Study of 5 million Swedes finds links between blood groups and disease risks

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Researchers at Karolinska Institutet have found links between certain blood groups and a total of 49 diseases, including a new finding that having blood group B seems to be a protective factor against kidney stones. The study, which includes data on more than five million people and over 1,000 diseases, confirms previously identified connections

between certain blood groups and increased risk of blood clots, bleeding conditions or pregnancy-induced hypertension. The result is published in *eLife*.

A person's type of blood can vary depending on which proteins, so-called antigens, occupy the surface of the red blood cells. Two systems—ABO and RhD—are commonly used to define one's blood group. The ABO-system contains four main blood groups: A, B, AB and O, each of which can be either RhD positive or RhD negative. Identifying a person's blood group is essential for the safe administration of blood transfusions. It has also been used to make inferences about the susceptibility of certain diseases.

Previous studies have found that people with blood group O were less likely to have cardiovascular disease or experience a blood clot, but more likely to have a bleeding condition, than people with blood group A or B. Others have suggested that people with certain blood groups may be more susceptible to some infectious diseases.

Analyzed more than 1,000 diseases

"There is still very little information available about whether people with RhD-positive or RhD-negative blood groups may be at risk of certain diseases, or how many more diseases may be affected by blood group," says first author Torsten Dahlén, a Ph.D. student in the Department of Medicine, Solna, at Karolinska Institutet. "To help fill this gap, we used an unbiased approach to investigate the link between ABO blood types and RhD groups and more than 1,000 diseases."

The researchers scanned Swedish health registries with information on more than five million people and found 49 diseases that were linked to the ABO system, and one that was linked to the RhD system.

Their findings confirmed that people with blood group A were more likely to experience a blood clot and that those with blood group O were more likely to experience a bleeding disorder. They also verified that women with blood group O were more likely to experience pregnancy-induced hypertension.

New link to kidney stones

Additionally, they found a new connection between having blood group B and a lower risk of developing kidney stones. And women who were RhD-positive were more likely to experience pregnancy-induced hypertension.

The authors say that more studies are needed to confirm the results and to determine how different blood types or groups may increase the risk of certain diseases, or whether there are alternative explanations for these relationships.

"Our findings highlight new and interesting relationships between conditions such as kidney stones and pregnancy-induced hypertension and blood type or group," says senior author Gustaf Edgren, associate professor of epidemiology at the Department of Medicine, Solna, Karolinska Institutet. "They lay the groundwork for future studies to identify the mechanisms behind disease development, or for investigating new ways to identify and treat individuals with certain conditions."

More information: Torsten Dahlén et al. An agnostic study of associations between ABO and RhD blood group and phenome-wide disease risk, *eLife* (2021). DOI: 10.7554/eLife.65658

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