Why Do Mexican Americans Give Birth to Few Low-Birth-Weight Infants?

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There are relatively few low-weight births among Mexican Americans, despite their socioeconomic disadvantages. Fewer low-birth-weight (LBW) births result when babies are heavier at term or when there are fewer preterm deliveries. The authors used 1994 US singleton livebirth birth certificates to compare Mexican Americans with non-Hispanic Whites. They found that the lower LBW rate among Mexican Americans (5.8%) compared with non-Hispanic Whites (6.1%) occurred because fewer small, preterm babies were born to Mexican Americans (3.4% vs. 3.9%). This result was obscured by two findings. First, the mean birth weight of Mexican American babies (3,343 g) was lower than that of non-Hispanic White babies (3,393 g). This finding again showed the independence of mean birth weight and LBW. Second, the overall preterm birth rate was higher among Mexican Americans (10.6%) than non-Hispanic Whites (9.3%). Our hypothesis is that this finding reflects errors in recorded gestational age, as illustrated by a strongly bimodal birth-weight distribution at young gestational ages for Mexican Americans. Further studies on the LBW paradox among Mexican Americans should thus focus on gestational age more than on birth weight.


birth weight; gestational age; Hispanic Americans; Mexican Americans

Numerous researchers have commented on an apparent paradox regarding Mexican American babies. That is, there are relatively few low-weight births among Mexican Americans, despite their low socioeconomic status (1–8). It is not clear why pregnant Mexican American women and their babies are protected from the harmful effects of their adverse living conditions. When this paradox is explored, it may help to consider the components of low birth weight (LBW) itself.

There are two types of LBW babies (defined as those weighing <2,500 g): term and preterm. A low LBW rate implies that babies at term are heavier than expected, that there are fewer preterm deliveries than expected, or both. In the case of Mexican Americans, the source of the lower LBW rates has not been addressed fully. To our knowledge, no analysis has been conducted of the full birth-weight distribution of Mexican Americans. Preterm rates have been published, but they are inconsistent: a few studies have found favorable rates of preterm delivery among Mexican Americans (9, 10), but vital statistics data suggest that Mexican Americans give birth to more preterm babies than non-Hispanic Whites do (1, 3–6, 11). To what extent misclassification of gestational age might explain these discrepancies is unknown (11).

Our objective was to assess the components of LBW among Mexican Americans by comparing the full birth-weight distributions and gestational ages of Mexican Americans with those of non-Hispanic Whites. We also assessed possible errors in gestational age as recorded in vital statistics.

MATERIALS AND METHODS

We analyzed data from 1994 US birth certificates, including those for all singleton livebirths whose mothers were either of Mexican origin (Mexican Americans) or non-Hispanic Whites. First, we computed LBW rates, heavy birth-weight rates (≥4,500 g), mean birth weight, and standard deviations for each population. We also computed mean birth weights for foreign-born and US-born Mexican Americans.

In the next step, we analyzed the birth-weight distributions of term babies. We examined the distributions of those whose gestational age was more than 36 weeks. We also used the Wilcoxon-Russell approach to separate birth-weight distributions of all births into two components, main and residual (12). This procedure identifies the main Gaussian distribution of birth weights and a residual distribution of births of small babies outside the lower tail of the main distribution. The main Gaussian distribution corresponds to term babies. The small infants in the residual distribution are virtually all preterm.

We then computed rates of preterm delivery (<37 weeks of gestation) for Mexican Americans and non-Hispanic...
Whites. The National Center for Health Statistics (Hyattsville, Maryland) calculates gestational age for most births by using the date of the last menstrual period and the date of birth. If information is available on the month and year but not the day of the last menstrual period, then gestational age in weeks is based on the month and year. A clinical estimate of gestational age is used under only two conditions: if no information is available on the date of the last menstrual period (3.9 percent of 1994 births) or if the gestational age computed from that date is extremely inconsistent with the infant’s birth weight (0.2 percent of births). The gestational age variable is coded “not stated” when information on the last menstrual period or a clinical estimate of gestational age is not available (0.9 percent of births).

We also explored possible residual misclassification of gestational age by examining the birth-weight distributions within strata of gestational age. Misclassifications of the gestational ages of normal-weight babies may be evident from a bimodal distribution of weights among preterm infants, resulting from an excessive number of babies who are large for a given gestational age (13–15). We also computed frequencies of preterm births of babies who weighed less than 2,500 g, which is a crude method of excluding those whose gestational age has been misclassified.

**RESULTS**

A total of 454,264 Mexican American babies and 2,436,634 non-Hispanic White babies were among the singleton livebirths delivered in the United States in 1994. Mexican Americans gave birth to fewer LBW babies than non-Hispanic Whites did (5.8 vs. 6.1 percent), as well as fewer heavy (≥4,500 g) babies (1.4 vs. 2.0 percent, respectively). Mean birth weight was lower among Mexican Americans than non-Hispanic Whites (3,343 vs. 3,393 g), and the standard deviations were 562 and 589 g, respectively. The mean birth weight of both foreign-born (3,364 g) and US-born (3,309 g) Mexican Americans was lower than that of non-Hispanic Whites. Figure 1 shows the distribution of birth weights at term (>36 weeks) for Mexican Americans and non-Hispanic Whites. For Mexican Americans, the distribution shifted toward lower weights. The mean birth weight for at-term babies was 61 g less for Mexican Americans than for non-Hispanic Whites (3,416 vs. 3,477 g), and the standard deviation was smaller (473 vs. 491 g, respectively). The percentage of babies that were term and weighed less than 2,500 g was 2.5 for Mexican Americans and 2.4 for non-Hispanic Whites.

The Wilcoxon-Russell analysis of the birth-weight distributions of all births showed that the mean of the main

![FIGURE 1. Birth weight of Mexican American (Mex) and non-Hispanic (NH) White newborns at term (>36 weeks) based on information from US singleton livebirth birth certificates, 1994.](image-url)
Gaussian distribution (which corresponds approximately to term births) was 61 g lower for Mexican Americans than for non-Hispanic Whites (3,394 vs. 3,455 g) and that the standard deviation was smaller (477 vs. 494 g). The residual distributions were 2.9 and 3.6 percent, respectively.

The proportion of all births recorded as preterm was higher for Mexican Americans than for non-Hispanic Whites (10.6 vs. 9.3 percent). To explore the higher overall preterm rates for Mexican Americans, we plotted the birth-weight distributions of the two ethnic groups within strata of gestational age. Figure 2 shows that the Mexican American birth-weight distribution at 36 weeks of gestation was slightly asymmetric and was skewed toward heavy birth weights. At 32–35 weeks, this distribution became bimodal. At younger gestational ages, distributions for both ethnic groups were bimodal, and the first peak (at the lower weights) was smaller for Mexican Americans than for non-Hispanic Whites. The second peak, with its cluster of normal-weight babies, was more prominent among Mexican Americans. After all infants weighing 2,500 g or more were excluded from the preterm deliveries, the preterm rate was lower for Mexican Americans than for non-Hispanic Whites (3.4 vs. 3.9 percent).

DISCUSSION

It is well documented that Mexican Americans have low rates of LBW. This finding might easily be interpreted as evidence that Mexican Americans are larger at birth. There are biologic reasons that Mexican Americans babies might be expected to be heavier. For example, gestational diabetes is associated with higher birth weights (16) and is more common in Hispanics (17). Mexican Americans also smoke less and have a higher body mass index than non-Hispanic Whites do (18, 19).

It was all the more surprising, therefore, to find that Mexican American babies are on average smaller than non-

Hispanic White babies. This finding has been suggested previously in a few studies, although sample sizes were relatively small. Compared with the mean birth weights of non-Hispanic Whites, those of Mexican Americans were 12 g lower in Massachusetts (20), 62 g lower in six clinics in New York City and Chicago (Illinois) (21), and 105 g lower in Kaiser Permanente health clinics in northern California (22). Our data on nearly 500,000 Mexican American babies and 2.5 million non-Hispanic White babies provide more conclusive evidence that Mexican Americans are smaller at birth than non-Hispanic Whites and are confirm the lower LBW rates among Mexican Americans.

Our data further suggest that Mexican Americans give birth to few low-weight babies because they have few small preterm births. This result is supported by our statistical analysis of the birth-weight distribution, in which we found that the residual distribution was smaller for Mexican Americans. A methodological advantage of residual distribution is that it provides an estimate of the percentage of preterm births of small babies without using gestational age data (which are unavoidably prone to errors).

If the decreased occurrence of LBW among Mexican Americans is indeed due to fewer small preterm births, this finding provides a useful way to refocus the paradox. However, some comment is needed about two other observations that may have obscured this finding. One is the lower weights of Mexican American babies overall. Although the distribution of term births shifted to slightly lower weights, it was also narrower (i.e., with a smaller standard deviation), so the proportion of babies weighing less than 2,500 g increased only slightly. This result underscores the independence of LBW and mean weight.

The second observation that might have obscured the result concerns the apparent excess of preterm births among Mexican Americans overall. We cannot resolve this issue definitively, but our hypothesis is that a number of births classified as preterm were in fact term births mistakenly assigned young gestational ages. A bimodal distribution of the weights of preterm infants strongly suggests misclassification of gestational age (13–15). This finding was seen more often for the Mexican American babies (figure 2). While errors concerning gestational age occur for only a small portion of all births, they can make up a large fraction of preterm births (13).

We used a single cutoff point of 2,500 g to eliminate potentially misclassified preterm babies from our calculations. Other methods are available to identify misclassified gestational ages. Zhang and Bowes (15) fit a Gaussian curve to birth-weight distributions and considered misclassified the cases lying beyond a cutoff ranging from 1,250 g at 25 weeks to 3,600 g at 35 weeks. The data in figure 2 suggest that some misclassification could exist below such cutoffs. Choosing cutoff points other than 2,500 g to exclude implausible data would not change our conclusion that Mexican Americans give birth to few small, preterm babies. For example, after we excluded babies weighing more than 1,499 g, the preterm rates were also lower for Mexican Americans (0.9 percent) than for non-Hispanic Whites (1.0 percent).

Other studies have also reported high rates of “heavy preemies” among Mexican Americans (23, 24). Errors in calculating the last menstrual period are more common in low socioeconomic status populations in general (14, 25) and may account for much of the excess of heavy preemies among African Americans (26). Overpeck et al. recently published birth-weight-for-gestational-age curves for Mexican Americans and showed that they cross the curves for non-Hispanic Whites close to term (27). These authors concluded that Mexican Americans grow faster than non-Hispanic Whites early in pregnancy and slower thereafter. Even though Overpeck et al. replaced implausible gestational ages with clinical estimates, they acknowledged that residual misclassification could explain their results. Our interpretation of the preterm data is consistent with results from a hospital-based study with better-quality gestational-age data, which showed lower preterm rates for Hispanics than for non-Hispanic Whites (10). Preterm birth rates in Mexico are also relatively low (28, 29).

Possible causes for lower rates of preterm delivery among Mexican Americans are unknown. A Mexican cultural orientation has been suggested to be linked to favorable perinatal outcomes (30); in one study, a lower level of acculturation was associated with reduced prenatal stress and with a low frequency of preterm delivery (31). Available data do not suggest low rates of bacterial vaginosis among Hispanics (32).

Future studies on the Mexican paradox of LBW should focus on preterm delivery rather than on birth weight and should use measures of gestational age that reduce misclassification. If our hypothesis that Mexican Americans give birth to few preterm babies is confirmed, then further studies should focus on identifying the factors that protect this at-risk group from having high rates of preterm birth.

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REFERENCES


