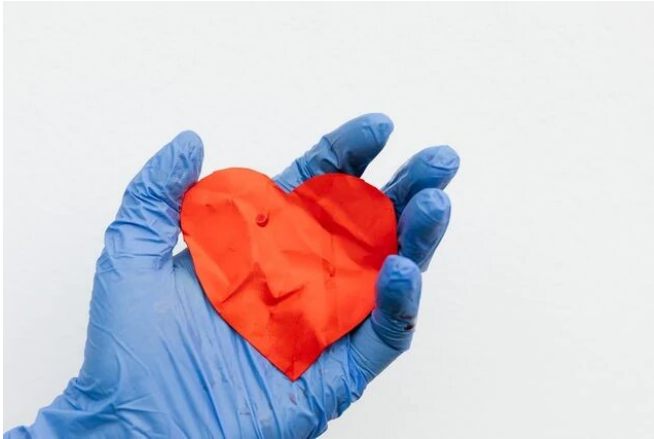


Modeling could predict heart disease in people with type 2 diabetes

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People living with type 2 diabetes could have a higher chance of developing cardiovascular disease, according to Dr Uddin's research. Credit: Karolina Grabowska/Pexels

Researchers from the University of Sydney's School of Project Management within the Faculty of Engineering have developed a model which aims to predict the risk of people living with type 2 diabetes developing cardiovascular disease.

The model has been found to have a high prediction accuracy with a range from 79 to 88 percent.

The study showcases the potential of machine learning in medicine, by using complex patient datasets and compiling them to find [risk factors](#) that contribute to a higher likelihood for a [disease](#).

Worldwide, nearly half a billion people live with type 2 diabetes, a progressive condition where the body becomes resistant to the normal effects of insulin.

"According to our study, people living with type 2 diabetes have a higher chance of developing

cardiovascular disease. However, it's not always clear who will develop it, and testing and monitoring can be time consuming and expensive," said the study's lead researcher, Dr. Shahadat Uddin.

In collaboration with University of Sydney researchers, Dr. Arif Khan and Mr Md Ekramul Hossain, Dr. Uddin developed the model using administrative data provided by private health fund, CBHS.

The administrative datasets were gathered from [private hospitals](#) in Australia, which contained patient admission information and discharge summaries.

"Our study found that the prevalence of renal failure, fluid and electrolyte disorders, hypertension and obesity was significantly higher in patients with both cardiovascular disease and type 2 diabetes than patients with only type 2 diabetes," said Dr. Uddin.

"These chronic diseases, disorders and conditions occurred frequently during the progression of cardiovascular disease in patients with type 2 diabetes," he said.

"What this study has revealed is that [machine learning](#) and network analysis of health data can be used to better understand disease progression. Our comorbidity risk prediction model could be useful for [medical practice](#) and stakeholders—including government and private health insurers—to develop health management programs for patients at high risk of developing multiple chronic diseases."

The team has developed a [software tool](#), now in a beta version, to implement the model.

One key learning from the research was that coding systems vary across hospitals and healthcare providers, making it difficult to quantify disease risk.

"To gain a more cohesive and broad understanding of [cardiovascular disease](#) risks in type 2 diabetes patients, our study suggests a universal coding practice, which would allow researchers to better analyze health data," said Dr. Uddin.

More information: Md Ekramul Hossain et al. Network analytics and machine learning for predictive risk modeling of cardiovascular disease in patients with type 2 diabetes, *Expert Systems with Applications* (2020). DOI: [10.1016/j.eswa.2020.113918](https://doi.org/10.1016/j.eswa.2020.113918)

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