Artificial Intelligence for Early Detection of Mental Health Disorders: A Clinical Framework for Developing Economies

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(Research Paper as part of a PhD Programme)

ABSTRACT

Mental health disorders continue to be a major public health concern worldwide, especially in developing economies, where there is a lack of mental health workers, poor mental health infrastructure, and delayed diagnosis of mental health conditions. Recognising early signs of mental health issues is crucial to better treatment outcomes, and to minimizing the long-term social and economic impacts of untreated illnesses. However, regular consultations, and subjective clinical assessment, are central to conventional screening approaches, making it difficult to implement in resource-limited settings.

Artificial Intelligence (AI) has ushered in some exciting possibilities to support earlier identification of mental health conditions through data-driven Clinical Decision Support Systems (CDSS). AI can help research the behavioral, linguistic, physiological, and digital biomarkers that could help identify individuals at risk of common mental health disorders earlier than traditional screening methods. In this paper, a clinically focused approach to AI-supported early detection of mental health disorders in developing nations is introduced. The framework was synthesised in a thorough review of recent studies on machine learning, deep learning, natural language processing, wearable sensing, digital phenotyping, and digital health applications. The challenges of applying AI in low-resource healthcare settings are addressed, such as data quality, algorithmic fairness, digital infrastructure, privacy protection and ethical governance.

The proposed framework includes five key components: data collection, AI analysis, clinical decision support, healthcare integration, and ongoing monitoring and assessment. The framework does not envision AI replacing healthcare workers, but rather it sees AI as a tool that can work alongside clinical care to make decisions, alert healthcare providers to people at risk earlier and help with timely interventions. The literature review reveals that AI screening tools have significant promises for enhancing early detection for common mental health conditions, provided they are used in a clinical setting with proper adaptation and supervision.

The researchers' research findings are that responsible AI integration can enhance the delivery of primary mental health care, improve the time to diagnosis, and increase the availability of mental health care more equitably in developing economies. Further studies are recommended on larger, clinical sample validations, building local mental health screening datasets, and cost-effectiveness analyses for sustainable adoption of AI-supported mental health screening.

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Keywords: Artificial Intelligence; Mental Health; Early Detection; Clinical Decision Support Systems; Developing Economies; Machine Learning; Digital Health; Healthcare Innovation.

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