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Seminars in Perinatology

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Global disparities in maternal morbidity and mortality

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ARTICLE INFO

Keywords:
Global disparities
Maternal mortality
Race/ethnicity

ABSTRACT

The disparity in maternal mortality for African American women remains one of the greatest public health inequities in the United States (US). To better understand approaches toward amelioration of these differences, we examine settings with similar disparities in maternal mortality and "near misses" based on race/ethnicity. This global analysis of disparities in maternal mortality/morbidity will focus on middle- and high-income countries (based on World Bank definitions) with multiethnic populations. Many countries with similar histories of slavery and forced migration demonstrate disparities in health outcomes based on social determinants such as race/ethnicity. We highlight comparisons in the Americas between the US and Brazil—two countries with the largest populations of African descent brought to the Americas primarily through the transatlantic slave trade. We also address the need to capture race/ethnicity/country of origin in a meaningful way in order to facilitate transnational comparisons and potential translatable solutions. Race, class, and gender-based inequities are pervasive, global themes. This approach is human rights—based and consistent with the UN Millennium Development Goals (MDG) and post 2015—sustainable development goals' aim to place women's health the context of health equity/women's rights. Solutions to these issues of inequity in maternal mortality are nation-specific and global.

Introduction

The International Statistical Classification of Disease (ICD 10) defines maternal death as "the death of a woman while pregnant or within 42 days of termination of pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes." Accidents/suicides are often reviewed during maternal mortality surveillance, but are not included in international maternal mortality ratios.[1] A late maternal death is the death of a woman from direct or indirect causes more than 42 days, but less than 1 year after termination of pregnancy.[2] In high-income countries these sentinel events are rare. Another indicator of maternal health-related outcomes is maternal near misses. WHO defines a "Maternal Near Miss" (MNM) case as "a woman who nearly died but survived a complication that occurred during pregnancy, childbirth or within 42 days of termination of pregnancy."[3] Maternal mortality ratios are expressed as number of maternal deaths per 100,000 live births. Severe maternal morbidities—"near misses" occur

Terrence Allen is supported by the National Center for Advancing Translational Sciences, United States of the National Institutes of Health under Award Number KL2TR001115. The content of this article is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

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http://dx.doi.org/10.1053/j.semperi.2017.04.009
0146-0005/

approximately 100 times more commonly than maternal mortalities and can be used as indicators of quality of care.[4] The higher frequency of these events enables more robust analysis of potential factors contributing to maternal deaths as well as examination of potential health disparities in care.[5] "Near misses" also allow survivors to provide their personal accounts of factors contributing to the adverse outcome.[3,6]

Globally, MDG-5 placed women's health in a human rights and political context. The world's nations pledged to reduce maternal mortality ratios by 75% from 1990 to 2015. The world's maternal mortality ratios have cut in half; however, still remain high- and low-income countries still bear the highest burden.[7] The fact that maternal mortalities are largely preventable events places these events in a human rights context as violations of women's reproductive rights.[8] Women's rights to education, access to quality health care, and health equity are essential; UN sustainable development goals continue this focus.[9]

Global disparities exist between low, high and middle, income nations with low-income countries demonstrating the highest maternal mortality ratios.[10] Within nations, disparities in race/ethnicity adversely impact maternal mortality. This analysis focuses primarily on middle- and high-income nations with identified racial/ethnic disparities in maternal mortality.

In the United States (US), maternal mortality ratios for non-Hispanic black women are 3–4 times higher than for White women.[11] Maternal near misses follow a similar pattern with non-Hispanic black women demonstrating approximately 2 to 5-fold increased risk for severe morbidity than non-Hispanic white women in the US.[4,12] In Brazil, maternal mortality for women of African descent is approximately five times higher than for white women.[13] The United Kingdom (UK) confidential inquiries demonstrate similar disparities with a greater than 5-fold increased risk for black women in the UK.[14] Maternal near misses occur twice as often for women of African and Afro-Caribbean descent in the UK.[5] In the Netherlands, an analysis of largely migrant populations demonstrated a higher rate of maternal near misses for African women than White women in their population.

United Kingdom

The United Kingdom (UK) Confidential Enquiries in Maternal and Child Health (CEMACH) is the oldest maternal mortality surveillance system in the world.[1] The focus has evolved since the 1950s from clinical issues to encompass clinical, public health, and policy issues to reduce health inequities.[1] The Enquiry's philosophy is to "recognize and respect every maternal death as a young woman who died before her time…a member of a family and of her community…it goes beyond counting numbers to listen and tell the stories of the women who died so as to learn lessons that may save the lives of other mothers and babies…as well as aiming to improve the standard of maternal health."[1] The UK is racially and ethnically diverse. Early reports did not analyze race/ethnicity. Since 1995, ethnicity was provided in England and the new query demonstrated surprising findings in a system where universal coverage through the National Health Service system was thought to eliminate barriers to care.[1] However, in 2000–2002, women self-described as Afro-Caribbean and African descent were noted to have maternal mortality ratios two and seven times higher, respectively, than Whites in the UK. These results should be interpreted with caution due to the overall small number of maternal deaths in this cohort.[1] In 2005, the UK initiated a United Kingdom Obstetric Surveillance System (UKOSS), a national, population-based audit to study near miss maternal morbidities and rare events. Rates of maternal near misses (MNM) for African and Afro-Caribbean women were double those for White women.[5] These risks remained elevated following adjustment for age, socioeconomic status, BMI, and parity (OR = 1.5, 95% CI: 1.15–1.96).[1] Maternal and system factors were identified as contributors to these disparities. Black and minority ethnic groups often book later for antenatal care than white women and report experiencing disrespect from health care providers. Many reported staff did not effectively communicate with them in a way they could understand during pregnancy, labor/birth and the puerperium.[5,15] The contribution of preexisting medical conditions to these outcomes was not measured in this UKOSS analysis.[5]

One of the strong features of the UK Confidential Enquiries is the use of "top ten" recommendations for maternal mortality prevention based on identified primary causes of maternal death[1] (Table). The report also highlights national guidelines aimed at reduction of the primary causes of maternal mortality. The report information is also disseminated publically.[1] The Confidential Enquiry made recommendations aimed at the reduction in racial/ethnic disparities in maternal mortality. Specifically, the report recommended the following:

- Maternity services should ensure that antenatal services are accessible and welcoming so that all women, including those who currently find it difficult to access maternity care, can reach them easily and earlier in pregnancy. Women should

Table – Strategies associated with overall maternal mortality and in disparities reduction (UK).

- Comprehensive maternal mortality surveillance and review system focusing on widespread dissemination of strategies for prevention.
- Ensure that antenatal services are universally accessible and welcoming, so that all women, including those who currently find it difficult to access maternity care, can reach them easily and earlier in pregnancy.
- Women should also have had their first full booking visit and hand held maternity record completed by 12 weeks of pregnancy.
- Pregnant women, who on referral to maternity services are already 12 weeks, should be seen within 2 weeks of referral.
- All pregnant women from countries and groups where women may experience poorer overall general health and who have not previously had a full examination should have a medical history taken and clinical assessment made of their overall health, including a cardiovascular examination at booking, or as soon as possible thereafter. This should be performed by an appropriately trained doctor, who could be their usual general practitioner.

also have had their first full booking visit and hand held maternity record completed by 12 weeks of pregnancy.
- Pregnant women, who on referral to maternity services are already 12 weeks, should be seen within 2 weeks of referral.
- All pregnant women from countries where women may experience poorer overall general health. And who have not previously had a full examination in the United Kingdom, should have a medical history taken and clinical assessment made of their overall health, including a cardiovascular examination at booking, or as soon as possible thereafter. This should be performed by an appropriately trained doctor, who could be their usual general practitioner.

Over the last decade; the UK demonstrated an overall, progressive reduction in the maternal mortality ratio from 13 (2003–2005) to 11.[1] For white women, the ratio decreased from 10.7 to 7.8 from 2000–2013. African women experienced a marked decrease in the maternal mortality ratio from 72 to 28 in the same period.[1,16] These changes are attributed to reorganization of maternity services to improve access for vulnerable populations as recommended.[1] The reduction in maternal mortality for one of the most vulnerable populations is encouraging; however, the continued disparity for women of African descent still remains a challenge.

Brazil

Over the last 3 decades Brazil has progressed from a low-income nation with a military dictatorship to a middle-income democracy.[8] In addition to political changes, over the last 30 years, Brazil transitioned from a country with one of the highest disparities in income and absent middle class to a democracy with a large and expanding middle class.[8] These political and economic changes influenced health-related outcomes. Cited changes include education for women, decreased fertility rates, urbanization, and reorganization of the health sector to provide a universal, national health care system.[8] The country met several MDGs for eradication of extreme poverty and hunger (reduce by half), promotion of women's equality, access to universal primary education (95% in 2005), and a reduction in mortality for children below than 5 years of age (from 58/1000 births in 1990 to 15.6 in 2011). Although maternal mortality rates have declined (from 120/100,000 live births in 1990 to 56/100, 100,000 live births in 2010), they did not meet MDG stated goals for maternal mortality reduction.[7,8] Despite these improvements in health care-related outcomes, disparities such as racial/ethnic disparities in maternal mortality/morbidity still exist.

Brazil and the US share similar historical legacies of forced slavery of individuals of African descent. Geographically, the majority of slaves were brought to the Northeast of the country. Despite economic advances, this area remains more economically depressed than the South. Unlike the US, however, after the abolition of slavery in 1888, Brazil never established legislation forcing racial segregation. Burgard notes that although "defacto" legislation did not exist, "dejure" discrimination against blacks in Brazil was maintained.[17] Also unlike the US, Brazil did not dichotomize race as "black/white" but based racial grouping along a "continuum" of color from white to black grounded in the country's long-standing history of racial admixture/miscegenation.[17–19]

In 2000, maternal mortality in Brazil was estimated by the World Bank at 49.3/100 K for white women and 240.4 for black women; deaths from hypertensive disease were 8 times higher for black than white women.[13] The Brazilian Ministry of Health estimated maternal deaths at 75/100 K in the same period and those numbers are consistent with most recent estimates.[13]

Brazil's fertility rate is 1.8 children/women and the country provides universal, free health care. The public sector covers approximately 75% of the population.[20] More than 95% of births occur in hospitals.[13] Abortion is illegal except in cases of rape and in if the mother's life is at risk.[20]

In a Brazilian cross-sectional study of 109 maternal mortalities from a single state, non-white women were 3.5 times more likely to die from direct obstetric death than white women.[19] For the purpose of their analysis race was categorized as white/non-white with the later constituting mixed and black racial categories from death certificate classification.[19] Authors describe the difficulty in studying race/ethnicity in Brazil due to tendency to classify by color/parental background/and social position or preference against use of any racial classification.[19]

Hypertensive diseases are the leading cause of direct maternal mortality in Latin America and may be a contributor to some of the disparities in maternal mortality for Afro-Brazilian women.[19,21,22] Martins demonstrated a higher risk for maternal mortality among Afro Brazilian women in a single state.[23] Similar to other studies, they identify hypertension related mortality as markers of limited access to health and suboptimal care, which may disproportionately affect black women.[19,21]

In a study of ethnicity and maternal near misses from a nationwide hospital-based survey from 2011 to 2012, Domingues demonstrated a higher risk for MNM in women over age 35 who self-identified as black. However, after adjusting for other variables, maternal race was no longer significant. Authors refer to the high rate of cesarean deliveries as a potential reason for the attenuation of this risk. The high cesarean delivery rate in Brazil (approximately 50%) is associated with an increased risk for MNM.[8,24] White women have significantly higher rates of elective cesarean deliveries than black women. Authors also conclude white women had better social and economic conditions; however, the greater access to health care, including, cesarean delivery may have increased their risk for MNM and attenuated the difference that would have been demonstrated if black women had similar cesarean delivery rates.[24]

A major challenge in Brazil involves the classification and identification of race/ethnicity.[25] Multiple measurement methods are applied to describe race/ethnicity and health outcomes in Brazil including: interviewers' identification of maternal race/ethnicity, self-description of "skin color" (black, brown, and white) and use of census categories. Consistent measurements will enable better comparisons and understanding of data and trends within the country and internationally.

Netherlands

The Netherlands has an ongoing, nationwide study of severe obstetric morbidity, the "LEMMoN" study.[26] The LEMMoN

study incorporated geographic country of origin in the study to identify and understand ethnic disparities in maternal morbidity and mortality. Zwart identifies maternal mortality as the 'tip of the iceberg" and utilize the LEMMoN study's large, nationwide, population-based study of all women experiencing severe maternal morbidities to analyze ethnic disparities in severe maternal morbidity.[26] They defined ethnicity by geographic ethnic origin. Women born in the Netherlands with one parent born outside the Netherlands was classified by the origin of their non-Dutch parent. Western immigrants and Dutch women were considered similar in terms of socioeconomic statuses and classified as "Western". Non-western immigrant women demonstrated a 1.3 fold risk (95% CI: 1.2–1.5) of developing a severe morbidity while Saharan African women demonstrated a 3.5 fold (95% CI: 2.8–4.3) increased risk for severe morbidity when compared to native Dutch women. Recent immigration was highest in women from sub-Saharan Africa, the Middle East, and the Far East. The increased risk was most evident in eclampsia. Lack of recognition due to communication barriers and substandard care were cited as factors leading to this disparity. The greater risk of low socioeconomic status, unemployment, single household, and high parity have been cited as significant explanatory factors for these differences in their adjusted multivariable regression model. However, the protective role of acculturation and community may also play a role, because severe morbidity was not increased in Moroccan and Turkish women who have resided in the Netherlands in large populations for more than 40 years.[26] Similar to the recommendations from the UK the authors highlight improved access to quality antenatal care and communication as areas for improvement to support the most disadvantaged women in Dutch society.

Van den Akker and van Roosmalen[27] reviewed maternal mortality and morbidity among migrants in high-income countries and note the paucity of available literature. In France, sub-Saharan African women demonstrated higher maternal women from sub-Saharan Africa demonstrated a higher maternal mortality ratio (aOR = 5.45; 95% CI: 2.47–35.7) when compared with white women. Sepsis and hypertensive disorders contributed to these excessive maternal deaths. Van den Akker and van Roosmalen[27] highlight the importance of understanding nativity/migration status as a potential factor associated with improving maternal health-related outcomes.

US: Hispanic population

The Hispanic population in the US is the largest ethnic minority group. Analyses of health outcomes for Hispanic women demonstrate a phenomenon known as the "Hispanic paradox." This Hispanic paradox describes lower rates of preterm birth, infant mortality, and maternal mortality in Hispanic women when compared with non-Hispanic whites despite higher adverse social determinants of health.[11,28] This paradox has been explained by a "health migrant" theory, strong social cohesion, better diet, and lower use of toxic substances like tobacco.[11] These data, however, may vary when specific geographic regions are evaluated.[29]

Maoddab reviewed national population data from the US Center for Health Statistics and CDC and analyzed health care disparities in maternal mortality by state. Maternal mortality was twice as high for non-Hispanic African American women overall. However, rates of maternal mortality were twice as high for non-Hispanic blacks than for whites in the US, overall. In their review, the overall US maternal mortality rate was 17.2. The rates for individual racial/ethnic groups were as follows: 11 (Hispanics), 14 (non-Hispanic whites), 40 (non-Hispanic black), 25 (native American), and 10 (Asian). In several states maternal mortality ratios were higher for Hispanic women than for whites: Arizona, Iowa, Mississippi (33.7 vs 16), New Mexico, New York, Oregon, Rhode Island, Utah, and Washington, DC. Authors identify "social, rather than geographic factors—unintended pregnancy, unmarried mother, and non-Hispanic black race" as the factors contributing to observed maternal mortality ratios. Addressing state level policies that affect health care disparities—particularly access to care are encouraged.[29]

Creanga et al.[12] provide an interesting analysis of ethnic disparities in severe maternal morbidity in the US that also incorporates nativity in the analysis. This analysis lends itself to better comparisons to the studies described in the Netherlands and the UK that attempt to tease out the impact of migration status on health outcomes. Creanga et al. use the CDC Pregnancy Mortality Surveillance system to calculate pregnancy related mortality ratios by race/ethnicity and nativity (from birth and death certificates). Maternal mortality ratios were 9 and 7.5 for US and foreign-born white women, but 9.6 and 11.6 for US and foreign-born Hispanic women. For women of African descent (Hispanic and non-Hispanic), foreign-born women had mortality ratios 3.6 times those of white women while US born Black women had ratios 5.2 times those of whites.[12]

After adjustments for age, foreign-born white women had the lowest risk of death in the US population. Maternal mortality from hypertensive disease and hemorrhage were higher for Hispanic women (US and foreign born) than US born white women. These data challenge the concept of a "Hispanic paradox" in maternal health. Authors highlight issues related to language barriers, access limitations related to legal status, and lack of familiarity as factors contributing to these adverse outcomes. Authors recommend further state and hospital reviews that address race, immigration status, and ethnicity to better understand and address barriers to care.

Conclusion

Global issues of race/ethnicity Universal coverage and universal access are not synonymous.[30] Universal health coverage, however, is an important step toward ameliorating poor health outcomes. This coverage is a consistent component of maternal mortality reduction in countries with successful maternal mortality reduction. Understanding the cultural and social contexts of inequity based on race/ethnicity as well as approaches to the amelioration of these inequities globally should also be a focus in our attempts to bridge disparities in health care. The approach to these goals from a human rights and political perspective remains essential.

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