

Transforming Mental Healthcare in The Internet Age

Ang Li*

Assistant Professor in Psychology, Department of Psychology, Beijing Forestry University, Beijing, China

***Corresponding Author:** Dr. Ang Li, Assistant Professor in Psychology, Department of Psychology, Beijing Forestry University, Beijing, China.

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Mental health is a global public health concern. Around the world, 17.6% of people suffer from mental disorders in the past 12 months, and 29.2% of people have experienced at least one mental disorder during their lifetimes [1]. Despite the prevalence of mental disorders, public health systems have not yet adequately respond to the burden of mental disorders. It is estimated that the treatment gap for mental disorders exceeds 50% in different countries around the world [2], which might be due to the inefficiency of mental healthcare, including inefficient diagnosis and treatment.

Early diagnosis and treatment of mental disorders leads to improved recovery. The traditional method for delivering mental healthcare is embedded in the context of face-to-face communication. In practice, such method suffers from limitations and fails to meet up the requirement of early diagnosis and treatment. For example, traditional diagnostic methods (e.g. self-report ratings, structure interview, and clinical judgment) cannot identify people with mental disorders among the population in real-time, which may lead to delayed reporting. Moreover, because of the insufficient number of trained clinicians and the difficulty of adhering to the costs and demands, the face-to-face treatment is also not widely available. Therefore, further efforts are needed to improve the connection among clinicians, patients, health data and service.

The emergence and development of the internet may shed light on this direction. Internet has changed the way people interact with each other. On the internet, interpersonal communication can take place in computer-mediated rather than face-to-face settings, which implies that the virtual world becomes independent of the real world, thus inspires a transformation of traditional mental healthcare [3].

The internet technology has the potential to transform traditional mental healthcare services by building a closed-loop system for delivering mental healthcare via the internet Figure 1.

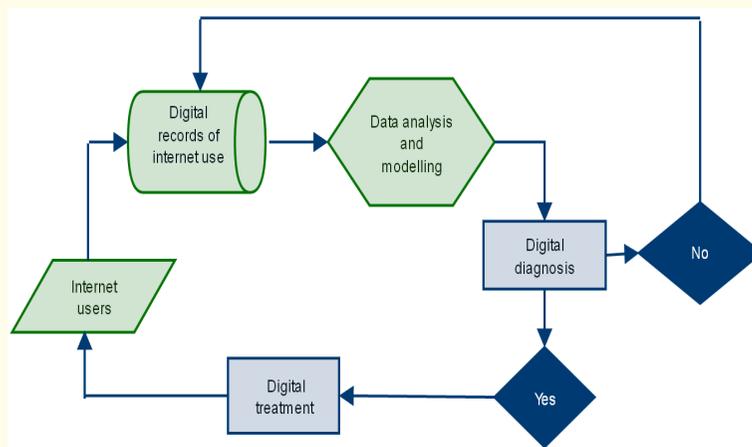


Figure 1: A closed-loop system for delivering mental healthcare via the internet.

The closed-loop system is composed of digital diagnosis and digital treatment. With regard to the digital diagnosis, to realize the early diagnosis of mental disorders, it is reasonable to track one's mental health status through longitudinal, momentary, and ecological data. On the internet, users surf the web under ecological conditions and their internet use behaviors can be recorded as web logs. With the help of information technology, cyber data collection can be continuous, automatic and non-intrusive. According to the previous research, individual mental health status can be indicated by their behavioral patterns (e.g. items in psychological testing and symptoms listed in diagnostic criteria for mental disorders). If real-life behaviors can predict and manifest one's mental health status, as a subset of human behaviors, cyber behaviors should be able to predict and manifest one's mental health status in the cyber world as well. Therefore, we can analyze the digital records of internet use behaviors and extract useful features from the raw data as predictors. After acquiring labels on personal mental health status (e.g. scores on psychological questionnaires) as dependent variables, we can use the method of machine learning to build computational models for predicting personal mental health status through their digital records of internet use behaviors. Using such established models, we can predict personal mental health status among the population in real-time and track their changes more efficiently.

As to the digital treatment, on the basis of digital diagnosis, we also need to provide individuals with further psychological services in an efficient manner. The information technology enables us to design websites or internet-based programs for delivering treatments via the internet (e.g. Beating the Blues and Mood GYM). Therefore, we can send the treatments (e.g. the website URL or a copy of program) directly to the targeted individuals via the internet to realize a combination of early diagnosis and treatment of mental disorders, which is beneficial to improve the individual well-being.

In summary, as the internet becomes increasingly popular, strategies for leveraging this technology for mental healthcare are rapidly emerging. However, no evidence shows that the potential of such new technology has been fully realized. It suggests that concentrated efforts are still needed in future works to transform that potential into reality.

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