



Overview of current state of research on pregnancy outcomes in minority populations

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KEY WORDS

Disparity
Pregnancy outcome

Pregnancy outcomes improved significantly over the 20th century in the United States but currently vary widely between women of different ethnic and racial backgrounds. The current health disparities that exist are based, in part, only on differences in socioeconomic status or education. There is wide variability in pregnancy outcomes within specific subgroups of women. Disparities may be due to underlying differences in health before pregnancy, differences in community norms, and individual lifestyle choices and to differences in health care delivery systems. Areas for needed research and promising new models of care are reviewed.

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The United States has enjoyed marked improvements in the health of mothers and babies during the 20th century. In 1900, approximately 6 to 9 women died for every 1000 live births. For every 1000 live births in 1900, approximately 100 infants died before they reached their first birthday. Over the course of the 20th century, the infant mortality rate declined by >90% to a rate of 7.2 per 1000 live births. Maternal mortality rates declined by 99% to a rate of 0.1 reported deaths per 1000 live births (7.7 deaths/100,000 live births in 1997).¹ These marked changes in pregnancy outcomes occurred as a result of a better medical and nursing care. Early in the century, the establishment of prenatal care, well baby care, and family planning services improved pregnancy outcomes. In the second half of the 20th century, improvements in the treatment for mothers and babies were enhanced by the establishment of perinatal regionalization and high-risk perinatal and neonatal units.

However, throughout the 20th century, improvements in the health of mothers and babies also occurred because of improved economic and social welfare, changes in lifestyle that included improved nutrition, improvements in education, and decreased environmental threats.

At the beginning of the 21st century, we can be proud of all that has been accomplished to improve pregnancy outcomes. However, we must be concerned about inequities that continue to exist and the challenges that still remain in promoting optimal outcomes. Not every woman enjoys the same likelihood of positive pregnancy outcomes. Well-documented disparities in pregnancy outcomes exist between racial and ethnic groups.² The widening gap, over the past century, in both infant and maternal mortality rates in black infants compared with white infants is of particular concern. Black infants are more than twice as likely to die as white infants. Black mothers are 3 times more likely to die than white mothers.¹

To eliminate health disparities in pregnancy outcomes, it is important to be able to identify (1) where disparities exist, (2) what disparities might be most amenable to changes in economic situation, (3) where improvements

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in medicine and nursing may be expected to most improve pregnancy outcomes, and (4) where individual life style changes can most significantly interact with improved health care to improve pregnancy outcomes. The purpose of this study was to provide an overview of the current state of pregnancy outcomes and health disparities, to discuss promising research strategies and findings that might serve to narrow the gap in health disparities in pregnant women and their infants on the basis of race and ethnicity, and to discuss the challenges that must be faced as these disparities are narrowed and then eliminated.

Overview of the literature

Current state of health disparity and pregnancy outcome

Black women compared with women of other races or minority background are most likely to die from pregnancy-related complications,^{3,4} to have a fetus⁵⁻⁷ or infant who dies,^{8,9} to have a preterm or low birth weight infant,^{10,11} and to be delivered of an infant with congenital anomalies.¹² Black women are also more likely than other women to experience a spontaneous abortion,¹³ an ectopic pregnancy,¹⁴ or a cesarean delivery.^{15,16}

Although black women are most likely to experience the most negative pregnancy outcomes and white women generally experience more positive outcomes, there is variability among specific pregnancy outcomes between different ethnic and racial groups. For example, in 1998 the infant mortality rate was actually lowest for Asian/Pacific Islander women at 5.5 per 1000 live births. The infant mortality rate in 1998 was 5.8 per 1000 live births for Hispanic infants, 6.0 per 1000 live births for white infants, 9.3 per 1000 live births for Native American infants, but 13.8 per 1000 live births for black infants.¹⁷ Black women in 1998 delivered a higher percent of low and very low birth weight babies (13%) than did any other ethnic or racial groups. This 13% low birth weight rate for the infants of black women was double the 6.4% that was experienced by non-Hispanic white women, the 6.5% that was experienced by white women, the 6.8% that was experienced by Native American women, or the 7.4% that was experienced by Asian/Pacific Islander women.¹⁷

Not only are black infants most likely to die, but their mothers are also at highest risk for death as a result of pregnancy. The pregnancy-related maternal death rate (deaths that occur during pregnancy or within a year of pregnancy as a result of pregnancy) between 1991 and 1997 was 11.3 per 100,000 live births overall in the United States. It was lowest in white women at 7.3 and highest among black women at 29.6. This 3 to 4 time higher death rate for black women than for white women strikingly delineates the health disparities that exist

today in pregnancy outcomes. Other minority groups are also at increased risk for maternal pregnancy-related death. American Indian/Alaska Native women have a pregnancy-related mortality rate of 12.2, whereas Asian/Pacific Islander women have a rate of 11.3 and Hispanic women have a rate of 10.3.¹⁸

Variability within subgroups in pregnancy outcome

Clearly, disparities exist in pregnancy outcome that is based on racial or minority status, but the causes of these disparities and therefore the solution to the problem of health disparities is less clear. There is a well-known wide variation in pregnancy outcomes even within specific ethnic or racial groups, which argues for careful examination of the meaning of race and ethnicity. Factors also must be examined that might interact with minority status to influence pregnancy outcomes (such as individual health behaviors, education, income, and other sociodemographic variables).

Differences in smoking behaviors, for example, among Hispanics subgroups might help to explain some of the variability in low birth weight and very low birth weight births within this group. Low birth weight is lower among Mexican American infants (6%) than among Puerto Rican infants, who at 9.7% are one of the minority groups with the highest rates of low birth weight.^{8,17} Mexican American women as a group have low smoking rates, high levels of social support, and generally are well nourished.¹⁹ These factors may contribute to the decreased risk of low birth weight that Mexican American women experience compared with other Hispanic subgroups.

As a group Mexican American women also have low levels of education, less timely attendance at prenatal care, high poverty, and high teenage pregnancy,²⁰ Mexican American women also have relatively positive pregnancy outcomes, which perhaps indicates that the modification of health behaviors can be beneficial particularly in women who are at risk of experiencing poor pregnancy outcomes. Promoting community norms for healthy life styles among minority populations and promoting positive individual health behaviors may result in important public health gains. Currently, minority women perceive that they are less likely to receive health-promoting messages during prenatal care, including information about smoking cessation and alcohol use.²¹ Health care providers may provide care that is intentionally or unintentionally biased and that does not account adequately for and promote individual and community strengths. Thus, differences in the care that is provided may explain, in part, some of the disparities in pregnancy outcomes that currently exist between women of varying racial and ethnic backgrounds.

The variability in pregnancy outcomes that exists within subgroups of the same broad ethnic or racial group provides support for continuing to collect more specific data on race, ethnicity, and health outcomes on birth certificates, death certificates, and other sources of large-scale survey data. To truly understand how to intervene to eliminate health disparities, it is important that we better understand differences in pregnancy outcomes in specifically defined ethnic and racial groupings.²² For example, in Hispanic women, not only do pregnancy outcomes differ depending on the original country of origin, but there also are known differences in pregnancy outcomes between women who were born in the United States and those born women who were born outside of the United States. Hispanic women who were born outside of the United States have a 50% higher pregnancy-related mortality rate than do women who were born in the United States.¹⁸ Natality also has a variable influence on infant outcomes, with foreign-born Hispanic women being less likely to be delivered of low birth weight infants compared with US-born Hispanic women. Again, this points out the importance of health behaviors such as not smoking, nutrition, social support, and other culturally based protective factors.²³

Natality in other minority women has also been examined to help explain whether pregnancy outcomes are more likely to be explained by economic factors (generally less favorable among recent immigrants), by genetic factors (that would be unaffected by place of natality), or by life style and health care variables that may be interrelated with economic situation. Black women who were born in Africa have been shown to have birth weight patterns closer to those of US-born white women than to US-born black women.²⁴ This advantage of foreign birth in black women was also found in a group that was largely born in the Caribbean (72%) and may be explained in part by the better prepregnancy nutritional status that is found in the foreign-born women in this study.²⁵ Thus far, foreign-born Asian women exhibit the same kinds of birth weight patterns that US-born Asian women experience.²³ These findings raise questions about the genetic basis of differences in pregnancy outcomes and lend support to the need to identify and modify environmental factors (such as poverty and poor working conditions) that lead some groups to be more likely to experience poor pregnancy outcomes than other groups. The fact that there is more genetic variation within races than between them²⁶ and the historically changing social constructs that surround our definition of race²⁷ also raise questions about the likelihood that genetic differences explain disparities in pregnancy outcomes. However, genetic variations cannot be discounted fully. Infant death is influenced by documented differences in the response of white and black infants of similar

birth weights and gestational age to surfactant therapy, for example, that may be explained in part by poorly understood racial differences.¹⁰

Poverty, education, and pregnancy outcomes

In the United States, race and minority status has long been associated with social class and with socioeconomic status both in terms of income and education. It is clear that social class is related inversely to pregnancy outcomes. Black, Hispanics, and Native American individuals are represented disproportionately among the poor. However, the extent is not clear to which disparities in pregnancy outcomes persist, even in more optimal socioeconomic situations.²⁸

In a large study of low income black and white women, the black women had more preterm and low birth weight infants than the white women, even though many of the risk factors for low birth weight were more common among the white women. However, the black women in this study were poorer and less likely to be married.²⁹

The contribution of income to pregnancy outcomes has been examined in military populations in which pregnant women do not have financial barriers to health care and income is well documented. Black women in the military have better pregnancy outcomes than black women in the general population. However, disparities in pregnancy outcomes exist between black and white enlisted women.³⁰ For example, black enlisted women had a higher probability of preterm delivery (13.5%) than did white women (10.5%), but this difference was seen only in early preterm delivery before 33 weeks of gestation.³¹ Wives of enlisted men who had similar access to prenatal care, similar income, and the benefit of social support from a husband were also found to have disparate birth outcomes based on race. Low birth weight was twice as likely in black mothers as in white mothers.³²

When large metropolitan areas were examined, the black-white difference in infant mortality rates was found to be smaller in areas with low segregation, even when considerable differences existed in poverty levels between black and white women. These findings once again underscore the concern that being black in the United States has an impact on health that is not solely accounted for by socioeconomic status.³³

Similarly, the discrepancy in pregnancy outcomes between black and white women remains even among college-educated women. Education is generally expected to result in better health outcomes. Educated women are more knowledgeable about how to promote a healthy pregnancy. However, college-educated black women continue to experience higher rates of low birth weight than college-educated white women.³⁴ If a black infant is born at normal weight, there is no difference in

the infant mortality rate, including the number of sudden infant death syndrome deaths between black and white children of college-educated parents. The rate of low birth weight remains twice as high in black infants of college-educated parents as in white infants of college-educated parents. These disparities again underscore the need to examine factors other than socioeconomic status in an explanation of health disparities.³⁵

Underlying health problems and pregnancy outcome

Whether because of basic biologic differences, lifestyle factors, or differences in diagnosis and treatment, there are underlying health problems that are more common in some groups of women than in others. These underlying health problems might influence pregnancy outcomes. For example, anemia may be more common in minority women. One study of 8903 women found that anemia was one of the major underlying causes of prematurity among black women.³⁶ However, other studies have not found anemia to be related to birth outcomes in minority populations.³⁷

Known differences in maternal hypertension between different ethnic and racial groups might help to explain differences between disparities in pregnancy outcomes. Chronic hypertension that precedes pregnancy is higher among black women than it is for women of other ethnic or racial status. Women with chronic hypertension are known to be 4 times more likely to have preeclampsia and eclampsia. Hypertensive black women are also at 3-fold greater risk of experiencing antepartum hemorrhage that also contributes to preterm delivery and low birth weight.³⁸

Many lifestyle choices are related to health problems that may influence pregnancy outcomes. Poor nutrition, smoking, drug and alcohol use, and a sedentary lifestyle have all been related to cardiovascular health, diabetes mellitus, and a myriad of other health problems that lead to poorer pregnancy outcomes.³⁹

Black women as a group are less likely to engage in regular exercise than other groups of women.³⁹ Regular exercise has been demonstrated to decrease the risk of gestational hypertensive disorders,⁴⁰ and a lack of exercise may contribute to hypertension in pregnant women who are at risk for hypertension.⁴¹ There also may be underlying differences between majority and minority groups in what they eat, their patterns of weight gain during pregnancy, and their patterns of nutrient intake during the day that contribute to increased poor pregnancy outcomes in minority women.⁴² Smoking during pregnancy in minority women has been demonstrated to increase the risk for preterm delivery and low birth weight.⁴³

Health care delivery system factors and pregnancy outcome

The impact of the health care delivery system on health outcome has received much attention of late.⁴⁴ The interaction between those seeking health care and health care providers may differ systematically between women of majority and minority status, as seen in the lack of health promotion information provided to black women.²¹ There is a well-documented shortage of health care providers who are from minority populations,^{45,46} which also may add to the disparity that exists in pregnancy outcomes between majority and minority women. For example, racial and ethnic disparities have been found to exist in the rates of cesarean delivery even when clinical indications and insurance are taken into consideration.^{15,16} Additionally the content of prenatal care received by black and white women in the United States has been demonstrated to differ in terms of the use of tocolysis, ultrasound examination, and amniocentesis. Black women are less likely to experience amniocentesis or ultrasonographic examinations, and there is an underused of tocolysis among black women with singleton pregnancies.⁴⁷

Race and gender have been demonstrated to be important factors in the way that patients and providers interact and with patient satisfaction. Patients who are cared for by members of their own racial or ethnic subgroup are least likely to encounter problems with culturally sensitive care, which includes miscommunication, inherent racism, or medical decision-making that is unintentionally influenced by patient background.⁴⁸ The development of a culturally competent health care delivery system may mean not only increasing the number of minority health care providers but also the development of systems of care that are acceptable to and address specific health needs of minority populations.

Overview of current promising research strategies and findings

Research on the cause of poor pregnancy outcome

Continued research on the cause of preterm birth, low birth weight, and other poor pregnancy outcomes is needed. We have not been successful in decreasing the preterm birth rate or low birth weight rates in part because the causes of these problems are not clearly understood. As well as continuing to elucidate the underlying cause of poor pregnancy outcome, we continue to need research that carefully examines the effectiveness of the interventions that we are currently using. Many of these interventions (such as bed rest) may have unacceptable sequelae to the very women that they are prescribed to help.⁴⁹

Even with similar education and similar income there are well-known differences between the races in family wealth and family social status,^{50,51} so findings that income and education do not eliminate disparities in pregnancy outcomes are not altogether surprising. However, the fact that, when income and education is controlled, disparities in pregnancy outcomes between majority and minority populations persist indicates that factors other than poverty contribute to poor pregnancy.

The stress of racism, intergenerational differences in health, differences in how the health care system responds to individuals of different racial backgrounds, and biologic variables (such as blood pressure control during pregnancy or infection) that may be mediated by these other factors must be examined carefully if we are to be able to respond adequately to the racial disparities that exist in pregnancy outcomes. For example, racial and gender discrimination has been documented to lead to negative psychologic and physiologic outcomes (such as increased stress and increased blood pressure, both of which could negatively influence pregnancy outcome).^{52,53}

Chronic stress has also been associated with the increased likelihood of experiencing infections (such as bacterial vaginosis, which is another leading cause of adverse perinatal outcome).⁵⁴ Increased stress itself has been related, independent of medical risk, to both preterm delivery and low birth weight.⁵⁵⁻⁵⁸ Ethnic differences in corticotropin-releasing hormone during the second trimester of pregnancy underscore the importance of continued examination of the relationship between stress and pregnancy outcome in women of varying ethnic and racial backgrounds.⁵⁹ Research that clarifies the relationship of stress, individual health behaviors, and health outcomes among varying ethnic groups is particularly important, given recent research that has linked increased stress to decreased immune function and preterm birth.^{60,61}

Research on health behaviors

Culturally competent care that is successful in improving individual health behaviors without “blaming” individuals for health care choices (such as overeating, drinking, smoking, when these behaviors may be particularly helpful in reducing the stress of poverty) will be particularly important in the 21st century.⁶² Although nutritional variation in a large sample of 4589 US women was not found to explain ethnic differences in birth outcomes,⁶³ factors other than the intake of major nutrients may be related to ethnic and racial differences in pregnancy outcomes. For example, research that links vitamin C and E to preterm premature rupture of membranes argues for a continued examination of the relationship between nutrition and pregnancy outcomes,⁶⁴ especially in terms of micronutrients.

Patterns of nutritional intake may influence pregnancy outcomes. There are documented differences in patterns of weight gain during pregnancy among women of various racial and ethnic subgroups⁶⁵ that might make some women more susceptible at certain points during pregnancy to negative outcomes. On a day-to-day basis, prolonged periods without food intake have been related to elevated maternal corticotropin-releasing hormone and may be related to risk for preterm delivery.⁶⁶ Clearly, changing health behaviors (such as smoking and drug and alcohol use) has the potential for large payoffs in the improvement of both maternal and infant health, but research is needed that provides direction for how best to change these behaviors in pregnant women.

Health care delivery systems

Just as changes in health care delivery systems in the 20th century led to improvements in pregnancy outcomes, research on culturally competent health care systems must be developed and evaluated in the 21st century. Prenatal care has been demonstrated to improve pregnancy outcomes.⁶⁷⁻⁶⁹ However, receiving adequate prenatal care in itself is not enough to eliminate the disparities in pregnancy outcomes that currently exist. Improved insurance coverage in the late 20th century led to significant improvements in prenatal care use among poor women but did not result in improved pregnancy outcomes (such as fewer low birth weight births).⁷⁰ Given constraints of time and resources, findings that many minority women report not receiving information on sexually transmitted diseases, preterm birth prevention, family planning, or family violence⁷¹ is not surprising but might help, in part, to explain why improving prenatal care usage is not sufficient to improve pregnancy outcome.⁷² Enhanced models of prenatal care delivery, preconceptual care, and new models of patient education that are targeted specifically to the needs of minority populations may be needed to ensure further improvements in some of the most intractable of health problems.

Many new models of health care delivery are being developed and evaluated. For example, a telephone support program that is provided by nurses decreased the rate of preterm birth in black women compared with white women in one southeastern study.⁷³ Programs that provide home-based care or peer support may also be efficacious with minority populations.^{74,75}

Potential research questions and challenges

A number of interacting factors clearly contribute to the poorer pregnancy outcomes that are experienced in minority populations. Examining individual environmental, health, and societal factors that all contribute to pregnancy outcome is clearly necessary. Studies that

examine interactions of those factors that are most likely to contribute to poor pregnancy outcomes must be conducted. A number of studies currently are examining models of social, behavioral, physiologic, and psychologic factors that may explain poor pregnancy outcomes in minority populations.^{76,77} For example, exposure to environmental pollution and toxins is experienced more often by minority women, who might also be most likely to experience poor nutrition and increased stress, which further enhances the impact of environmental toxins.⁷⁸ Paternal exposure to solvents has been related to increased low birth weight,⁷⁹ and future studies that examine paternal and maternal exposure to environmental risks may be one fruitful area for further study.

Just as in the 20th century, improvements in maternal child health have occurred in part because of improvement in social factors; social factors in the 21st century continue to warrant close investigation. For example, pregnancy desire has been found to be related to low birth weight; women who did not want to be pregnant had higher rates of low birth weight.⁸⁰ One reason that women do not seek early prenatal care is that they do not wish to be pregnant, and this may impact on individual health behaviors (such as smoking, drinking, and drug use). Research that identifies interventions to help women work through issues that surround the discovery of pregnancy may be particularly helpful in the promotion of healthy pregnancy behaviors. Women who do not want to be pregnant are more likely to smoke, drink, have unsafe sex, eat poorly, get inadequate folic acid, and thus have poorer outcomes.¹

In this same vein, research on novel ways to improve preconception education and reproductive health such that more women take folic acid, receive appropriate vaccinations, and practice other health-promoting behaviors would seem to be particularly appropriate. With so many new ways of providing education for women, we are at a point in time at which we will be able to provide much wider and more targeted health education in a much more cost-effective manner than we have been able to in the past, and we must examine ways to best do this.

In the 21st century, prevention and treatment modalities that improve pregnancy outcomes for all women must be developed. New systems of health care delivery that promote healthy pregnancies and that are sensitive to the needs of specific communities also must be established. However, meaningful improvements in maternal and infant health will require more than improved medicine, nursing, and health care delivery systems. Meaningful improvements in maternal and infant health will also require, as they did in the 20th century, improved economic situations, education, and lifestyle changes and a decrease in environmental risks. Continued research on the multifactorial nature of poor pregnancy outcomes will require unique collaborations

between researchers from different disciplines and with stakeholders from varying communities. At the end of the 21st century, just as at the end of the 20th century, continued marked improvements in maternal and infant outcomes will be made, but this time for all women, not just for some women.

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