Study suggests need for iron tests in teen girls and young women

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Four out of every 10 teen girls and young women may have iron levels low enough to cause symptoms such as low energy and dizziness, a new

study suggests.

But most of them probably don't know it, because regular health screenings for their age group don't include a blood test that measures the body's iron reserves, called a ferritin test, the lead author of the study says.

On the more severe side, the study finds that one in every 17 females age 12 to 21 have low enough iron levels to qualify them for a diagnosis of iron-deficiency anemia, which can cause life-limiting symptoms if not treated.

The study, published in *JAMA*, used national data from a broad sample of young women who took part in a health survey carried out by the Centers for Disease Control and Prevention.

While the overall iron deficiency rate in the study group was 40%, the rate was about 30% higher among both Black and Latina young women compared with their non-Hispanic white peers. Women from other racial and ethnic backgrounds, taken as a group, also had slightly higher rates of iron deficiency.

Meanwhile, those with family incomes near or below the poverty level had 24% higher rates of iron deficiency than those with higher incomes.

Even though the study confirms menstruation's general link to lower iron levels, it also shows that 27% of girls who had not yet gotten their first period already had low iron levels. Meanwhile, the rate of iron deficiency in the rest of the study group didn't change with the number of years the young women had been menstruating.

Lead author Angela Weyand, M.D., a clinical associate professor of pediatrics at the University of Michigan Medical School, says the

findings suggest it's high time to consider routine screening of iron levels in adolescents and young women—even if they don't have symptoms such as fatigue, cognitive or mental health concerns, shortness of breath when exercising, pale or sallow skin, rapid heartbeat or headache.

"Iron deficiency is an under-recognized problem with adverse impacts, but its symptoms and even those of anemia are normalized in young females," says Weyand, a pediatric hematologist at Michigan Medicine who practices at University of Michigan Health C.S. Mott Children's Hospital. "Why are we not screening for a condition that is highly prevalent, easily diagnosed, easily treated and associated with serious symptoms and increased risk of death if not addressed?"

She notes that current testing recommendations focus on toddlers, and people who are pregnant or have a cluster of symptoms suggestive of anemia.

Besides the lack of screening at routine health care visits, Weyand notes that both young females and their health care providers may not routinely discuss menstrual bleeding. So a young woman may not know that she has abnormally heavy periods that might accelerate iron loss.

For the new study, Weyand and her colleagues used ferritin and hemoglobin blood test data, and other information, from a national survey called NHANES. They analyzed data from 3,490 females aged 12 to 21 who took part between 2003 and 2020 except for several years when ferritin levels weren't collected. The analysis excluded young women were pregnant or had signs of conditions that can interfere with iron levels, including diseases that involve chronic inflammation, the kidneys or the liver.

The study focused on ferritin, which is the form of protein-coated iron that's stored in the liver and called up into the blood when the body

needs more iron to assist with sending oxygen to tissues and organs, or to make hormones and build cells, hair, skin and nails.

The team set a level of under 25 micrograms per liter of blood (μg/L) as the definition for iron deficiency. But because experts don't have a clear international standard for what level of ferritin is too low, they also looked at levels under 15 ug/L and 50 ug/L.

They also looked at hemoglobin, and classified young women as having anemia if they were both below 12 milligrams per deciliter (mg/dL) of hemoglobin and 25 μg/L of ferritin.

Overall, 39% of the young women had ferritin levels below 25 ug/L, and 17% were below 15 ug/L. When it came to iron-deficiency anemia, 6% qualified for this diagnosis using a combined cutoff of 12 mg/dL of hemoglobin and 25 ug/L of ferritin.

Then, they looked at how ferritin and hemoglobin/ferritin levels varied among the young women based on their different characteristics. In addition to race, ethnicity and poverty, the researchers found other links.

About one-third of all the young women in the study had family incomes below 130% of the poverty level, and a slightly lower percentage reported experiencing food insecurity. Members of the low-income group were more likely to have iron deficiency and those with food insecurity were more likely to qualify for a diagnosis of anemia.

The average body mass index for the entire group was 22, but those with lower BMI were more likely to have iron deficiency.

Weyand hopes that the findings will act as a spur for health care providers to order ferritin tests in young female patients, and to counsel them on eating foods rich in iron—both the form found in animal-based

foods and that found in fruits, vegetables, nuts and seeds.

If ferritin levels are low even with a well-rounded diet, health care providers can recommend a multivitamin with iron, or oral iron supplements, which are low-cost and come in formulations designed not to cause digestive issues. For those with more serious iron deficiencies, intravenous iron is also available.

In addition to Weyand, the study's authors include her U-M Department of Pediatrics colleagues Gary L. Freed, M.D., M.P.H. and Sung Won Choi, M.D., M.S., and colleagues from other institutions Alexander Chaitoff, M.D., M.P.H.; Michelle Sholzberg, M.D., M.Sc. and Patrick T. McGann, M.D., Ph.D. Freed is a member of the Susan B. Meister Child Health Evaluation and Research Center.

More information: Angela C. Weyand et al, Prevalence of Iron Deficiency and Iron-Deficiency Anemia in US Females Aged 12-21 Years, 2003-2020, *JAMA* (2023). DOI: 10.1001/jama.2023.8020

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