Artificial Intelligence in Early Disease

CNHP 6000:

Research Methods for Health Professionals

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**Introduction**

Artificial Intelligence (AI) revolutionizes healthcare, particularly early disease detection.1Therefore, it is important to identify when there is a need for accurate and timely diagnosis when the global population ages and the incidence of chronic diseases increases. The problem with traditional diagnostic methods is that a lot of data is produced, and human factors that affect it include fatigue, experience, and time. Aware of how AI performs the best at processing big input data flows and identifying subtle relations between them, this approach will be effective in identifying early signs of diseases and enhancing patient’s quality of life.

Current scientific literature has researchers exploring its AI potential in different specialties of medicine. There are several cases where the performance of AI algorithms has been comparable to or even superior to that of physicians in tasks such as interpretation of medical images, electrocardiograms, or disease prediction based on electronic health records. For instance, oncology has noted enhanced potential to show early cancer detection through systems that have adopted AI technologies. When discussing the work of AI in diagnosing and treating colorectal liver metastases, Rompianesi et al2 focused on integrating technology into cancer treatment planning and diagnostics.

AI has proved useful in aspects such as the prediction of tendencies of heart attacks and other kinds of cardiovascular events. Suzuki et al3 have demonstrated that AI can assist in identifying patients with atrial fibrillation during sinus rhythm based on the electrocardiogram (ECG) study. They discovered that the current labeling method influences the ability of an AI algorithm to identify ‘silent’ atrial fibrillation, which would reduce instances of stroke and other severe complicating factors resulting from an unobserved irregular heartbeat. Such capability provides insight into how AI can be effective in extending the detection times and the subsequent results in cardiovascular therapy.

The use of this technology has also been tested for the detection of neurodegenerative diseases. Venugopalan et al4 have stated multimodal deep-learning models to present solutions for the early-stage detection of Alzheimer's disease. Their research employed different imaging technologies to improve the visualization of brain alterations concerning Alzheimer's. They proved that, in this case, AI interventions can detect these alterations even before the clinical symptoms manifest themselves years later. This approach emphasizes the future possibilities of AI in enhancing early detection and management of neurodegenerative diseases.

This body of work shows how the advanced application of AI could fundamentally uphold an exhaustive primary screen of afflicting diseases. Nonetheless, the application of AI in clinical practice still needs to be improved .1Issues such as the lack of explainability of the AI algorithms, problems associated with training data bias, and the sheer size of data required for proper generalization are some challenges that still must be overcome. Also, healthcare professionals' understanding, and appreciation of AI tools remain significant in their application.

Nevertheless, the promising trends in AI-driven early disease diagnosis illustrate the advantages of its application: higher diagnostic accuracy, lower costs, and better patient outcomes.5 As AI technologies advance, one needs to evaluate the effectiveness of such concepts and define the possibilities of implementing them in the current clinical setting.

This study aims to assess the effectiveness of using AI in identifying diseases at the initial stage of clinical practice to enhance the number of accurate diagnoses and the quality of the impressions of clinicians working with these tools. By analyzing the impact of AI on diagnostic results and providing insight into physicians' sentiments and perceptions, this study offers a balanced review of the current applications and future possibilities of AI in early-stage disease identification. 1

This is an interesting topic, Jasma. However, some of the text of the Introduction is unclear and there is no specific focus for your study. You summarized where AI is being used to diagnose people with heart disease, neurogenerative diseases and cancer. However, you did not indicate a gap in the literature (e.g., where AI is not being used but may be beneficial). You can propose research to fill the gap. (-5) The research question and hypothesis are also missing. (-4)

Please let me know if you have any questions about my comments.

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