

Blood markers may help predict psychosis in at-risk Asian youth: IMH-NTU study

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SINGAPORE – A simple blood test could one day help doctors predict who will develop psychosis long before debilitating symptoms fully appear, allowing patients to have better recovery outcomes.

In a study published in the journal *Translational Psychiatry*, researchers from the Institute of Mental Health (IMH) and NTU's Lee Kong Chian School of Medicine (LKC Medicine) have identified blood-based “proteomic” biomarkers – measurable patterns of proteins in blood plasma – that can help predict the development of psychosis in at-risk Asian youth.

Psychosis, which typically emerges from adolescence to early adulthood, is characterised by symptoms such as hallucinations, delusions and disorganised thinking.

In Singapore, one in 43 individuals aged 18 and above has been diagnosed with psychosis, [which includes schizophrenia, in their lifetime](#).

Currently, psychiatrists rely primarily on clinical assessments and behavioural observations to diagnose psychosis, which can be challenging because early warning signs can be vague and slow to develop.

“Certain sets of behaviours seem to put one at a higher risk of psychosis and this will be things like hearing voices that are a little bit softer, milder, not so severe, not so frequent, or having unusual experiences that don't really cross what we call the threshold to become a psychotic symptom,” said Associate Professor Jimmy Lee, who is a senior consultant psychiatrist at IMH and the group chief research and innovation officer at NHG Health.

To bridge that gap, the researchers turned to data from IMH's Longitudinal Youth At Risk Study (LYRIKS), a landmark Singapore study initiated in 2008 that laid the foundation for subsequent research in psychosis.

The study followed 173 people aged 14 to 29, of whom 65 participants were identified as being at ultra-high risk of developing psychosis. Over a two-year follow-up period, 13 of those individuals – about 20 per cent of them – were diagnosed with psychosis. This mirrors global data.

“Our objective is to identify ways to pinpoint and follow up more closely that 20 per cent, or perhaps intervene even earlier or more aggressively to prevent the onset of psychosis,” said Prof Lee, who led the LYRIKS study.

To do so, the researchers used advanced mass spectrometry to analyse the blood plasma samples of study participants, initially detecting a massive pool of 1,757 proteins, which they narrowed down to a core group of 605 proteins for the study.

They then created and tested five models using advanced machine learning methods to predict whether high-risk patients might develop psychosis.

What they found was that the blood protein patterns previously identified in Caucasian groups could successfully predict psychosis risk in Asian populations, achieving an accuracy rate of 75 per cent to 81 per cent.

The findings show that although the specific proteins identified differed between the LYRIKS and Caucasian groups, similar biological changes driving psychosis – such as immune system dysregulation – are the same across different ethnicities.

When researchers used machine learning to build new predictive models tailored to an Asian cohort (the LYRIKS dataset), the accuracy rate shot up to 96 per cent.

Clinical implementation, however, will take time as the findings still need to be validated in larger, independent global studies that are being conducted, Prof Lee said.

Also, as the current study focused only on proteins present in most blood samples, future research could look at lower-abundance proteins in the blood that might hold further biological clues, the researchers said.

Blood tests are not yet used to diagnose mental illnesses, but studies are being done in this area. Overseas, blood tests are currently used only to stratify the risk of patients with psychiatric

disorders, such as depression, to guide treatment choices, said Prof Lee.

Assistant Professor Wilson Goh, from LKCMedicine and the NTU Centre of AI in Medicine, who co-led the study, said there is potential to combine protein tracking with other data types such as genetics, metabolites, and social factors to improve predictive accuracy.

“The future of mental health care is likely to be increasingly supported by AI to deliver better outcomes,” he said.

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