## LAY ABSTRACT

The Recommended Dietary Allowance (RDA) for iron is 27 mg/d during pregnancy and 18 mg/d for non-pregnant, non-lactating women. By contrast, the RDA for iron in lactation is only 9 mg/d because of the expectation that there will be no menstrual losses during the first 6 mo postpartum. As a result, universal iron supplementation is generally not necessary for lactating women. Despite this, many women are advised to continue taking their prenatal vitamin-mineral supplements (usually containing at least 30 mg Fe daily) during the postpartum period, and data from the third National Health and Nutrition Examination Survey (NHANES) showed that, on average, lactating women took about 30 mg iron from supplements in addition to their daily dietary iron intake (~ 16 mg/d). For women who have become iron deficient during pregnancy or experienced substantial blood loss during childbirth, continuation of iron supplements postpartum may be beneficial. However, for those who have adequate iron reserves after childbirth, iron supplements could pose some risk because iron promotes oxidative reactions, which can damage DNA and affect lipid metabolism. These oxidative reactions have been linked to subsequent cardiovascular disease and some types of cancer. Thus, it is essential to better understand the consequences of iron supplementation during lactation.

The overall goal of this proposed study is to understand the potential for oxidative stress due to iron supplementation, and possible mechanisms for these effects, and to identify safe and efficacious ways to ensure adequate iron status during lactation. The study will be a randomized controlled trial of lactating women who are recruited within the first two weeks postpartum. Participants will be randomly assigned to one of the three groups: (***iron given between meals*** *(30 mg daily, in a multivitamin-mineral supplement),* ***iron given with meals*** *(30 mg daily, in a multivitamin-mineral supplement) and* ***multivitamin-mineral supplement with no iron, given between meals***). The treatment will last for 3 months. Blood and urine samples will be collected at the beginning and end of the 3-month treatment period to assess iron status and oxidative stress.

To our knowledge, no one has studied this question previously. The results will be important for improving guidelines for iron supplementation during lactation.