ABSTRACT

The high demand for mental health services and scarce supply of healthcare professionals are increasingly suppressing the mental healthcare industry. The emergence of artificial intelligence shows the potential to be able to transform the landscape of this industry. The application of artificial intelligence has offered a promising hope to bridge the gap between the long-lasting demand and supply issues in the industry, and to provide better healthcare support, as it reduces the fear of judgement while increasing self-awareness. Nevertheless, some challenges need to be overcome before the mental healthcare industry can truly capitalise on artificial intelligence.

INTRODUCTION

Increasing demand for mental healthcare services has garnered widespread attention to explore digital mental health interventions, and in particular, artificial intelligence (AI). The emergence of AI in the healthcare industry offers alternative pathways for optimising healthcare practices such as diagnostics, monitoring, treatments, and patient care. Given the global mental health development, the increasing statistics regarding mental health, and low access to mental health care, the successful revolution of AI applications in the mental healthcare domain can be very beneficial. This revolution also suggests better provision of support and widening access to individuals in a more cost-effective way.

Development of Global Mental Health

The World Health Organization (WHO) has estimated that about 1 billion people experience mental disorders worldwide. More concerning, approximately one in eight people in the world experience a mental disorder, with anxiety and depressive disorders being commonly diagnosed. Depression affects both an individual's emotional and physical well-being, as well as daily activities, performance and work productivity, such as saddened mood, increased weariness, problems in attentiveness, rationalising and making decisions, and feelings of futility or blameworthiness. Moreover, it adversely increases the risk of suicide or death. According to WHO (2022), more than one suicide is estimated for every 100 deaths worldwide. Critically, suicide is identified as the fourth major cause of death for teenagers and young adults aged between 15 and 29 years. Furthermore, WHO reported that mental health conditions have led to premature death some 20 years earlier.

Early detection of depression can save hundreds of lives. Nonetheless, a lack of access to mental health care has exacerbated the situation, due to the crisis of insufficient mental health professionals globally. According to the latest data from WHO, in developed countries, the ratios of psychiatrists per 100,000 are 48.04 in Norway (2016), 24.18 in Poland (2016), 23.59 in Finland (2017), 20.86 in Sweden (2016), 14.68 in Canada (2017), 13.53 in Australia (2015), and 10.54 in the United States (2016). Conversely, in developing countries, the ratio is low with the number of psychiatrists per 100,000 being 1.05 in Malaysia (2016), 0.76 in Thailand (2016), 0.31 in Indonesia (2015), and 0.29 in India (2016).
AI Applications: Strengths

Enhance Accessibility and Affordability

The emergence of AI technology in recent years, with its promising solutions for health industries, has received an increasing amount of interest in new research. The potential of harnessing AI technology, such as machine learning, in enhancing our understanding of mental health diagnosis, and predicting outcomes and treatment can be a new solution to the current accessibility and affordability problems. The success of the AI application is expected to enhance the accessibility to more promising mental healthcare services by reducing the gap between the high demand and supply shortage issues. More importantly, the AI application is expected to increase the chances of accessibility for low-income households due to better affordability.

Increase Self-awareness

At this juncture, the emergence of wearable AI apps offers a promising direction to detect and screen symptoms of depression and anxiety, such as via natural language processing, and voices or chatbots in smartphones despite it being in its infancy stages. Furthermore, using a smartphone is increasingly becoming a necessity, and is no longer a luxury trend; therefore, this can be an affordable and ideal way for tracking an individual’s mental health status. More importantly, this can increase the individual’s self-awareness regarding their mental health conditions.

Minimise the Fear of Judgemental Issues

Stigma and discrimination are among the factors that refrain people from seeking help from mental health professionals. Fear of judgement or discrimination by either therapists or the people living in proximity to the individual are common. Thus, the application of AI apps has become a new platform for people to receive mental health support freely without any concerns. The use of this tool offers a safe, private space for people as it can be achieved without human interactions, thereby minimising the fear of judgement.

AI Applications: Challenges

Data Management and Risk of Misinterpretation

Proper data management enhances the accuracy of model prediction and diagnostic outcomes. Thus, poor data management, and neglect of data engineering for AI models are concerning. Results from Adler and colleagues indicated that deep learning through machine learning models trained on combined longitudinal study data may generalise across heterogeneous datasets. However, they suggested that proper data management should be considered to enhance model generalisability. WHO supports this and cautioned that the application of high-dimensional data, complex statistics, and mathematical approaches may lead to risks of misinterpretation of outcomes and unrealistic of what AI can accomplish. A systematic review and meta-analysis by Abd-Alrazaq and colleagues opined that wearable AI should not be used as a stand-alone tool in clinical practice but as a complementary tool for predicting and diagnosing depression. Yan and colleagues questioned the practicality of AI over clinical practice capability in the diagnosis of mental disorders. They argued that multimodal information is not yet sufficient to support the application of AI in the mental health domain; in particular, disparity within-group and heterogeneity characteristics between-group add to the existing challenges.

Transparency and Ethical Issues

On one hand, the application of deep learning via online interventions can be beneficial to treat mental disorders patients due to its flexibility. On the other hand, some ethical and societal concerns of AI applications should be taken into consideration. Torner-Costa and colleagues supported this and raised concerns about the transparency and methodological flaws related to AI applications in the mental health domains. A comprehensive annotation can be useful for clinical collaborations, knowledge sharing, and analysis; however, Yan and colleagues asserted that annotations remain too subjective to fulfil the requisites of professional clinicians.

CONCLUSION

The emergence of AI technology can be a new revolution in the mental healthcare industry; however, this does come with potential pitfalls. More importantly, since the application of AI technology in this industry is at its infancy stage, it should not be overly promoted until most of the significant challenges are addressed. More research and practice-based evidence relevant to this field are worthwhile to explore prior to fully leveraging the potential role of AI in this industry.

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