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Artificial Intelligence Algorithms in Diagnosing and Improving the Diet of People with Metabolic Syndrome: A Systematic Review

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ABSTRACT

Introduction: Metabolic syndrome is defined by interconnected physiological, biochemical, clinical, and metabolic factors that directly increase the risk of cardiovascular disease and type 2 diabetes. Metabolic syndrome is associated with overweight and inactivity. This disorder is a global threat to public health, and its physical symptoms are very challenging. Therefore, using cost-effective technology, it is important to identify individuals at high risk of metabolic disorders without relying on biochemical markers. In the medical field, machine learning techniques can analyze extensive clinical, imaging, and genomic data to improve diagnostic accuracy and disease classification while providing a new paradigm in treatment. This study aimed to investigate artificial intelligence (AI) algorithms in diagnosing and improving the diet of people with metabolic syndrome.

Methods and Materials: This systematic review study was conducted in 2024 by searching reliable databases such as PubMed, Web of Sciences, Scopus, and Google Scholar search engine. Keywords “artificial intelligence”, “metabolic syndrome”, and “diet” were investigated in related studies between 2020 and 2024. English-language studies that investigated the role of AI in improving diet and diagnosis and prevention of metabolic syndrome met the inclusion criteria. Titles and abstracts were evaluated independently by two evaluators. Then, the full text of the articles was reviewed, and a standardized form containing the study title, publication year, country, number of participants, study objectives, and main findings of the study was used for the data extraction stage.

Results: A total of 22 articles were retrieved from the above-mentioned databases. Finally, after reading the title and abstract of the articles and considering the inclusion and exclusion criteria, nine articles were included in the of prevention, early diagnosis, and improvement of the diet and quality of life of people with metabolic syndrome. Adherence to diet has a significant effect on treatment, prevention of progression, and diagnosis of disease. To effectively manage their condition, individuals with metabolic syndrome should improve their understanding of the disease, including dietary considerations and the contributing factors.

Conclusion and Discussion: The findings of this study indicate that the use of AI enhances the quality of life for these patients by assisting in prevention, early diagnosis, correction, and adherence to dietary guidelines. However, further research is needed in this field to increase awareness among these individuals.

Keywords: Artificial intelligence, Diet, Metabolic syndrome