Advances in Precision Psychiatry and Digital Health for PTSD

Katharina Schultebraucks, PhD

Posttraumatic stress disorder (PTSD) is a debilitating, stress-related mental health condition that occurs in people who have experienced a traumatic event. Although US Food and Drug Administration-approved pharmacological treatments exist for PTSD[1,2] and clinical practice guidelines recommend various psychological treatments,[3] major challenges remain for securing the long-term mental health of people who survive trauma. Large individual differences in the response to first-line treatment of PTSD exist and only one-half of patients respond; full remission is even rarer.[4]

Katharina Schultebraucks, PhD, is the Director of Computational Medicine and Artificial Intelligence and an Assistant Professor in Behavioral and Cognitive Sciences, Department of Emergency Medicine, Columbia University Medical Center.

Address correspondence to Katharina Schultebraucks, PhD, Department of Emergency Medicine, Columbia University Medical Center, 622 West 168th Street, New York, NY 10032; email: ks3796@cumc.columbia.edu.

New approaches are needed to overcome these challenges, and recent advances in precision psychiatry may spur the development of new computational methods. Such computational methods greatly improve the precision of the prediction of PTSD risk as well as treatment response. This issue of *Psychiatric Annals* outlines how machine learning (ML) and artificial intelligence can improve risk-based targeting of people who survive trauma to identify those with the highest predicted need for PTSD treatment and to inform treatment selection by predicting individual response to treatment.

The first contribution introduces the concept of precision psychiatry and outlines the role of ML for personalized medicine. The article presents recent discoveries in the field, such as scalable and potentially cost-effective algorithm-based screening for PTSD risk in the emergency department (ED).[5] The authors discuss how computational methods can improve both the prognostication of individual PTSD risk and the prediction of treatment response.[5]

The second contribution presents a valuable perspective on new innovative methods for digital measurements in clinical psychiatry.[6] There is a strong case for digital diagnostics that integrated objective, sensitive, and scalable tools into a common technological infrastructure and thereby foster multimodal ML models for accurate and objective monitoring of mental health.[6]

In the third contribution, various clinical useful digital health approaches for treatment delivery are presented. These digital health applications go far beyond imitating face-to-face health care delivery, and such applications also provide the option to gather clinical data in automated ways that can then be analyzed using artificial intelligence. This approach promises to enhance PTSD prediction, monitoring, and ad-hoc treatment interventions.[7]

The fourth contribution discusses the value of computational methods for the prognosis of PTSD risk after acute medical events such as cardio-vascular diseases (CVD) leading to ED admission.[8] CVD-induced PTSD is common. To implement targeted prevention early after the CVD event, a risk-based approach is needed, which requires an accurate clinical prediction model that is now achievable with the recent advancements in computational and digital technologies discussed in this issue.

The four articles and the continuing medical education quiz aim at informing clinicians and service providers about the recent advances in this rapidly evolving field of precision psychiatry. Digital health applications and digital diagnostics will become routine clinical

tools for the next generation of practitioners in clinical psychiatry. As the digital transformation in precision psychiatry is ongoing, it will be important to prepare the integration of such digital technologies into clinical practice. The aim of this issue is to offer guidance for clinicians to adopt digital health and to offer informed advice to their patients.

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