Medical Xpress

Beyond signaling risk, blood pressure and obesity causally related to lifespan

October 17 2019

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Researchers are exploring the cause and effect relationships between common health indicators and lifespan, by analyzing polygenic risk scores (PRS), a numerical score of a person's risk for disease based on

multiple genetic variants. Saori Sakaue, MD, a Ph.D. candidate at Osaka University, and her mentor Professor Yukinori Okada, recently showed that in addition to signaling inherited risk of a disease, PRS revealed that blood pressure and obesity are themselves causally related to lifespan. The research was presented at the American Society of Human Genetics 2019 Annual Meeting in Houston, Texas.

"Meeting patients around the world, I've found that people want to understand their genetic risk," Dr. Sakaue said. "When you find you are at a high risk for a disease, it is great to know your future health risk but obviously you cannot modify the inherited genetic risk. I wanted to find something that we could also modify to improve outcomes, such as lengthening lifespan, by utilizing the genetic data in a population scale."

To find a clinically actionable indicator of genetic risk, Dr. Sakaue and her team started by examining samples from BioBank Japan, which has a heavy East Asian representation. They used the genetic data of 180,000 people to perform genome-wide association studies for 45 common health indicators. By analyzing the PRS of each indicator, they identified the ones that most strongly affected lifespan.

"If you only look at raw clinical data associated to lifespan, you cannot show which attribute is cause and which is effect," Dr. Sakaue said. "For instance, when a patient is dying, their blood pressure is low, so you can't necessarily know if blood pressure is the cause of their death. By using PRS, we can get closer to identifying the cause, because PRS is less susceptible to the acquired confounding factors such as decline in general health."

For the individuals in BioBank Japan, Dr. Sakaue and colleagues found that high blood pressure and obesity had the most significant associations to reduced lifespan.

To improve the diversity of their study and ensure that these associations held across populations, the researchers collaborated with the UK Biobank and FinnGen, and performed a trans-ethnic association study of PRS and lifespan. This increased the sample size to 700,000 and, with the help of additional analyses, reinforced the conclusion that blood pressure and obesity are causally related to reduced lifespan.

The researchers emphasized that while blood pressure and obesity are heritable traits, they can also be monitored and modified. "Obesity and blood pressure can be modified through lifestyle changes and medications. So, a clinician can tell his or her patients that genetics research suggests modifying these areas may help extend lifespan, in order to encourage their lifestyle changes," said Dr. Sakaue.

Dr. Sakaue's next steps in this research are to collaborate with more biobanks to grow the genetic diversity of their data and find more clinically actionable causal factors. She hopes that beyond identifying someone's risk for a disease, her team can use biobank information to improve health.

More information: S Sakaue et al. (2019 Oct 16). Abstract: Trans-ethnic mega-biobank polygenic risk score analysis involving 676,000 individuals identified blood pressure and obesity as causal drivers affecting human longevity. Presented at the American Society of Human Genetics 2019 Annual Meeting. Houston, Texas.

Provided by American Society of Human Genetics