

THE RELATION OF AGE TO LOW BIRTH WEIGHT RATES AMONG FOREIGN-BORN BLACK MOTHERS: A POPULATION-BASED EXPLORATORY STUDY

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Background: In stark contrast to the J or U-shaped relationship between age and low birth weight rates (< 2500g) seen among non-Latino White and Mexican American mothers, low birth weight rates among US-born Blacks are lowest in their teens and rise with increasing age (ie, weathering). The age-related pattern of low birth weight rates among foreign-born Black mothers is unknown.

Objective: To determine the relationship between age and low birth weight rates among foreign-born Black mothers.

Design: Stratified analyses were performed on the 2003–2004 National Center for Health Statistics vital record datasets of foreign-born Black mothers. Maternal age was categorized into six subgroups. Potential confounding variables examined included marital status, parity, and prenatal care usage.

Results: Foreign-born Black mothers (N=143,235) demonstrated a J/U-shaped age-related pattern of low birth weight rates with the lowest rates observed among those in their twenties and early thirties. The subgroups of 15–19 and 35–39 year old mothers had low birth weight rates of 12.0% and 11.4% compared to 9.1% for 25–29 year old mothers; RR=1.31 (1.22–1.42) and 1.25 (1.20–1.31), respectively. The J/U-shaped age-related pattern persisted independent of marital status, parity and prenatal care usage.

Conclusions: Foreign-born black mothers do not exhibit a weathering pattern of rising low birth weight rates with advancing age regardless of traditional individual-level risk factors. Further research into the age-related pattern of birth outcome among impoverished foreign-born Black mothers is warranted. (*Ethn Dis.* 2014;24[4]:413–417)

Key Words: Weathering, Low Birth Weight Infant, Maternal Age, Foreign Born, African American

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INTRODUCTION

Maternal age is strongly associated with birth outcomes; however, its relationship to low birth weight (< 2500g, LBW) rates varies by race and contributes to the long standing US-born Black women's pregnancy disadvantage. Among Whites there is a J- or U-shaped relationship with elevated rates among teens and those aged ≥ 35 years.^{1–3} In stark contrast, among US-born Blacks, LBW rates are actually lowest among teens and rise with advancing age.^{1–4} Geronimus proposed the Weathering Hypothesis to explain the later phenomenon.¹ It states that the reproductive health of US-born Black women begins to deteriorate in early adulthood as a physical consequence of cumulative socioeconomic disadvantage associated with lifelong minority status.¹

The limited available data highlights the importance of factors closely related to lifelong minority status, such as neighborhood poverty.^{2,4–6} However, prior studies showed that non-Latino White and US-born Mexican-American mothers, even those with a lifelong residence in poorer neighborhoods, did not exhibit the weathering pattern of rising LBW rates with advancing age.^{5,7} As such, the mechanisms underlying the weathering pattern among US-born Black mothers are incompletely understood. Foreign-born Black women of reproductive age are a unique subgroup of Blacks, the study of whom can help disentangle the contribution of intrinsic factors from those associated with lifelong minority status on birth outcomes. Interestingly, the LBW rates of African-born and Caribbean-born mothers in the United States are substantially lower than native-born US-born Black mothers; moreover,

their LBW rates approximate those of US-born White women.^{8–10} To our knowledge no study has addressed the relationship between age and LBW rates among foreign-born Black mothers (using PubMed search terms “infant, low birth weight”, “African continental ancestry group”, “weathering,” “maternal age” and “race”). This information may help us better understand the extent to which lifelong underserved minority status contributes to the disparate maternal-age related patterns of LBW rates between the races.

We, therefore, performed a population-based study to explore the relationship between age and LBW rates among foreign-born Black mothers. We hypothesized that foreign-born Black mothers do not exhibit a weathering pattern of rising LBW rates with increasing age.

METHODS AND STATISTICS

Using 2003 and 2004 vital records from the National Center for Health Statistics, we examined the LBW rates of US births to foreign-born Black women. Data were limited to singleton births. The race and ethnicity variables were used to define women as non-Latino Black. The maternal nativity variable was used to define women as

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Table 1. Characteristics of foreign-born black mothers delivering live births, US Vital Statistics 2003–2004 (n = 143,235)

Maternal Characteristic	n	%
Age		
15–19	6,209	4.3
20–24	24,470	17.1
25–29	38,997	27.2
30–34	41,014	28.6
35–39	25,337	17.7
≥40	7,208	5.0
Marital status		
Unmarried	56,657	39.6
Married	86,578	60.4
Parity		
Primiparous	54,595	38.3
1–3 previous live births	79,635	55.9
>3 previous live births	8,176	5.7
Prenatal care utilization		
Inadequate	36,490	27.2
Intermediate	50,725	37.8
Adequate	22,632	16.9
Adequate plus	24,433	18.2

foreign-born. Maternal age was categorized as: 15–19, 20–24, 25–29, 30–34, 35–39, or ≥40 years. Women aged <15 years were excluded from the study.

We calculated low birth weight (< 2500g, LBW) rates according to maternal age. Parity was defined as primiparous, low (1–3 previous births), or high (>3

previous births). We used the trimester of entry into prenatal care and number of visits to categorize women according to the Adequacy of Prenatal Care Index into those receiving inadequate, intermediate, adequate, and adequate plus care.¹¹ Women with adequate-plus levels of prenatal care were excluded from the stratified analysis because they represent a

pool of women with high medical risk for low birthweight. We calculated age-specific LBW rates according to marital status, parity, and prenatal care. Relative risk (RR) and ninety-five percent confidence intervals (95% CI) were computed using SAS, version 9.2, statistical software (SAS Institute, Inc, Cary, North Carolina) using the 25–29 age category as the reference group.

RESULTS

In our study population, foreign-born Black mothers (N= 143,235), who are described in Table 1, had an overall LBW rate of 10.1%. Of the women studied 23% were of advanced maternal age (aged ≥35 years) and 4.3% were teenagers. More than half of the women studied were married, had between 1–3 previous births and had less than adequate prenatal care utilization. There was evidence of a J-shaped age-related pattern of LBW rates (Figure 1). Teenage foreign-born mothers 15–19 years old (N=6,209) had a LBW rate of 12.0% compared to 9.1% for their 25–29 years old counterparts (N= 38,999), RR = 1.31 (1.22–1.42). Low birth weight rates were also elevated among 35–39 (N=25,339) and ≥40 (N=7,209) mothers compared to those aged 25–29 years, RR= 1.25 (1.20–1.31) and 1.47 (1.38–1.57) respectively (Table 2).

Figure 2 shows age-specific LBW rates according to maternal marital status. As expected, LBW rates were higher among unmarried (compared to married) mothers regardless of maternal age. However, each subgroup demonstrated the same age-related pattern of LBW rates: rates were greatest for teens and for women aged ≥35 years. Similarly, we found no evidence of a weathering pattern of lower LBW rates in the teen years that subsequently rise throughout childbearing years among those of high parity (Figure 3) or those who had inadequate prenatal care utilization (Figure 4).

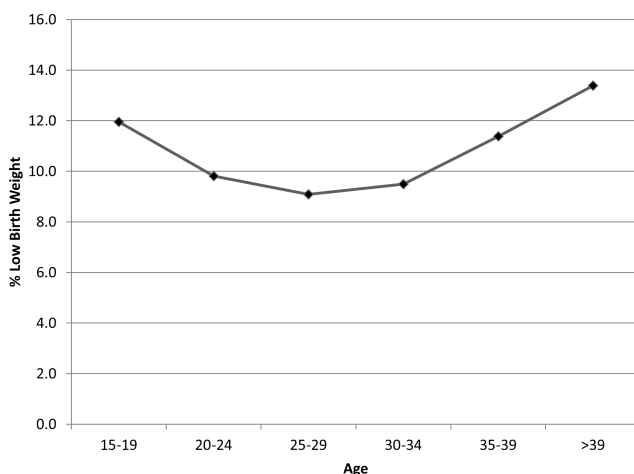


Fig 1. Low birth weight rates by maternal age; United States, 2003-2004. The lowest rates of LBW occurred in mothers 25–29 years old

Table 2. Relative risks for the relationship between maternal age and low birth weight, overall and stratified by maternal characteristics, among foreign-born Black mothers, US Vital Statistics 2003–2004 (N=143,235)

Maternal Characteristic	15–19 RR (95% CI)	20–24 RR (95% CI)	25–29 ^a RR (95% CI)	30–34 RR (95% CI)	35–39 RR (95% CI)	≥40 RR (95% CI)
All women	1.3 (1.2, 1.4)	1.1 (1.0, 1.1)	1.0	1.0 (1.0, 1.1)	1.3 (1.2, 1.3)	1.5 (1.4, 1.6)
Unmarried	1.2 (1.1, 1.3)	1.1 (1.0, 1.1)	1.0	1.1 (1.0, 1.2)	1.3 (1.2, 1.4)	1.3 (1.2, 1.5)
Married	1.3 (1.1, 1.6)	1.0 (.9, 1.1)	1.0	1.1 (1.0, 1.1)	1.3 (1.2, 1.4)	1.6 (1.5, 1.7)
0 prior live births	1.2 (1.1, 1.3)	1.0 (.9, 1.1)	1.0	1.2 (1.1, 1.3)	1.6 (1.4, 1.7)	2.1 (1.9, 2.4)
1–3 prior live births	1.6 (1.3, 1.9)	1.2 (1.1, 1.2)	1.0	1.0 (.9, 1.1)	1.2 (1.2, 1.3)	1.4 (1.3, 1.6)
≥4 prior live births	1.2 (.8, 1.8)	.9 (.8, 1.2)	1.0	1.0 (.8, 2.0)	1.0 (.9, 1.7)	1.1 (.9, 1.4)
Inadequate PNC	1.5 (1.3, 1.8)	1.2 (1.1, 1.4)	1.0	1.0 (.9, 1.1)	1.2 (1.1, 1.4)	1.6 (1.3, 1.9)
Intermediate PNC	1.6 (1.2, 2.0)	1.3 (1.1, 1.5)	1.0	1.0 (.9, 1.2)	1.2 (1.0, 1.4)	1.4 (1.0, 1.8)
Adequate PNC	1.5 (1.2, 1.8)	1.2 (1.0, 1.3)	1.0	1.0 (.9, 1.1)	1.3 (1.1, 1.4)	1.5 (1.3, 1.7)

PNC, prenatal care.

^a Common referent group (25–29 years of age).

DISCUSSION

Our exploratory study provides new information that LBW rates among foreign-born Black mothers do not deteriorate with advancing age. We found that foreign-born Black mothers actually exhibit a J-shaped age-related pattern of LBW rates similar to that observed among US-born White mothers. Teens and mothers aged ≥35 years have greater LBW rates than those aged 25–29 year. This non-weathering pattern persists in foreign-born Black

mothers independent of marital status, parity, and prenatal care usage. These exploratory findings provide insight into the mechanisms underlying the weathering phenomenon observed among US-born Black women.

Established literature shows that foreign-born Black mothers have LBW rates lower than their US-born Black peers.^{8–10} Our study confirms and extends these findings to the age-related patterns of LBW rates. Similar to non-Latino Whites and US-born Mexican-American mothers, foreign-born Black

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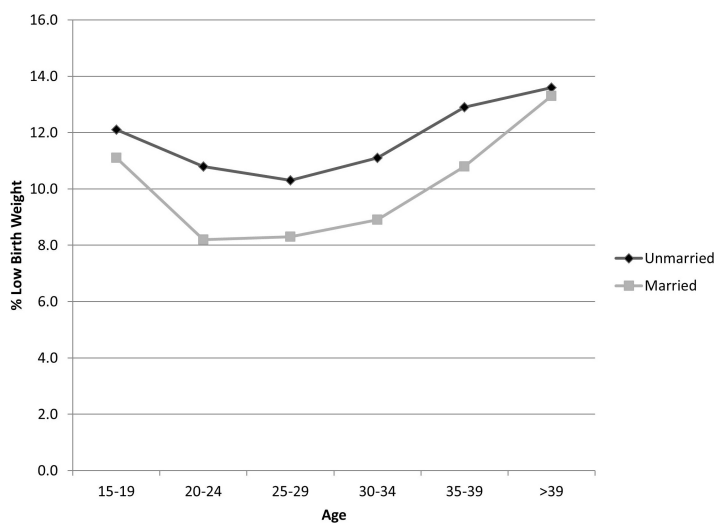


Fig 2. Low birth weight rates by maternal age and marital status; United States, 2003–2004. The lowest rates of LBW occurred in 25–29 year old unmarried mothers and in 20–24 year old married mothers

mothers do not exhibit weathering. Given that the majority of genes among US-born Blacks are of African origin,^{12–14} this finding suggests that intrinsic factors, such as ancestral genetics, are unlikely to singularly account for the racial differential in the age-related patterns of LBW rates.

We speculate that the lack of a weathering pattern among foreign-born Black mothers provides indirect evidence that unmeasured contextual factors closely related to lifelong and/or generational minority status may explain the weathering phenomenon observed among US-born Black women. One possibility for such contextual factors may be maternal exposure to neighborhood poverty. A prior study found a weathering pattern of rising LBW rates with advancing age among US-born Black mothers with early-life and/or adulthood residence in low-income

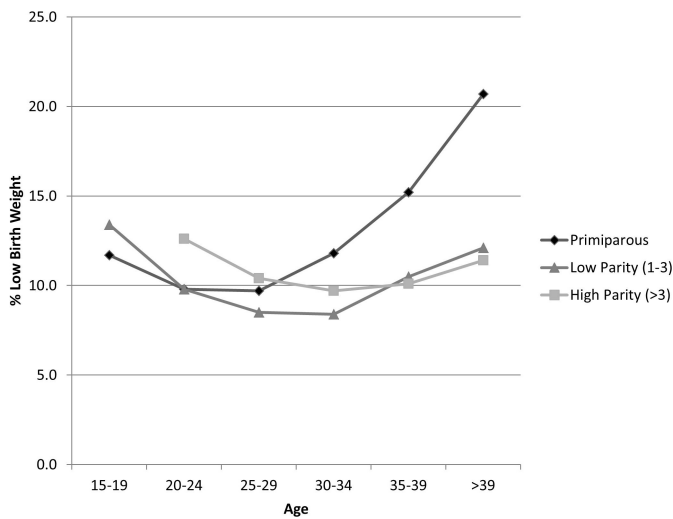


Fig 3. Low birth weight rates by maternal age and parity; United States, 2003–2004. The lowest rates of LBW occurred in 25–29 year old primiparous mothers and in 30–34 year old multiparous mothers (both low and high parity)

neighborhoods, but not among the few US-born Blacks who had experienced early-life and adulthood residence in higher income neighborhoods.⁵ It is possible that foreign-born Black women reside in higher income neighborhoods than their US-born counterparts given recent US census data showing lower poverty rates for African-born families (13.1%) and individuals (17.3%) than for

Blacks (25.8%).^{15,16} However, place of residence does not fully account for weathering since neither non-Latino White or US-born Mexican-American mothers with lifelong residence in low-income neighborhoods exhibit weathering.^{5,7} Further research into the relationship between residential environment and the age-related pattern of LBW among foreign-born Black mothers is warranted.

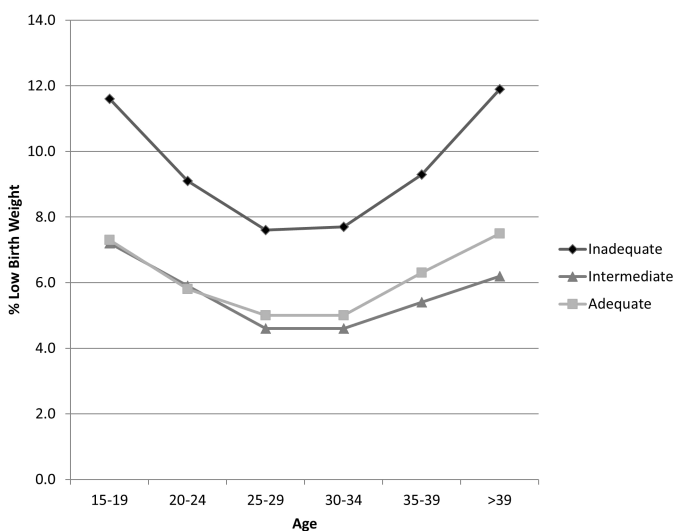


Fig 4. Low birth weight rates by maternal age and prenatal care; United States, 2003–2004. The lowest rates of LBW occurred in 25–34 year old mothers regardless of prenatal care usage

Another potential explanation for the weathering phenomenon observed among US-born but not foreign-born Black mothers could be exposure to racial discrimination, a stressor that has been shown to be associated with poor birth outcomes^{17–23} and may have a cumulative effect as US-born Black women age. In a recent study, US-born Black women reported a significantly higher prevalence of personal and group racism in eight life domains across the life course than their foreign-born counterparts.²⁴ More research is needed to determine whether racial discrimination contributes to the age-related gradient in LBW among African-Americans.

Our exploratory study has the benefit of a large sample size but vital records have pertinent limitations. First, we had no information of duration of maternal US-residence. A prior study showed that duration of US residence was a risk factor for birth outcome among Mexican-born mothers.²⁵ Second, we had no information on neighborhood income. We encourage researchers to explicitly take residential environment into account when examining the age-related pattern of birth outcome among foreign-born Black mothers. Third, it is possible that some mothers are represented more than once in the dataset if they had more than one birth during 2003 and 2004. Using the public-use data from the NCHS, which is stripped of identifiers, we cannot uniquely identify women or detect births to the same mother. Therefore, we cannot account for the lack of statistical independence across births to the same mother for the subset with more than one birth in that time period. Although this is a limitation of the analysis, it is likely to have a small impact on standard errors given only two years of birth records are used and this likely applies to a small subset of mothers in the sample. Lastly, sample size considerations forced us to combine all foreign-born Black mothers into a single group. However, prior studies have shown African-born and Caribbean-born mothers have comparable LBW rates, so this

grouping may be appropriate.^{9,26–28} We are unaware of published data on the birth outcomes of Canadian-born Black mothers.

In summary, our exploratory study shows that foreign-born Black women fail to exhibit weathering pattern of rising LBW rates with advancing age.

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AUTHOR CONTRIBUTIONS

Design and concept of study: Deal, Collins
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Data analysis and interpretation: Deal, Bennett, Rankin, Collins
Manuscript draft: Deal, Bennett, Rankin, Collins
Statistical expertise: Bennett, Rankin
Acquisition of funding: Deal, Collins
Administrative: Deal, Rankin, Collins
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