Researchers identify objective predictors of suicidality in women

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Researchers have identified blood-based biomarkers and developed questionnaire-based apps that may help clinicians identify which of their female patients being treated for psychiatric disorders are at greatest risk of suicidal ideation or behavior.

In the article "Towards understanding and predicting suicidality in

women: biomarkers and clinical risk assessment," researchers at the Indiana University School of Medicine reported development of effective blood tests and questionnaires that are personalized for women.

The study, reported Tuesday in the Nature Publishing Group's leading journal in psychiatry, *Molecular Psychiatry*, follows similar research published in 2015 that identified blood-based biomarkers and questionnaires that could accurately predict which men were most likely to begin thinking of suicide, or to attempt it.

While women have a lower rate of suicide completion that men—likely because they tend to use less violent means—they have a higher rate of suicide attempts, noted the study's principal investigator, Alexander B. Niculescu III, M.D., Ph.D., professor of psychiatry and medical neuroscience at the IU School of Medicine.

Nonetheless, he said, "Women have not been adequately studied in research about suicide, and we did not know how well we would be able to define objective predictors of suicide in women.

"It was important to determine whether biomarkers and app-based questionnaires could be used to make predictions among women, and whether such tests can be adjusted for gender to be more accurate," said Dr. Niculescu, who is also attending psychiatrist and research and development investigator at the Richard L. Roudebush Veterans Affairs Medical Center.

"These results suggest that the best way to proceed would be to use gender-tailored approaches," he said.

Using methods similar to their previous studies, the researchers regularly assessed 51 female patients who had been diagnosed with psychiatric

disorders such as bipolar disorder, depression and schizophrenia, noting any instances when they swung between testing visits from no thoughts of committing suicide to high levels of suicidal ideation. In 12 patients with such swings, genomic analyses were conducted to identify genes whose activity was significantly different between two states. The candidate biomarkers were prioritized using the Niculescu group's Convergent Functional Genomics approach.

Next, working with the Marion County (Indianapolis, Ind.) Coroner's Office, the researchers validated the prioritized biomarkers using blood samples from six women who had committed suicide. Fifty such biomarkers were validated.

Although some of the biomarkers corresponded to those identified in the studies of male patients, others differed, such as those involved in mechanisms related to the body's responses to the psychiatric drug lithium, and genes involved with circadian rhythms. Such findings raise intriguing questions about potential diagnostic and treatment approaches, Dr. Niculescu said.

The two app-based questionnaires assess a patient's risk of suicidal thoughts and attempts, one using measures of mood and anxiety, the other with questions about life issues such as physical and mental health, social isolation and environmental stress. Neither directly asks whether the individual is having suicidal thoughts.

Finally, the researchers used blood samples and medical records from different groups of 33 women with the same psychiatric diagnoses to confirm that the biomarkers and apps predicted suicidal ideation, and also examined their ability to predict future hospitalizations for suicide attempts.

In combination, the biomarkers and apps were able to predict future

instances of suicidal thoughts with 82 percent accuracy, and future suicide-associated hospitalizations with 78 percent accuracy.

While the biomarkers and apps were effective in predicting suicidality, Dr. Niculescu cautioned that because the subjects in both studies had been diagnosed with psychiatric illnesses, how well the biomarkers would work among people who have not been diagnosed with a psychiatric disease is not known.

More information: *Molecular Psychiatry*, dx.doi.org/10.1038/MP.2016.31

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