

Breastfeeding Trends Among Very Low Birth Weight, Low Birth Weight, and Normal Birth Weight Infants

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Objective To examine the change in breastfeeding behaviors over time, among low birth weight (LBW), very low birth weight (VLBW), and normal birth weight (NBW) infants using nationally representative US data.

Study design Univariate statistics and bivariate logistic models were examined using the Early Child Longitudinal Study—Birth Cohort (2001) and National Study of Children's Health (2007 and 2011/2012).

Results Breastfeeding behaviors improved for infants of all birth weights from 2007 to 2011/2012. In 2011/2012, a higher percentage of VLBW infants were ever breastfed compared with LBW and NBW infants. In 2011/2012, LBW infants had a 28% lower odds (95% CI, 0.57-0.92) of ever breastfeeding and a 52% lower odds (95% CI, 0.38-0.61) of breastfeeding for ≥ 6 months compared with NBW infants. Among black infants, a larger percentage of VLBW infants were breastfed for ≥ 6 months (26.2%) compared with LBW infants (14.9%).

Conclusions Breastfeeding rates for VLBW and NBW infants have improved over time. Both VLBW and NBW infants are close to meeting the Healthy People 2020 ever breastfeeding goal of 81.9%. LBW infants are farther from this goal than VLBW infants. The results suggest a need for policies that encourage breastfeeding specifically among LBW infants. (*J Pediatr* 2018;■■:■■-■■).

Both the World Health Organization and the American Academy of Pediatrics^{1,2} have established breastfeeding as the preferred method of feeding low birth weight (LBW) and high-risk infants because it is health protective and health promoting for all infants.³⁻¹² Healthy People 2020, a health initiative with specific health goals for citizens of the US, aims for 81.9% of all infants to be ever breastfed and 60.6% of infants to be breastfed for ≥ 6 months by 2020.¹³

Previous studies investigated breastfeeding among small samples of LBW and very low birth weight (VLBW) infants,¹⁴⁻¹⁶ but breastfeeding patterns by birth weight have not been established using nationally representative data. The purpose of this study was to evaluate breastfeeding initiation and duration trends among a nationally representative sample of mothers of NBW, LBW, and VLBW infants in the US. Further, we investigated how breastfeeding behavior trends may vary by racial and ethnic groups over time. We hypothesized that normal birth weight (NBW) infants would have the highest breastfeeding rates, followed by LBW and then VLBW infants, because physical ailments increase as birth weight decreases.^{17,18} VLBW infants are strongly encouraged to breastfeed while in the neonatal intensive care unit (NICU),¹⁹⁻²¹ but may still lag behind LBW infants because breastfeeding is often more difficult for this population owing to problems with milk production²² and latching or sucking.^{23,24}

Methods

For the purpose of this study, breastfeeding was defined as receiving breast milk (from the mother or a donor) for nutritional purposes. It does not assume direct feeding at the breast and may include bottle-feeding or enteral tube feeding with breast milk.

Breastfeeding rates by birth weight status were assessed at three time points: 2001, 2007, and 2011/2012. For 2007 and 2011/2012, information from the National Survey of Children's Health (NSCH) was used²⁵ and, for 2001, the Early Childhood Longitudinal Program—Birth Cohort (ECLS-B) was used.²⁶ The NSCH analytic sample is restricted to children 0-5 years of age whose mother is the survey respondent and for whom there exists full breastfeeding information. ECLS-B responses come from the birth certificate and a survey administered at 9 months of age.²⁷ The ECLS-B sample is restricted to singleton births with full breastfeeding information whose biological mother was the survey respondent. Infants weighing <2500 g at birth were oversampled in the ECLS-B. This is a common practice when nationally

ECLSB	Early Childhood Longitudinal Program—Birth Cohort
LBW	Low birth weight
NBW	Normal birth weight
NICU	Neonatal intensive care unit
NSCH	National Survey of Children's Health
VLBW	Very low birth weight

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Supported by the National Center for Advancing Translational Sciences (NCATS) (UL1 TR000127 and KL2 TR000126 [to P.M.]); the Susan G. Komen Foundation Post-Baccalaureate Training Program in Disparities Research (KG101424 [to A.C.]); and the Penn State Hershey Cancer Institute, Social Science Research Institute, and Clinical and Translational Science Institute. The authors declare no conflicts of interest.

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<https://doi.org/10.1016/j.jpeds.2018.04.039>

representative surveys want to study subpopulations that would represent <10% of respondents in a fully random sample.²⁸ The oversampling allows for sufficient variation in the sample to study a small subgroup of interest (in this case infants weighing <2500 g). When proper weights are applied, results are not biased.

In the NSCH, birth was standardized to ounces and coded continuously. Infants were coded as VLBW if they weighed less <53 ounces (1500 g = 52.9 ounces).²⁹ Infants with weights from 53 to 88 ounces (2500 g = 88.2 ounces)²⁹ were coded as LBW, and infants who weighed ≥88 ounces were coded NBW.²⁹ Women were asked, “Was [sample child] ever breastfed or fed breast milk?” Answers were coded as yes (1) or no (0). Women were then asked, “How old was [he/she] when [he/she] completely stopped breastfeeding or being fed breast milk?” This variable was standardized to months by dividing the number of days fed breast milk by 30. Children who were breastfed for >6 months were coded as 1, and children who were breastfed for <6 months or not at all were coded as 0. This question does not distinguish between partial breastfeeding, enteral feeding, or the use of donor milk. For both datasets, the infant’s race and ethnicity was reported by the mother, and categorized as non-Hispanic black, non-Hispanic white, or Hispanic.

For the ECLS-B, birth weight was recorded continuously in grams on the birth certificate. This variable was recoded to reflect the following: infants weighing >2500 g were coded as NBW, <2500 to 1500 g were coded as LBW, and <1500 g were coded as VLBW. In the first wave of the ECLS-B survey, mothers were asked the questions: “Did you ever breastfeed your child?” (1 = yes) and “How many months have you breastfed your child?” (1 = ≥6 months). There were no questions in this dataset regarding partial breastfeeding, supplementation with formula, or supplementation with donor milk.

Univariate descriptive statistics and bivariate logistic models were used to examine breastfeeding rates among VLBW, LBW, and NBW infants in the US. Comparisons by race and ethnicity could not be investigated specifically for the non-Hispanic multiracial/other category owing to small sample size. All tabulations were weighted to be nationally representative. This study was approved by the University Park Institutional Review Board at the Pennsylvania State University (protocol #00001773).

Results

There was a steady increase in the percentage of all infants in all birth weight subgroups who were ever breastfed between 2001, 2007, and 2011/2012 (Table I). In 2001 and 2011/2012, the odds that a VLBW infant was ever breastfed were similar to NBW infants. In 2007 VLBW infants had an 83% increase in the odds of being ever breastfed relative to NBW infants. In contrast, LBW infants had lower odds of ever breastfeeding relative to NBW infants in all years. In 2011/2012, LBW infants had a 28% reduction in the odds of being ever breastfed relative to NBW infants. The odds of breastfeeding for ≥6 months were reduced by 52% for both VLBW and LBW infants relative to NBW infants.

Table II illustrates breastfeeding percentages by racial/ethnic group and year. The percentage of all NBW infants who were ever breastfed trended upward between 2001 and 2011/2012, but this trend did not occur among LBW infants. The percentage of VLBW infants who were ever breastfed has risen above or is almost equal to the percentage of NBW infants who were ever breastfed in 2011/2012 among all racial/ethnic groups. There was also no difference in the odds of ever breastfeeding between VLBW and NBW infants across all racial/ethnic groups in 2011/2012. However, among non-Hispanic white mothers, the odds that a LBW infant was ever breastfed was significantly lower than the odds that an NBW infant was ever breastfed.

All racial and ethnic groups saw a decline in the percentage of LBW infants who were breastfed for ≥6 months from 2007 to 2011/2012, and an increase in the percentage of VLBW infants who were breastfed ≥6 months between 2001, 2007, and 2011/2012. In 2011/2012, the percentage of VLBW infants breastfeeding for ≥6 months surpassed the percentage of LBW infants breastfeeding for ≥6 months among non-Hispanic black women and was almost equal among non-Hispanic white women.

Discussion

Rates of breastfeeding in VLBW, LBW, and NBW infants have greatly increased since 2001, with rates in VLBW infants improving more than LBW infants. Beginning in 2007, the percentage of VLBW infants who were ever breastfed has consistently equaled or surpassed the percentage of NBW infants who were ever breastfed. LBW infants, in contrast, displayed a reduced odds of ever breastfeeding relative to NBW infants in 2011/2012. Our study evaluated this pattern by birth weight categories using nationally representative data and we found that the odds of a VLBW mother initiating breastfeeding is not significantly different from mothers of NBW infants.³⁰

Because breast milk diets are strongly supported by the World Health Organization and the American Academy of Pediatrics, the high percentage of LBW infants who never received any type of human milk is concerning. Previous work on late preterm infants suggests that, even if infants seem to be healthy enough for discharge from the hospital, special interventions may still be required to begin and sustain breastfeeding.^{22,31}

VLBW infants require NICU admission more often than infants of greater birth weights,³² and 1 study showed that VLBW infants born to Hispanic mothers are admitted to a NICU less often than VLBW infants born to non-Hispanic white and black mothers.³³ Therefore, it is possible that improvements in rates of breastfeeding for >6 months among non-Hispanic black and white infants were due to interventions that occurred in the NICU setting,²¹ where mothers of VLBW infants receive support to breastfeed by hospital staff.¹⁹⁻²¹

Infants who are deemed not to need specialized attention or who are admitted to special care or intermediate care nurseries may not have the same breastfeeding supports as infants admitted to a NICU. For example, a hospital-grade breast pump

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