Iron-Strong Pregnancies, Babies, and Children

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"Step Into the Future of WIC"

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Disclosure Statement

I have no relevant financial or non-financial relationships in the products, services, or organizations described, reviewed, evaluated or compared in this presentation.

Objectives

- Identify four risk factors for iron deficiency anemia (IDA) in pregnancy and early childhood.
- Discuss the short- and long-term effects of IDA on the body.
- Integrate knowledge about IDA into your WIC education strategies.

Iron Deficiency Anemia (IDA)

- What?
  - A Definition
  - A Diagnosis
- Who, When, and Where?
  - A Person, Time, or Place at risk
- Why It Matters?
  - A Lifetime Impact

What? A Definition

- Anemia: is a condition in which the number of red blood cells or the oxygen-carrying hemoglobin protein (hgb) concentration within them is lower than normal.
- The most common reason for anemia is iron deficiency due to inadequate dietary intake. This is true world-wide and in the US.

- WHO hgb cut-offs – as of **March 2024**:
  - Infants and children < 10.5 (6-23 months), < 11 (24-59 months)
  - Pregnancy < 11 (first and third trimester), < 10.5 (second trimester)
- CDC
  - WIC hgb cut-offs are based on CDC guidelines.
- WIC hgb cut-offs
  - Infants and children < 11 (8-23 months), <11.1 (24-59 months)
  - Pregnancy < 11 (first and third trimester), < 10.5 (second trimester)
  - Post partum < 12

What? A Diagnosis

- Consider hemoglobin
- Also, other lab tests
  - MCV - the size of the red blood cells, varies with age, low = a Microcytic Anemia
  - Serum Iron level - <35-50
  - Ferritin – storage form of iron, earliest marker of deficiency, <12-15
- Improvement with supplemental iron treatment
- Clinical signs and symptoms
  - Low energy, light-headedness, headache, pale skin & mucus membranes, angular cheilitis, nail/skin/tongue/hair changes
  - Restless leg syndrome, pagophagia (ice), pica, breath-holding spells
  - If severe – heart failure, arrhythmia, increased rate of infection
  - **OFTEN, anemia has NO CLINICAL SIGNS OR SYMPTOMS!**

How Common is it?

- In pregnancy:
  - US rates 7.5% (NHANES 1999-2010, 2015-2018)
  - MN WIC data shows rates of overall rates 2011-2019
    - 10 to 19% total
    - 26 to 38% in 3rd trimester
  - Post partum:
    - MN WIC data shows overall rates 2011-2019

    - 30 to 36%
- In infancy and early childhood
    - US rates 5%
    - MN WIC data shows rates of 10.7 to 14.4% in 2011 – 2019
        - Varies by location: range of 3 to 21%, by county
        - Varies by race/ethnicity, from most recent data Q1 2020, range of 12 to 22%:
        - 20% NH Amer Indian AOIC/ 16% H Amer Indian AOIC
        - 20% Asian AOIC NH
        - 22% NH Black/African-Amer AOIC
        - 12% NH White AOIC/ 14% NH White AOIC
        - 16% H other AOIC

Who, When, and Where? Increased Risk

- Factors During Pregnancy
    - Race/ethnicity
    - Multiple gestation
    - Pre-existing anemia, diabetes, smoking
    - Adolescence
- Childbirth factors
    - Maternal hemorrhage
    - Early cord clamping
- Child factors
    - Suboptimal maternal iron status?
    - Prematurity
    - Delayed intro of solids
    - Early intro of cow's milk (before 1 year)
    - Toddlers drinking more than 24 oz milk/day
- Environmental factors
    - Food Insecurity/Financial stress
    - Urban, rural

Food Insecurity (Going Off Road…)

- Food insecure children 2.4 times as likely to have iron def anemia.
- FI may contribute to delayed intro of solids or lack of access to iron-rich foods.
- Feeding America's Map The Meal Gap data Hennepin County.
  - Overall rate of 7.5%, but WIDE RANGE from 0 to 29%.
  - Survey did not adequately sample newly arrived immigrants and refugees.
- USDA Data for 2023- shows increasing prevalence.

Public Policy

- WIC – the Original Food Is Medicine program
- and SNAP, CCAFP, Child Tax Credit
- Shout-out to Universal School Meals! Yay Minnesota!
- Access issues – food deserts, transportation, time, adequate staffing of skilled and culturally sensitive assistance program staff, need for navigation assistance

Why Care? Impact on Health & Development

- Anemia during pregnancy – increased stress on hear, poor fetal growth, complications of delivery, preterm birth and low birthweight
- Anemia while lactating – reduced milk production, postpartum depression, cognitive impacts
- Anemia in infancy and early childhood
  - Crucial role in neurocognitive development- affecting brain structure, neurotransmitter systems, and myelination of nerve fibers
  - Delayed cognitive, language, motor, attention and memory deficits, visual/auditory changes, decreased school performance, behavioral disorder – ADHD
  - **May also be seen in iron deficiency without anemia**

Treatment of Anemia

- 3-5 mg/kg/day of elemental iron, once daily
- Continue for minimum of 3 months, to fully replete
- Side effects: constipation, dark stools, dental staining, nausea, epigastric pain
- After meals, with orange juice, Vit C increases absorption, not with dairy – calcium inhibits absorption
- Dental hygiene after administration
- Keep medication out of reach of children

- F/U: Hgb at 1 month and Hgb and ferritin at 3 months
- Address underlying nutritional issues!
- If severe: IV iron, blood transfusion

How Well Do We Treat?

- MN WIC data – Resolution of Anemia within Subsequent Year
  - (2014-18) Ranges
    - Resolved < 6 mo : 26 to 47%
    - Resolved > 6 mo: 22 to 32%
    - No follow-up: 10 to 18%
    - Unresolved: 17 to 24%

How Well Do We Treat

- Children's HealthWatch Data
- A Case Study of Three US Urban Hospitals
  - Boston, Little Rock, Minneapolis, N=1978
    - 18.7% (370) had hgb<11 and MCV<77
    - 36.2% (134) iron rx
    - 36.6% (49) of those with a prescription had repeat lab
    - 10.2% (5) showed resolution of anemia
    - 5 of 370 (1.3%) children with anemia shown to be successfully treated

Treatment Failure

- Compliance – poor tolerance, need for weeks of treatment, cost
- Inhibitors of iron absorption: tannins in tea/coffee, oxalates in spinach, rhubarb, phosphate in soda, protein in milk or egg white, antacids and acid-reducing medications used to treat reflux
- Complicating diagnosis – GI disease with impaired iron absorption
  - Celiac disease
  - H pylori infection
  - Short bowel syndrome
- Other hematologic diagnoses, incl genetic conditions- thalassemia
- Persistence of cause (low-iron diet)

Prevention

- Delayed cord clamping at delivery
- WIC Lessons!
  - Encourage breastmilk
  - Adequate iron formula
  - Both until age 12 months
  - Weaning from the bottle ~ age 12 months
  - Iron rich foods: intro age 4-6 months, on-going utilization
- Beware Milk Toxicity

Purchase Patterns of WIC foods

- Trend of decreased purchase of iron-rich foods

Be Real! Prepare families for

- Transition to solids - timing
- Mess
- Pickiness
- Purchase Patterns of WIC foods

Family Dinners are Good Medicine

- Eating family dinners is associated with:
  - Healthy weight
  - Improved diet
  - Improved school performance
  - Improved emotional well-being for both children and adults

Health Equity Considerations

- Iron deficiency anemia is both preventable and treatable
- Occurs more commonly in communities of color
- Significant life-long implications for neurodevelopment
- Greater health equity requires re-energized and re-prioritized anemia prevention and treatment efforts

Challenges for WIC

- Initial enrollment
- Sustained enrollment
- Leverage of technology
- Cultural sensitivity
- Screening – FS, maternal BP and depression?
- Federal support

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Thank you!