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ORIGINAL RESEARCH

Evaluation of Iron Deficiency Anemia in a Pediatric Clinic in the Dominican Republic

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Abstract

BACKGROUND Iron deficiency and iron deficiency anemia affect billions of people worldwide. Infants and young children are the most vulnerable. The Niños Primeros en Salud pediatric clinic aims to follow the American Academy of Pediatrics (AAP) recommendation to screen all children at 12 months of age, a vital period for development and the time of greatest risk.

OBJECTIVES To evaluate the clinic's performance screening for, diagnosing, and treating iron deficiency anemia; and to describe the prevalence and severity of anemia in infants and children attending a perirural clinic in the Dominican Republic.

METHODS A total of 293 charts were reviewed for hemoglobin tests performed between 9 and 15 months of age. If a hemoglobin screening was performed, then sociodemographic characteristics, medical history, and laboratory data were collected. If blood tests revealed anemia, then the presence or absence of documented anemia diagnosis as well as the presence or absence of documented provision of iron therapy were recorded.

FINDINGS Less than one-third (87, 29.7%) of patients had a documented hemoglobin test performed in this age range. Of these, 89.6% indicated anemia and nearly half (48.6%) revealed moderate anemia. One-third (34%) of hemoglobin results revealing anemia were not accompanied by a documented diagnosis. The vast majority (86.5%) of results indicated microcytosis, yet just more than half (50.8%) of anemic patients received iron therapy.

CONCLUSIONS Many children at the clinic were not screened for iron deficiency anemia during the period of highest risk. In the participants screened, iron deficiency anemia was underdiagnosed and often untreated. Anemia is a significant burden in this community—one demanding reliable screening and universal supplementation.

KEY WORDS Caribbean, iron supplementation, pediatric, quality improvement, resource limited setting.

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INTRODUCTION

Iron deficiency is the most common nutritional disorder worldwide, and iron deficiency anemia is among the most important contributors to global disease.[1] Anemia is estimated to affect at least 30% of the global population, or more than 2 billion people, and 50%-80% of this is attributable to iron deficiency anemia.[2,3] The disorders of iron deficiency and iron deficiency anemia exist on a broad spectrum and have profound consequences, including increased rates of prematurity, maternal and fetal mortality, neurodevelopmental deficits, increased infectious risks, and decreased productivity.[1,4] Although the impact of anemia and iron deficiency anemia is geographically variable, resource-limited settings are the most affected. Despite iron deficiency anemia's global influence, several institutions (eg, World Health Organization [WHO], the United Nations Children's Fund [UNICEF]) acknowledge that little improvement has occurred in decades.[5]

Infants and young children are among the most vulnerable to iron deficiency and iron deficiency anemia. Newborns accrete 80% of their iron stores during the third trimester, making preterm infants and those born to iron-deficient mothers particularly susceptible. Rapid growth and neurologic development in the first 12 months demand the highest daily iron requirement of any period in life.[6] This period is also marked by a transition to solid foods, which if insufficient in quantity or quality can exacerbate iron deficiency. Infants and young children in resource-limited settings often have increased iron needs because they are born iron deficient, have increased losses from parasitic infections, or both. All these factors increase the risk and prevalence of iron deficiency and iron deficiency anemia and the subsequent negative health consequences.[3]

Of particular importance are neurodevelopmental deficits accrued in children with iron deficiency and iron deficiency anemia—psychomotor delay, impaired cognitive performance, and decreased energy. Research by Lozoff et al of children 12-23 months of age found that children with moderate iron deficiency anemia (hemoglobin [Hb] < 10 g/dL) had lower mental and motor functioning both before and after iron supplementation despite a robust hematologic response (Hb increased on average 3.7 g/dL).[7] In a follow-up study of the same population, the authors found that nearly all children had comparable iron stores at 5 years. Yet the children who had either moderate iron deficiency or refractory iron deficiency in infancy had lower neurodevelopmental scores that persisted at 5 years.[8] Other studies found similar results while adjusting for socioeconomic and infectious factors, validating the concern that iron deficiency in infancy impairs motor and cognitive performance and is associated with potentially irreversible deficits.[9-11]

Unfortunately, conflicting results abound on the impact of iron supplementation on neurodevelopmental outcomes.[12,13] These discrepancies are possibly attributable to variability in timing of diagnosis, treatment, and follow-up, yet without unifying evidence to support intervention, global iron deficiency and iron deficiency anemia have remained a low priority. Anemia prevention programs may be warranted for preschool-aged children in areas with high iron deficiency anemia prevalence.

The Ministry of Health of the Dominican Republic does not have a recommendation on screening for anemia but recommends iron supplementation to all children from ages 6 months through completion of primary school. However, this occurs infrequently. American-trained pediatricians often work at the clinic where this study was performed and the American Academy of Pediatrics recommendation to ensure that all children are screened for anemia at approximately 1 year of age, starting as early as 9 months, has been accepted as a practice guideline. The objectives of this assessment were to review the clinic's performance screening for, diagnosing, and treating iron deficiency anemia. Further, the authors aimed to describe the prevalence and severity of anemia in infants and children attending Niños Primeros en Salud, a perirural clinic in the Dominican Republic.

METHODS

Setting. Data collection occurred at a pediatric clinic, Niños Primeros en Salud (NPS), located in Consuelo, Dominican Republic (perirural, population ~36,000) that cares for children younger than 5 years of age. NPS cares for children who live in 6 barrios (neighborhoods) that were chosen for proximity to the clinic and severity of poverty. These barrios are a good representation of many communities in the Dominican Republic. The pediatric clinic is staffed with a Dominican pediatrician, a Global Health Fellow from the United States, 1-2 rotating Dominican pediatric residents, and a Dominican registered nurse. The nurse is present 5 days a week, conducts home visits, and provides continuity for patients. NPS conducts deworming every 6 months, during which clinic providers travel door to door to dispense albendazole to