Depression in adolescents linked to increased risk of cardiovascular disease

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Depression affects about 8% of adolescents worldwide and is a known risk factor for premature cardiovascular disease (CVD) in adulthood. While the reasons for this risk are not well understood, a study from The

Hospital for Sick Children (SickKids) has found that certain subgroups of adolescents with depression have an even higher risk of developing CVD.

CVD refers to a group of conditions that affect the heart and the blood vessels. Routine screening methods in place today rely heavily on body measurements to assess eligibility for preventive measures against CVD.

"Preventative cardiology in adolescents is important, as early interventions are known to diminish the more serious consequences of CVD later in life," says Dr. Brian McCrindle, a Senior Scientist in the Child Health Evaluative Sciences program and Section Head of Preventative Cardiology & Epidemiology at SickKids.

Previously, SickKids researchers in *Frontiers in Psychiatry* identified that just over half of adolescents with MDD exhibit at least two CVD risk factors.

Now, research published in *JAACAP Open* and led by Dr. Daphne Korczak, Associate Scientist in the Neurosciences & Mental Health program and a Staff Psychiatrist in the Department of Psychiatry, is delving deeper into how those risk factors present in adolescents MDD.

"By identifying the heterogeneity of depression in adolescents and better understanding the intersection between mental and physical health we hope to be able to provide more personalized and effective care for this vulnerable population," says Korczak, who is also the SickKids Chair in Child and Youth Medical Psychiatry.

Screening for CVD, regardless of weight or appearance

The study recruited 189 adolescents with Major Depressive Disorder (MDD) from the Children's Integrated Mood and Body (CLIMB) depression program at SickKids and assessed their mental health symptoms and cardiovascular risk factors, such as blood pressure, cholesterol and body mass index (BMI).

Using machine learning, and a statistical method called cluster analysis, the researchers identified four distinct groups of adolescents with depression, two of which demonstrated higher CVD risk. Of the two high-risk subgroups, one had high levels of low-density lipoproteins (LDL, or "bad" cholesterol) but appeared healthy on physical examination.

Adolescents in this group demonstrated this dyslipidemia—a condition known to lead to CVD and characterized by abnormal levels of lipids in the bloodstream—despite being of a healthy weight and having normal blood pressure.

"Our findings suggest that there may be a subgroup of adolescents with depression that would not be identified using usual physical examination indicators but are at increased risk for heart disease later in life," Korczak says.

Currently, treatment strategies for MDD are fairly standardized, despite the wide range of depressive symptoms observed and potential underlying mechanisms that may be at play.

Based on these findings, Korczak believes that a more tailored approach to treatment aligned with Precision Child Health, a movement at SickKids to deliver individualized care to each patient, could be provided that incorporates preventative heart health care to adolescents at a higher CVD risk, sooner.

"The more we understand the nuances of depression, the more precise our treatment plans can be," Korczak says.

More information: Anisa F. Khalfan et al, Identifying Cardiovascular Disease Risk Endotypes of Adolescent Major Depressive Disorder Using Exploratory Unsupervised Machine Learning, *JAACAP Open* (2024). DOI: 10.1016/j.jaacop.2024.04.004

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