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Prediction of Suicide Attempts in Early Adolescence

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Keywords

Suicide, adolescence, prediction, machine learning, random forest, mental health, youth

Abstract

Early adolescence can be a tumultuous transition period for many, and as such, suicide risk in this age range is heightened compared to earlier ages. By age 12, suicide is already the second leading cause of death among children of that age (Centers for Disease Control and Prevention). The primary aim of this study was to use psychosocial measures to longitudinally predict first-time suicide attempt (SA) after a one-year follow-up. To achieve this goal, a random forest model was trained and tested on year 2 follow-up psychosocial data from the Adolescent Brain and Cognitive Development (ABCD) Study, using participants who had no prior SA (N = 10,376; ages 11-13 years old). Participants were classified as having or not having new onset, past year SA at year 3 follow-up, based on the Kiddie Schedule for Affective Disorders and Schizophrenia (KSADS) – Lifetime Version (116 had SA [1.1%]). The model using psychosocial variables at year 2 follow-up to predict past-year SA at year 3 follow-up performed with an AUC of 0.79 (95% CI: 0.72-0.87). The same model was used to predict first-time, past-year SA at year 4 follow-up (N = 4,502; 99 had SA [2.2%]) with an AUC of 0.75 (95% CI: 0.66-0.83), highlighting the efficacy of model continuity. Important predictive features included: externalizing symptoms, specific suicidal ideation (suicidal ideation with a method, plan, intent, and/or preparatory actions), being a victim of reputational aggression, and neighborhood affluence. Future prediction of suicide attempts in youth is an important public health goal for the current direction of mental health, and even small improvements in predictive ability could greatly assist clinicians in identification and prevention efforts.