2002; 156:797-802.

43. Dayan J, Creveuil C, Herlicoviez M, et al. Role of anxiety and depression in the onset of spontaneous preterm labor. *Am J Epidemiol.* 2002;155:293-301.

44. Mutale T, Creed F, Maresh M, et al. Life events and low-birthweight analysis by infants preterm and small for gestational age. *Br J Obstet Gynecol.* 1991;98:166-172.

45. Collins JW, David RJ. Low-income African-American mothers' perception of exposure to racial discrimination and infant birthweight. *Epidemiology.* 2000;11:337-339.

46. Wadhwa PD, Dunkel-Schetter C, Chicz-DeMet A, et al. Prenatal psychosocial factors and the neuroendocrine axis in human pregnancy. *Psychosom Med.* 1996;58:432-446.

47. Norbeck JS, Anderson NJ. Psychosocial predictors of pregnancy outcomes in low-income black, Hispanic, and white women. *Nurs Res.* 1989;38:204-209.

48. Barrera Jr M. Distinctions among social support concepts, measures, and models. *Am J Comm Psychol.* 1986;14:413-445.

49. U.S. Bureau of the Census, Current Population Reports, Series P20-537, "America's Families and Living Arrangements: March 2000", and earlier reports.

50. Williams DR. Racial/ethnic variations in women's health: the social embeddedness of health. *Am J Public Health.* 2002;92: 588-597.

51. U.S. Department of Defense, Selected Manpower Statistics, Annual National Defense and Veteran Affairs, U.S. Census Bureau, Statistical Abstract of the United States: 2001, Available at http://www.census.gov/prod/2002pubs/01statab/defense.pdf. Accessed on May 19, 2003. U.S. Bureau of the Census, May 1996. Available at http://www.census.gov/population/socdemo/race/black/tabs95/tab03.txt. Accessed on May 19, 2003.

52. Harrison PM, Karberg JC. Prison and jail inmates at midyear 2002. Bureau of Justice Statistics Bulletin, April, 2003. PDF version available at http://www.ojp.usdoj.gov/bjs/pub/pjim02.pdf. Accessed on May 4, 2003.

53. Kennell J, Klaus M, McGrath S, et al. Continuous emotional support during labor in a U.S. hospital. *JAMA.* 1991;265: 2197-2201.

54. Klaus MH, Kennell JH, Robertson SS, et al. Effects of social support during parturition on maternal and infant morbidity. *Br Med J.*1986;293:585-587.

55. Sosa R, Kennell J, Klaus M, et al. The effect of a supportive companion on perinatal problems, length of labor, and mother-infant interaction. *N Engl J Med.* 1980;303:597-600.

56. Geronimus AT, Hillemeier MM. Patterns of blood lead levels in U.S. black and white women of childbearing age. *Ethn Dis.* 1992;2:222-231.

57. Geronimus AT. The weathering hypothesis and the health of African-American women and infants: evidence and speculations. *Ethn Dis.* 1992;2:207-221.

We Welcome Your Comments

The *Journal of the National Medical Association* welcomes your Letters to the Editor about articles that appear in the JNMA or issues relevant to minority healthcare.

Address correspondence to ktaylor@nmanet.org.