

Breast-feeding and anemia: Let's be careful

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The study of anemia and iron deficiency in 9-month-old James Bay Cree infants reported in this issue (page 323)¹ raises 2 interesting and provocative questions. First, what is anemia in this age group? Second, how well is a breast-fed 9-month-old infant protected against iron deficiency?

Commonly used norms were derived from populations of nonindigenous white children living near sea level,² but these cutoff points do not appear to apply to all populations. Emond and colleagues³ found that, for British children, a more representative cutoff for anemia was a hemoglobin concentration of less than 97 g/L. Other investigators⁴ found that African-Americans may have a mean hemoglobin level that is 5 g/L lower than the mean for white people, although care should be exercised in drawing conclusions from these differences.⁵ In the current study, only 5.3% of the formula-fed infants, most of whom received iron-enriched formula, had hemoglobin concentrations below 105 g/L at 9 months of age, and none had significant microcytosis. Might the levels for this group of formula-fed infants represent a "normal" range for James Bay Cree infants? In contrast, both breast-fed babies and those fed cow's milk had findings suggestive of iron deficiency. A total of 31% of the breast-fed infants had hemoglobin levels below 105 g/L, and 17% had levels below 100 g/L, as compared with 5% and 1% respectively among the formula-fed babies. Furthermore, the odds ratio for microcytosis (mean cell volume less than 71 fL) was 11 times higher among the breast-fed infants than among their formula-fed counterparts. Microcytic, hypochromic anemia in these infants was most likely due to iron deficiency, although other, less likely, conditions, such as chronic disease, vitamin B₆ deficiency, lead poisoning and thalassemia minor, can give a similar picture. Increased demand for iron among breast-fed compared with formula-fed babies was not likely a factor. The mean weight gain, and, thus, the blood volume expansion with growth, was less for breast-fed infants. If anything, this should have resulted in less demand for iron and less reason for iron deficiency.

Iron deficiency associated with consumption of cow's milk is well known. Iron deficiency among breast-fed infants is less well accepted,⁶ yet the findings of this study suggest that it may occur by 9 months of age. A healthy baby is protected against iron deficiency during the first 6 months of life. Hemoglobin levels at birth are high, in the

range of 180 to 210 g/L, and hemoglobin contains about 75% of the newborn's iron stores. Very little iron is lost, so that a 3.5-kg term infant who doubles her or his weight by 6 months should be able to maintain a hemoglobin level of 90 to 110 g/L without the need for extra iron. Thereafter, exogenous sources of iron become important, and this may be where the problem begins. The infant gains about 3.5 kg between 6 and 12 months of age, and to maintain a hemoglobin concentration of 110 g/L about 1 mg/d of additional iron is needed. Breast milk contains only 0.3 to 0.5 mg of iron per litre. Even if up to 50% of this iron is absorbed, it may not be enough, and additional sources of dietary iron may be needed to prevent depletion of iron stores and anemia. Iron-fortified cereals, which are important iron sources, may not be used or may not be readily available in remote communities. Other factors may have contributed to iron deficiency in the breast-fed babies in this study. Does maternal iron deficiency influence infant iron status and iron concentration in breast milk? Was the breast-fed infant being given tea or foods containing substances such as phytates that may interfere with the absorption of iron?

This important study has implications for public health and nutrition programs, especially around breast-feeding and the introduction of supplementary foods. Suggesting that breast milk can be improved on is like entering a minefield: one must tread carefully. It is important that these findings not be construed as a criticism of breast-feeding. Breast is still best. However, because of the severe, sometimes irreversible neurologic and developmental effects that may be associated with iron-deficiency anemia, these findings should not be ignored. Further studies are needed. Meanwhile, it seems prudent to supply additional sources of iron to breast-fed infants after 6 months of age,⁷ either as iron-fortified foods (e.g., infant cereals) or, if depletion is severe, as supplementary iron.

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