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## Digital interventions empowering mental health reconstruction among students after the COVID-19 pandemic

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### Abstract

With the gradual end of the coronavirus disease 2019 (COVID-19) pandemic, the reconstruction of students' mental health is urgently necessary. Digital interventions offer advantages such as high accessibility, anonymity, and accurate identification, which can promote the reconstruction of students' mental health through the provision of psychological support platforms, psychological assessment tools, and online mental health activities. However, we recognize that digital interventions must undergo many adjustments, and corresponding ethical norms require further clarification. It is crucial for different stakeholders to collaborate and work toward maximizing the effectiveness of digital interventions for the reconstruction of mental health after the COVID-19 pandemic.

**Key Words:** Digital interventions; Artificial intelligence; Big data; Students; Mental health

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**Core Tip:** As the coronavirus disease 2019 (COVID-19) pandemic has gradually come to an end, a challenge that has emerged is how to restore the mental health of students after the pandemic. This paper contends that digital interventions are cutting-edge and that effective approaches should be fully utilized to address the impact of the COVID-19 pandemic on the mental health of students.

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## TO THE EDITOR

We have read the observational study titled “Investigating adolescent mental health of Chinese students during the coronavirus disease 2019 (COVID-19) pandemic: Multicenter cross-sectional comparative investigation” authored by Huang *et al*[1] and published in the 11<sup>th</sup> issue of the *World Journal of Psychiatry* in 2022. In this paper, the impact of the COVID-19 pandemic on the daily life and learning of adolescents was analyzed from four aspects: Time distribution, cohabitation groups, and positive and negative effects. The Patient Health Questionnaire-9 and the Generalized Anxiety Disorder Questionnaire-7 were used to measure the impact of the COVID-19 pandemic on the mental health of adolescents. The results of the study indicated that there were significant differences in the time distribution of daily activities and cohabitation groups for adolescents before and after the COVID-19 pandemic. The academic performance of adolescents from different grades was negatively impacted by the pandemic, with distinct features observed for students at different grade levels; in particular, there was a significant increase in the rate of severe anxiety among junior high school students[1].

We believe that the conclusion of the article is highly valuable for discussion. The COVID-19 pandemic has greatly impacted the daily lives and learning of adolescents, and the mental health status of this population deserves more attention. Our previous research also showed that the prevalence rates of depression and anxiety among Asian university students range from approximately 20% to 40%[2,3], which are relatively high rates and have various negative effects on the daily lives of these students. Given the uniqueness of the COVID-19 pandemic, most studies suggest that the mental health of adolescents has shown a deteriorating trend during the pandemic[4,5]. Other studies have also reported results consistent with the findings of Huang *et al*[1], indicating that the incidence of mental disorders among adolescents, such as depression, anxiety, and stress, has decreased during the COVID-19 pandemic[6-8]. However, the mental health status of adolescents remains concerning. During the COVID-19 pandemic, the improvement of mental health among adolescents is often accompanied by an increase in attachment security and communication with parents, continuous optimization of organizational structures within schools, and gradual adaptation to daily life changes[7,9]. In our study, family, school, and individual factors were considered to be influencing factors of individual depression and anxiety levels, such as family relationships, parental education level, school environment, peer relationships, and lifestyle factors[2,3]. Therefore, general intervention measures should start from these three aspects, namely, enhancing family support for the mental state of adolescents, providing various forms of psychological counseling in schools, and adolescents themselves making efforts to maintain a positive attitude. These measures would improve the mental health status of adolescents during and after the COVID-19 pandemic.

Currently, there are abundant research findings on the impact of the COVID-19 pandemic on students' mental health. However, as the pandemic ends, it remains challenging to effectively address the mental health crisis caused by the pandemic and reshape positive mindsets in individuals. Digital therapy is emerging rapidly and gradually becoming a hot topic in the research and practice of mental health interventions. Digital interventions, carried out *via* the internet, big data, and artificial intelligence, provide a new form for screening, assessing, intervening and treating mental health problems[10,11]. Several studies have confirmed the effectiveness of digital interventions in the treatment of mental health[12-15]. Their advantages are mainly reflected in the following three aspects. First, digital interventions are highly accessible, which can alleviate the imbalance between the supply and demand of mental health services[16,17]. The COVID-19 pandemic was characterized by a sudden onset, long duration, and broad impact. The resulting mental health problems have become increasingly prominent, and many professional psychologists are needed to provide targeted mental health services. In fact, the public health system has a limited capacity to respond to emergencies, and mental health resources are limited[18]. In the context of the intelligence era, students can access various forms of digital intervention services through the internet and mobile platforms to address potential mental health problems in a timely manner[19]. Second, digital interventions are anonymous, which can reduce the risk of stigmatization. Due to concerns about stigmatization, many students have low willingness to seek psychological help, and their anxiety and depression may not be relieved in a timely manner[20]. With the use of digital interventions, students can access services anonymously at any time[21]. Third, digital interventions can accurately identify psychological health problems and provide effective solutions. Through health data tracking and intelligent analysis systems, digital interventions can accurately screen students with potential psychological health problems, making it easier to provide psychological counseling in a timely manner. In addition, based on the different needs of students, digital interventions can also provide personalized psychological support, making them more flexible and convenient to use[16,22].

It is worth noting that there are still some challenges in more extensive and efficient mining and application of digital psychological health interventions. First, students inevitably face the risk of information leakage when using applications and other mobile platforms. Various countries have not established an effective supervision and management system, and the corresponding ethical norms need to be further clarified[23,24]. Second, digital interventions are essential tools. Psychological health practitioners should combine their professional literacy and fully utilize the characteristics of digital technology to maximize the potential of digital interventions[25]. Finally, technology changes rapidly,

and digital psychological health interventions have not kept up with the pace[18]. Different stakeholders need to work together to inject new vitality into digital psychological health interventions using the latest artificial intelligence and virtual reality technologies.

The rapid development of artificial intelligence provides powerful support for the improvement and popularization of mental health services. In response to the challenges encountered in the application of digital psychological interventions, the latest research proposes suggestions from three aspects: Theory, practice, and future development trends. First, the theoretical foundation for the development of digital intervention needs to transform good clinical practice standards (such as CBT) into key components of mental health services[26]. Second, to improve the effectiveness of digital psychological interventions, a participatory design approach should be widely adopted[27], and cultural relevance should be integrated into mobile applications or online platforms[28,29]. Finally, future digital psychological interventions should fully utilize the latest developments in artificial intelligence, applying algorithms such as machine learning and deep learning to automatically identify and analyze emotional states and establish a mental health database. In addition, protecting user data privacy, reducing costs, and improving usability are also key issues that need to be addressed in the future[30,31]. Regarding the protection of user privacy, we believe that students' information literacy should be given attention. In the digital environment, students are vulnerable to data malfunctions and the unethical use of their data. To prevent this situation, students should be aware of the risks they may face in digital media, improve their digital literacy and safety awareness, effectively use and manage their digital archives, and have a healthy online/offline social life.

In conclusion, after the outbreak of the COVID-19 pandemic, restoring the mental health of students is urgently necessary. Digital interventions can promote the reconstruction of students' mental health by providing a platform for psychological support, offering psychological assessment tools, and facilitating online mental health activities. We believe that digital interventions should be actively adopted to support students' mental health and enhance social welfare.

## FOOTNOTES

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