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Harnessing AI to Predict and Prevent Schizophrenia Relapse

Announcer:
You're listening to *NeuroFrontiers* on ReachMD. On this episode, sponsored by Bristol Myers Squibb, we'll hear from Dr. Matcheri Keshavan, who's the Stanley Cobb Professor of Psychiatry at Harvard Medical School and the Interim Head of the Department of Psychiatry at Beth Israel Deaconess Medical Center in Boston. He'll be discussing the role of artificial intelligence in schizophrenia care. Let's hear from Dr. Keshavan now.

Dr. Keshavan:
We are really witnessing a fascinating shift in how we track, anticipate, and potentially prevent relapse in schizophrenia using AI-driven technologies. Traditionally, relapse detection relied on patient self-report—what they told us—or what we observed, often after the relapse fully set in or the patient already started deteriorating.

Now, smartphone apps, variable sensors, and passive data collection are increasingly available, which allow for continuous real-world monitoring. For example, smartphone apps can track changes in speech, movement, and social interaction. These are signals that often precede relapse by days or weeks. Analyzing voice patterns can detect subtle indices, such as flat affect or slowing of speech that even trained clinicians sometimes miss. Wearable devices can monitor circadian rhythm, physiological stress responses, activity patterns, and so forth. And electronic health record systems can integrate these data streams, triggering alerts to care teams when the risk thresholds are crossed. These are called digital phenotypes, and there are many systems that use these digital phenotypes in predictive models that can identify relapse risk with a fair degree of accuracy in pilot studies. So this is a promising start.

Individualizing therapy plans is another important goal. Now, AI has the potential to make treatment more personalized—something that our field has long wanted to do. Today, AI algorithms can analyze complex data from multiple sources which were typically not used in our day-to-day clinical diagnoses—for example, information that comes from imaging, genetics, cognitive testing, historical evidence of treatment response, and so on. AI models can predict which patients are more likely to respond to certain treatments and which ones might be likely to have side effects based on a complex combinations of data.

Equally important is how AI can help with shared decision-making. When patients are able to see database projections, say the likelihood of response or side effects, they can engage in a much more informed, collaborative treatment choice, which empowers both patients and the clinicians.

There are many benefits, but there are also important limitations for AI. Access itself is a barrier. Many people with schizophrenia may lack smartphones. They may not have stable internet. They may not have digital literacy. And not all clinicians are well trained in AI. And no one wants to rely on a black box for life-changing decisions, so the algorithms must be validated, evidence-based, and transparent. There are also privacy issues, especially when we are collecting sensitive behavioral data like voice, tone, or GPS location. We need guardrails to ensure patients' dignity and privacy. Regulatory frameworks are evolving, but they're still lagging behind technology.

Another limitation that I have been particularly interested in over the last few years is the fact that AI systems make mistakes because they are based on imperfect data. They can have errors; sometimes they're called AI hallucinations. So one has to be wary of AI tools and not accept everything as if it is true. One has to verify.

And ultimately, AI should be seen as a partner, not something you delegate your work to. The AI systems are supposed to help us better understand our patients. They are more like copilots or collaborators, and they are not clinicians themselves. The human always has to be in the loop when using AI.

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