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Epidemiology of racial/ethnic disparities in severe maternal morbidity and mortality

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ABSTRACT

The literature abounds with examples of racial/ethnic disparities in both obstetric outcomes and care. Disparities in maternal mortality are well documented with non-Hispanic blacks carrying the burden of the highest maternal mortality rates. Maternal deaths likely represent only the “tip of the iceberg” with respect to pregnancy complications, leading many to explore risk factors and disparities in severe maternal morbidity, a more common precursor to maternal mortality. This review article explores commonly cited indicators of severe maternal morbidity and includes a review of the epidemiological literature supporting or refuting disparities among each indicator.

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Introduction

Racial/ethnic disparities in health and health care are important considerations in modern medicine, with a large body of literature dedicated to the documentation and exploration of inequities in outcomes and care. There is also an increase in visibility of disparities at all levels of health policy, as evidenced, for example, by their priority among Healthy People 2020 goals. Examples of racial/ethnic disparities are well described in most medical disciplines, including obstetrics.^{1–4} One of the earliest reports of racial/ethnic disparities in modern obstetric was published in 1946 and described efforts to improve the discrepancies in obstetric outcomes between black and white women in Alabama⁵; 70 years later we are still struggling to solve the problem.

Disparities in health outcomes and disparities in clinical care are both well described; the recognition that health outcomes have contributors (such as biology and genetics,

the physical environment and health behaviors)⁶ above and beyond what occurs in the context of health care, is vital. Health care inequities can be described as differences in health care access or quality and again, both are well described. To fully understand and address the breadth of racial/ethnic disparities, inequities in health outcomes, access, and quality of care should be evaluated independently, despite often overlapping contributors.

Maternal mortality

Life expectancy may be the ultimate metric of health, and therefore explorations of population-level mortality rates can provide insight into communities' health statuses. In the United States, racial/ethnic disparities in maternal mortality are extreme.⁷ Recent literature reports an increase in maternal mortality in the United States with some evidence that a

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significant proportion of that rise is attributable to deaths among women of color.^{8–11} Maternal mortality is rare with an estimated occurrence of 23.8 per 100,000 live births.¹⁰ However, racial disparities in maternal mortality have been documented time and again in the literature. Non-Hispanic black women have higher rates of maternal mortality compared to whites, both in the United States^{12–17} and abroad.¹⁸

Creanga et al.¹⁹ reported a pregnancy-related mortality ratio of 38.9 per 100,000 live births for non-Hispanic black women versus 12.0, 11.7, and 14.2 for non-Hispanic white, Hispanic, and women of other races, respectively. Moaddab et al.¹¹ analyzed the increased maternal mortality ratio at a population level and found that differences throughout the United States correlated significantly with the proportion of non-Hispanic black residents. This trend persisted across the country. States with fewer non-Hispanic black women had proportionately lower rates of maternal mortality and vice versa. Another report by Tucker et al.²⁰ demonstrated that non-Hispanic black women had higher case-fatality rates for five high-risk obstetric conditions in spite of similar underlying rates of the conditions. Interestingly, Howell et al.¹² found that racial disparities in obstetric outcomes persisted even after equivalent improvements in Agency for Health Care Research and Quality obstetric quality indicators, demonstrating that existing quality indicators fail to capture underlying causes of disparities.

Potential contributors to differences in mortality rates are numerous; one prominent theory implicates the increasing rate of cardiovascular diseases and obesity on worsening maternal health, which may have a differential impact on some populations over others.^{7,21} The etiologies of the wide disparity between populations' risks of death during pregnancy are likely multifactorial and may vary by populations compared. Combating the problem of inequities in maternal mortality will require a deeper understanding of all likely contributors.

Maternal morbidity

Despite increases in the maternal mortality rate over recent years, the prevalence of death in the context of pregnancy remains low. However, maternal deaths represent only the “tip of the iceberg” with respect to pregnancy complications, leading many to explore risk factors and disparities in severe maternal morbidity, a more common precursor to maternal mortality. Defining maternal morbidity remains a challenge: while neither the American College of Obstetricians and Gynecologists (ACOG) nor the Society for Maternal-Fetal Medicine (SMFM) have endorsed a standard definition of this construct, in a recent consensus document they refer to it as “unintended outcomes of the process of labor and delivery that result in significant short-term or long-term consequences to a woman's health.”²² However, since there is not absolute agreement on which conditions constitute severe maternal morbidity, prevalence estimates are lacking.

Callaghan et al.²³ delineated 25 conditions of major maternal morbidity using the Nationwide Inpatient Sample to evaluate delivery and postpartum hospitalizations from 1998 to 2009. Racial/ethnic disparities among some of these

categories are well documented, while others are not. Excess maternal morbidity among the non-Hispanic black population has often been demonstrated in epidemiologic studies, regardless of how “morbidity” is defined. These investigations are often conducted using large administrative databases, such as birth certificate files or the Nationwide Inpatient Sample.

Creanga et al.²⁴ analyzed birth hospitalization data from seven states to identify disparities in rates of severe maternal morbidity with morbidity defined as the presence of any of the 25 severe maternal morbidity indicators.²³ They found 2.1, 1.3, 1.2, and 1.7 times higher rates of severe maternal morbidity amongst non-Hispanic black, Hispanic, Asian/Pacific Islander, and American Indian women, respectively, as compared to non-Hispanic white women ($P < 0.05$). In another report, Shen et al. noted that African-American and white patients significantly differed in rates of severe maternal morbidities such as preeclampsia (adjusted odds ratio (aOR) = 1.59, 95% confidence interval (CI): 1.49–1.69), placental abruption (aOR = 1.52, 95% CI: 1.43–1.62), and diabetes (aOR = 1.26, 95% CI: 1.14–1.40). Similarly, they found that Hispanics and Asian/Pacific Islanders were more likely to have diabetes with an adjusted odds ratios of 1.44 (95% CI: 1.32–1.58) and 2.05 (95% CI: 1.80–2.32), respectively. Additionally, they found that Asian/Pacific Islanders had higher rates of postpartum hemorrhage with an adjusted odds ratio of 1.19 (95% CI: 1.09–1.29).²⁵

When examining the drivers of the disparity, differences in care have been implicated. Evidence of this can be found in the results from a secondary analysis of data from a National Institute of Child Health and Human Development (NICHD) Maternal-Fetal Medicine Units (MFMU) Network study. After adjusting for patient characteristics (e.g., age, diabetes mellitus, hypertension, birthweight, prenatal care, obstetric history, multiple gestation, abruption, placenta previa, placenta accreta, anticoagulant use during pregnancy, and insurance status) and for the delivery hospital, as compared to white patients, non-Hispanic black women were less likely to undergo induction of labor (aOR = 0.88, 95% CI: 0.84–0.92), more likely to have a vaginal delivery (aOR = 0.87, 95% CI: 0.83–0.91), and less likely to have an episiotomy (aOR = 0.62, 95% CI: 0.56–0.68). Black women were more likely to have general anesthesia in a cesarean section; however, when adjusted for hospital, this was no longer significantly different as compared to white controls.

This NICHD MFMU Collaborative study not only found differences among non-Hispanic black patients as compared to white patients, but also among Hispanic and Asian women. With respect to care, they found both Hispanic and Asian women were less likely to undergo induction of labor (aOR = 0.67, 95% CI: 0.64–0.70; aOR = 0.74, 95% CI: 0.69–0.80, respectively), and were less likely to receive ≥ 20 mU/min of oxytocin (aOR = 0.79, 95% CI: 0.73–0.85; aOR = 0.80, 95% CI: 0.71–0.90, respectively). Hispanic women were less likely to receive an episiotomy (aOR = 0.63, 95% CI: 0.58–0.70), but Asian patients were more likely to receive an episiotomy (aOR = 1.39, 95% CI: 1.26–1.54). Despite these differences in care, there was no difference in vaginal delivery rates among Hispanic and Asian patients as compared to a white reference group.²⁶

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