Donating blood before pregnancy is safe for mothers and babies

What is this research about?

Blood donations, especially when repeated, can deplete iron stores (iron deficiency) and lead to low hemoglobin levels (anemia). Iron deficiency is common in regular whole blood donors, with fatigue the most commonly reported symptom. For women of child-bearing age, iron deficiency is of particular concern because it may be associated with poor outcomes in mothers and babies.

The screening test for donor hemoglobin done before each donation ensures that donors with a hemoglobin level below the cut-off do not donate. Donors are also informed about the need for increased iron in their diet and, for frequent donors, the advisability of iron supplementation. However, repeat donors could unknowingly have iron deficiency since the predonation screening process checks the hemoglobin levels of potential donors but not their iron stores, and it's possible to have adequate hemoglobin levels to donate while still being iron deficient.

To better understand the potential impact of repeated blood donation by women, this study examined if there is an association between blood donations in female donors of child-bearing age and a risk of poor outcomes in the mother or her baby.

IN BRIEF: Repeated blood donations before pregnancy was not associated with risk of harm to newborns or mothers.

What did the researchers do?

The researchers conducted a study over time using donor data obtained from Canadian Blood Services and data on maternal and newborn outcomes obtained from an Ontario database of health services records. All Ontario women between 18–50 years of age who delivered an alive or stillborn infant between January 1, 2010 and March 31, 2012 were included in the study. Only a woman's first pregnancy occurring during the study time frame was included.

The analysis considered the occurrence and number of whole blood donations a woman made prior to pregnancy and the outcomes for her newborn. The main outcome they measured in newborns was a diagnosis of being smaller than usual for the number of weeks of pregnancy. The analysis also considered other measures of health in the newborn, such as preterm birth and birth weight <2500g, and in the mother, such as high blood pressure during pregnancy.

What did the researchers find?

Of 260,037 eligible women, 7,919 (3%) were blood donors, with a mean of 2.4±2.1 lifetime donations. The mean maternal age at the time of delivery for non-donors and donors was comparable at 30.3 ± 5.4 and 29.7 ± 4.9 years, respectively. Researchers found there was no increased risk of adverse newborn or maternal outcomes in women who donated blood before their pregnancy. The risk did not increase compared to women who never donated, or with increased frequency of donations prior to pregnancy. Some of the key findings were:

- A diagnosis of being smaller than usual for the number of weeks of pregnancy occurred in 23,706 (9.4%) of babies born to nondonors and 526 (6.6%) of babies born to donors.
- The risk of being smaller than usual for the number of weeks of pregnancy decreased with increasing number of lifetime donations when donations were one year prior to conception, with no association when donations were less than one year prior to conception.
- There was a reduction in the risk of low birth weight per additional donation, and for other secondary newborn or maternal outcomes there was no association except for maternal hypertension (possibly not clinically significant).

Researchers caution that the findings could be the result of a healthy donor effect, a bias related to the fact that one must be in a relatively good state of health to donate blood.

How can you use this research?

Canadian Blood Services is committed to safeguarding the health of every individual who generously donates blood. For women of child-bearing age, this study's finding that repeated blood donations before pregnancy is not associated with higher risks compared to women who never donate may be reassuring. The authors note that if maternal iron deficiency is confirmed, blood donation should be deferred, the cause of iron deficiency investigated, and iron supplementation offered when appropriate. This study shows the use of large databases, such as the Ontario database of birth records in combination with the Canadian Blood Services donor database, can help answer research questions.

About the research team: This study was led by **Dr. Michaël Chassé** of the Centre de recherche du Centre hospitalier de l'Université de Montréal and includes Canadian Blood Services experts in donor and clinical services and epidemiology.

This Research Unit is derived from the following publication:

Acknowledgements: This work was supported by a Canadian Blood Services-CIHR Partnership Operating Grant Program. The views herein do not necessarily reflect the views of Canadian Blood Services or the federal, provincial or territorial governments of Canada. Canadian Blood Services is grateful to blood donors for making this research possible.

Keywords: blood donation, neonate, mother, iron deficiency

Want to know more? Contact Dr. Mindy Goldman at mindy.goldman@blood.ca