

Abstract

The Prediction of Suicidal Ideation as a Function of Daily Mood and Anxiety Scores Collected Using mHealth Technology in Patients Undergoing Treatment for Depression

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Abstract

Background: Suicide is one of the most common causes of death in the United States. The rates of suicide have increased by 33% in the period 1999-2019. In 2019, suicide was responsible for one death every 11 minutes. Clinically, a previous history of suicide attempts is the main risk factor, as well as the presence of comorbid conditions like depression and anxiety. Accurate and real-time prediction of suicidal thoughts may lead to improved management of patients with depression. Prediction of suicidality is difficult due to its day-to-day variability in relation to mood and anxiety symptoms. This can be overcome with the advent of mobile health (mHealth) technology that can capture granular data scores at a higher frequency than conventional therapeutic visitations.

Objective: The aim of this study is to predict suicidal ideation using self-reported mood and anxiety in patients undergoing treatment for depression.

Methods: This study will use data from the DepWatch study, an mHealth study that uses the DepWatch app developed by our research group. The objective of this longitudinal study is to develop an mHealth-based, personalized diagnostic prediction system for patients undergoing treatment for depression. Patients are followed over 12 weeks using electronic assessments conducted via the DepWatch app installed on their smartphones. The electronic assessments include the Quick Inventory of Depression Symptomatology-Self Report (QIDS-SR), conducted on a weekly basis, and weekly medication adherence and medication safety and tolerability questionnaires. The assessments include brief mood and anxiety assessments conducted on a daily basis. Generalized estimating equation modeling for a binary outcome (the presence or absence of suicidal thought), clustered by individual subjects, will be used. The key explanatory variables are the daily mood and anxiety levels (time variant). The outcome variable is suicidal ideation as determined by the self-reported subject response to question 12 (about suicidality) on the QIDS-SR scale. Variables that show significance at P values $<.1$ are subsequently used in the multivariate model, in addition to mood and anxiety.

Results: A total of 34 subjects are in the interim analysis set. The median age is 26 years, 85.3% are female, and 64.7% are White. In addition, 38.2% either have a college degree or graduate education, while 23.5% are unemployed and 41.1% are full-time employed. About half of participants (52.9%) earn less than \$50,000 annually and 61% have never smoked. Univariate analysis shows statistical significance of gender, race, aggregate anxiety, and employment status at .1 significance level. In the multivariate model, only gender and employment status are significant at .05. Race is marginally insignificant ($P=.068$).

Conclusions: Suicidality and completed suicides are significant public health problems, especially in patients with depression. The mHealth technology and statistical modelling that captures daily variability in anxiety leading up to suicidal ideation can help predict suicidality.

Conflicts of Interest: None declared.

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mHealth; suicide; mood; anxiety

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