Differential Pathways to Infant Health, by Race and by Income

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Background

The United States has a high rate of infant mortality relative to other developed nations. Approximately 23,440 infants died in the year 2013 in the U.S., at a rate of 6 deaths per 1,000 live births (Centers for Disease Control and Prevention, 2015; The World Bank, 2015). This rate is higher than that of most other developed nations.
Race has been linked to risk for infant mortality. Racial disparity reflects, on a national level, disproportionate infant mortality between black and white infants. Black infants are approximately two times more likely to die before the age of 1 year than are white infants (Matthews & MacDorman, 2013).

Within Kalamazoo County, as across the United States, white infants die at markedly lower rates than infants of color. This statistic is particularly significant in Kalamazoo County compared to other counties and states. Not only do black and white infants die at different rates, but they die from different causes: leading cause of death among higher-income white infants is congenital anomalies compared to prematurity, which is the leading cause of death among higher-income infants of color. The analysis of whether infants from different racial and socioeconomic groups have different factors which impact prenatal health, birth outcomes and infant survival make this study unique.

Objective

The goal of the current study was to examine whether variations in infant health by race and by income were associated with different sets of predictors, including maternal demographics, health behaviors, obstetric history, maternal health condition, prenatal care.
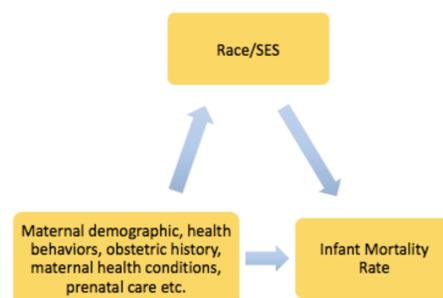
Method

Population-based cross-sectional study using secondary analysis of infant birth and death records. Sampling method was census, and the study sample consisted all infants born to Kalamazoo County residents during the study period, 2008 through 2014 (N=21,858).

The study outcome was infant health, as defined by full-term gestation (>37 weeks), adequate birthweight (>2,500 grams) and infant survival to first birthday. Predictors included maternal demographics, health factors and prenatal care. Generalized estimating equation models, stratified by race (of color, white) and income (Medicaid, private insurance), were conducted with two-sided statistical significance set at α<.05. Mediation by race and SES predictor was assessed using Baron and Kenny's process of mediation.

White	aOR (CI)	Of color	aOR (CI)
Higher income	1.4 (1.2, 1.6)	Higher income	1.1 (0.9, 1.4)
More education	1.4 (1.2, 1.7)	More education	1.2 (1.0, 1.5)
Adult (20+)	1.0 (0.8, 1.3)	Adult (20+)	1.1 (1.0, 1.4)
Married	1.0 (0.8, 1.1)	Married	1.3 (1.0, 1.6)
No fertility tx	3.3 (2.2, 4.3)	No fertility tx	1.7 (0.4, 7.5)
No prior poor outcome	1.3 (1.0, 1.7)	No prior poor outcome	2.5 (1.9, 3.3)
No hypertension	2.6 (2.2, 3.1)	No hypertension	2.4 (1.8, 3.2)
Appropriate BMI	1.8 (1.4, 2.3)	Appropriate BMI	1.3 (0.9, 1.9)
No STD (chlamydia)	1.2 (1.0, 1.6)	No STD (chlamydia)	1.2 (0.9, 1.6)
Adequate PNC	1.9 (1.5, 2.3)	Adequate PNC	2.0 (1.5, 2.7)
No tobacco	1.1 (1.0, 1.3)	No tobacco	1.1 (0.9, 1.3)

Figure 1. Health outcome in socioeconomic-status-stratified groups

Higher income	aOR (CI)	Low income	aOR (CI)
KZO as white person	1.5 (1.2, 1.8)	KZO as white person	1.4 (1.2, 1.5)
More education	1.1 (0.6, 1.8)	More education	1.3 (1.1, 1.5)
Adult (20+)	1.1 (0.7, 1.9)	Adult (20+)	1.1 (0.9, 1.3)
Married	1.0 (0.8, 1.2)	Married	1.1 (1.0, 1.3)
No fertility tx	2.8 (2.0, 4.0)	No fertility tx	5.9 (1.9, 17.9)
No prior poor outcome	1.2 (0.8, 1.7)	No prior poor outcome	2.0 (1.7, 2.5)
No hypertension	3.0 (2.4, 3.7)	No hypertension	2.3 (1.8, 2.8)
Appropriate BMI	1.4 (1.0, 2.0)	Appropriate BMI	1.7 (1.3, 2.2)
No STD (chlamydia)	1.2 (0.7, 2.0)	No STD (chlamydia)	1.2 (1.0, 1.5)
Adequate PNC	1.9 (1.5, 2.6)	Adequate PNC	2.0 (1.6, 2.4)
No tobacco	1.1 (0.9, 1.4)	No tobacco	1.1 (1.0, 1.3)

Figure 2. Health outcome in race-stratified groups

Results

Higher income status was protective for white infants but not for infants of color (income: white aOR1.39 (1.21, 1.60) / of color aOR 0.88 (0.69, 1.12). First trimester prenatal care, a protective factor, was more prevalent and brought significant health gains to white infants and to higher income infants but not to infants of color or low-income infants.
Women of color and low income women have substantially greater exposure to social, health & environmental risk– including lower income, less education, less fertility treatment, and tobacco use.
Having a prior poor birth outcome was more prevalent and was associated with greater risk to infants of color and to low-income infants.
Hypertension and having inconsistent or excessive prenatal visits are important factors on all women regardless of race and socioeconomic status.

Conclusion

Infants of color face different health risks than white infants; risks that vary not just in magnitude but in the character. High and low income infants of color express similar risk factors. This points to the need for tailored approaches to risk assessment, clinical care and public health interventions; such as patient centered clinical care models at the individual level and targeted population-level interventions which structure resources to meet the nature and degree of risk specific to a group.

References

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