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International Congress on MENTAL HEALTH

May 04-05, 2023 | Webinar

Mental health chatbot for young adults with depressive symptoms during the COVID-19 pandemic: Single-blind, three-arm randomized controlled trial

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Statement of the problem: Depression has a high prevalence among young adults, especially during the COVID-19 pandemic. However, mental health services remain scarce and underutilized worldwide. Mental health chatbots are a novel digital technology to provide fully automated interventions for depressive symptoms. The purpose of this study was to test the clinical effectiveness and nonclinical performance of a cognitive behavioral therapy (CBT)–based mental health chatbot (XiaoE) for young adults with depressive symptoms during the COVID-19 pandemic.

Methodology & theoretical orientation: In a single-blind, 3-arm randomized controlled trial, participants manifesting depressive symptoms recruited from a Chinese university were randomly assigned to a mental health chatbot (XiaoE; n=49), an e-book (n=49), or a general chatbot (Xiaoai; n=50) group in a ratio of 1:1:1. Participants received a 1-week intervention. The primary outcome was the reduction of depressive symptoms according to the 9-item Patient Health Questionnaire (PHQ-9) at 1 week later (T1) and 1 month later (T2). The secondary outcomes were the level of working alliance measured using the Working Alliance Questionnaire (WAQ), usability measured using the Usability Metric for User Experience-LITE (UMUX-LITE), and acceptability measured using the Acceptability Scale (AS).

Findings: Participants were on average 18.78 years old, and 37.2% (55/148) were female. The mean baseline PHQ-9 score was 10.02 (SD 3.18; range 2-19). Intention-to-treat analysis revealed lower PHQ-9 scores among participants in the XiaoE group compared with participants in the e-book group and Xiaoai group at both T1 ($F_{2,136}=17.011$; $P<.001$; $d=0.51$) and T2 ($F_{2,136}=5.477$; $P=.005$; $d=0.31$). Better working alliance (WAQ; $F_{2,145}=3.407$; $P=.04$) and acceptability (AS; $F_{2,145}=4.322$; $P=.02$) were discovered with XiaoE, while no significant difference among arms was found for usability (UMUX-LITE; $F_{2,145}=0.968$; $P=.38$).

Conclusion: A CBT-based chatbot is a feasible and engaging digital therapeutic approach that allows easy accessibility and self-guided mental health assistance for young adults with depressive symptoms.

Biography

Yuhao He studied civil engineering at North University of China and psychology at Tianjin University. He specializes in digital mental health. His research field included the use of conversational agents and chatbots in mental health, machine learning methods to predict suicidal behavior, and the identification and analysis of mental health problems on social media. He is currently working at Vanke School of Public Health of Tsinghua University.