ROLE OF AI FOR REDUCING OBESITY

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Abstract
Over 650 million people globally are classified as obese, a condition linked to considerable health, economic, and social issues. Due to its connection with major comorbidities like heart disease, there is a pressing need for innovative solutions to enhance risk prediction and management strategies.Artificial Intelligence personalizes treatment plans through the examination of unique genetic, metabolic, and lifestyle information, thereby enhancing the probability of successful outcomes.Machine learning algorithms are capable of forecasting a person's vulnerability to obesity and its associated complications by evaluating elements such as genetic makeup, clinical information, and behavioral trends.The trust and familiarity of healthcare providers with the emergence of AI technology continues to pose a challenge to its adoption. A study demonstrated that a machine learning model was able to predict the success of weight loss interventions with an accuracy of 81% over a six-month period.
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Introduction:

Over 650 million people globally are classified as obese, a condition linked to considerable health, economic, and social issues. Due to its connection with major comorbidities like heart disease, there is a pressing need for innovative solutions to enhance risk prediction and management strategies. In recent times, artificial intelligence (AI) and machine learning (ML) have surfaced as potent instruments in the healthcare sector, providing new methodologies for the prevention of chronic diseases.Artificial Intelligence (AI) significantly contributes to the management of obesity by developing tailored treatment strategies, improving risk assessment, and offering ongoing support. It examines extensive datasets from various sources, including health records and wearable devices, to detect patterns and generate data-informed suggestions for nutrition and physical activity. Additionally, AI facilitates drug discovery, optimizes administrative processes, and delivers interactive coaching to enhance patient compliance and health outcomes.Artificial Intelligence personalizes treatment plans through the examination of unique genetic, metabolic, and lifestyle information, thereby enhancing the probability of successful outcomes.Machine learning algorithms are capable of forecasting a person's vulnerability to obesity and its associated complications by evaluating elements such as genetic makeup, clinical information, and behavioral trends.AI technologies can precisely evaluate body composition from imaging scans, which aids in determining the risk for associated health issues.

The significance of artificial intelligence (AI) in contemporary technology is profound, particularly regarding sports analytics in high school education. AI is instigating transformation in sports analytics by providing data insights that enhance athletic performance, mitigate injuries, and refine game strategies.This narrative review explores the transformative impact of artificial intelligence in sports covering its applications challenges and future directions across key areas. Physical activity training is only way to solve all types of problems in our life and current generation are also using artificial intelligence for the purpose of physical education as well and physical Education also for decision making and accuracy of getting correct information and correct reason only studies published in the paper use artificial intelligence.

Healthcare Provider Perspectives on AI in Obesity Care

Healthcare providers play a crucial role in facilitating obesity management; however, they encounter considerable obstacles in assisting patients to implement lasting changes in their diet, exercise, and behavior. The increasing rates of obesity [1] indicate that existing counseling methods may not adequately tackle the complex issues associated with long-term weight management. Individuals who are overweight or obese tend to utilize healthcare services more frequently [2]; despite their increased engagement, the structure of their visits may not effectively promote sustainable weight management.

Modifications to lifestyle remain the most feasible intervention for the majority of patients. Nevertheless, these strategies require ongoing

motivation, resources, and persistent effort, which many patients struggle to sustain or access. New evidence regarding the outcomes of anti-obesity medications and bariatric surgery [3] continues to influence treatment frameworks, yet lifestyle interventions still constitute a fundamental aspect of care. In this context, artificial intelligence offers a distinctive opportunity to enhance conventional models by providing personalized, data-informed solutions aimed at improving patient outcomes.Artificial Intelligence (AI) has the potential to close existing gaps in contemporary practices by providing more profound insights into patient behaviors and challenges, thereby allowing healthcare providers to implement customized, evidence-based interventions. This section examines the viewpoint of healthcare providers, emphasizing the ways in which AI can improve clinical practice and empower healthcare professionals in the management of obesity.

The trust and familiarity of healthcare providers with the emergence of AI technology continues to pose a challenge to its adoption. A study demonstrated that a machine learning model was able to predict the success of weight loss interventions with an accuracy of 81% over a six-month period. In order to mitigate the skepticism regarding the predictions made by the model, an explainability tool known as PRIMO was created, which assists weight management professionals in comprehending and trusting the outputs of the model. Interviews conducted with healthcare providers highlighted the significance of PRIMO, noting that various explanations, visualization of uncertainty, and performance metrics were crucial in overcoming this trust deficit [4,5].

Risk Assessment

AI has the potential to significantly transform the prediction of childhood obesity risk, which subsequently influences health risks in adulthood. Machine Learning (ML) has notably expedited advancements in this field [6], allowing researchers to develop models utilizing electronic health record (EHR) data to forecast future obesity trends and to identify a wide array of risk factors that extend beyond conventional diet and physical activity. These factors include marital status, geographical location, age group, educational attainment, mental-emotional disorders, among others [7]. In a study involving 327 participants aged between 21 and 78, who provided at least 9 months of self-reported weight data during a weight loss intervention, multiple ML models were trained, with the most effective model achieving a prediction accuracy exceeding 50% with just half a month of data and reaching up to 97% with 8 months of data .AI has also been utilized to analyze publicly accessible health datasets to forecast obesity trends by examining genetic, epigenetic, and environmental factors. For instance, research has employed AI to enhance risk indicators such as waist circumference [8] and to explore the correlation between the proximity of supermarkets and body weight [9].

Diet:

Physiotherapy diet and barrier it can help with the help of each of these are enabling productive analysis behavior in real time and patient management including insurance risk prediction and behavior support like what you are good she is and real time feedback there for we can see that artificial intelligence is used full for solving the problems of solving the problem of obesity as wealth therefore we can see that artificial intelligence is the only way to solving challenges like data privacy Al in obesity management can analyze multi model data including Genetics and clinical data to create personal life that nutrition and physical activity plans machine can learn model can predict which individuals at Higher rescue developing obesity or its complication therefore problems can be solved with the scopein review was conducted in accordance with various guidelines for reducing problem of obesity three provision studies reviewed the applications through diet and answer sizes the found renewal promising evidence regarding the effectiveness of a power tools in decision support and digital to some more ice algorithm post methodology on the application digital and artificial intelligence solutions to obesity or needed to reduce the medical cost remain and aging societies size research the research published the use of AI and this areas concentrated mostly in various sector size intelligent defined as the simulation of human intelligent process by machines specially computer systems as much as a application of AI in public health sucrose the visualization and predicting health outcomes including patterns like likely good of diseases by the national institute developing type hey I can facilitated Data Collection analyze causes and effects summarize patients .

Patient Perspectives on AI in Obesity Care

Utilizing sophisticated algorithms such as Reinforcement Learning (RL), artificial intelligence enhances interventions tailored to meet the specific needs of individual patients, thereby ensuring more effective results while minimizing resource utilization. These technologies not only customize the nature and intensity of interventions in real-time but also amalgamate various data sources, including dietary patterns, physical activity levels,

and genetic as well as microbiome information, thereby delivering highly accurate care.

Patients gain from AI's capacity to provide consistent and cost-effective assistance via digital platforms, which encompass virtual health coaches, automated messaging systems, and gamified engagement tools that are frequently available at no cost. Systems based on RL have shown to achieve weight loss results comparable to those of traditional coaching methods, while necessitating considerably less human intervention, thus lowering labor expenses without sacrificing effectiveness. AI frameworks tackle issues related to individual adherence and accessibility by integrating real-time monitoring and natural language processing, which fosters supportive and engaging interventions. These methodologies not only enhance outcomes but also refine the patient experience through empowerment, improved accessibility, and sustained behavioral modifications.

Objectives:

To increases the risk of 5 blood pressure high cholesterol and high blood sugar all of which are major risk factors for her decisions it can cause insulin resistance where the body level friendly to the formation of Bridgestone are you artificial intelligence tool converted the size of persons Western by their age height weight ethnicity and level of education the tools striking could help doctor system at operation release of diabetes heart disease broken other obesity related conditions of using the film famous body muscle equation of persons height and weight to health is like diabetes and hard but it is not regularly measured in the clinic, Physical education the performance is best on the total stamina crown on the ground stamina can be improved with the help of physical fitness which can solve all the problems of obesity as well the teams is there work done studs the promise threatening a predictions in clinical practices special for threatening obesity hand physical education.

Clinical validation and evidence gaps

Despite the proliferation of AI-powered obesity management tools and platforms, significant gaps remain in high-quality clinical evidence demonstrating their effectiveness, safety, and superiority over traditional approaches. Many AI applications in obesity management have been evaluated through pilot studies, feasibility trials, or observational studies that lack the rigorous methodology, adequate sample sizes, and long-term follow-up necessary to establish clinical efficacy and guide evidence-based practice. The rapid pace of technological development often outpaces the slower process of clinical validation, resulting in AI systems being deployed in real-world settings without adequate evidence of their effectiveness or potential risks [10].

The heterogeneity of AI approaches, outcome measures, and study populations makes it challenging to synthesise evidence across different studies and platforms, limiting the ability to draw definitive conclusions about the overall effectiveness of AI in obesity management. Different studies may use varying definitions of success, different follow-up periods, and different comparison groups, making it difficult to compare results and establish consistent evidence patterns. The lack of standardised evaluation frameworks for AI-powered health interventions further complicates evidence synthesis and regulatory decision-making [11].

Long-term effectiveness and safety data are particularly lacking, as most studies of AI obesity management tools have focused on short-term outcomes and have not adequately assessed sustained weight loss, prevention of weight regain, or potential unintended consequences of AI-driven interventions.

Limitations of the Review

This narrative review presents several significant limitations that must be taken into account when interpreting its findings and conclusions. The swift advancement of technology in artificial intelligence and digital health implies that some recent innovations and research outcomes may not be thoroughly represented in the existing literature, especially considering the publication delays that are characteristic of peer-reviewed research. The domain of AI in obesity management is rapidly progressing, with new applications, platforms, and research studies continuously emerging, which complicates the task of providing a fully up-to-date and comprehensive overview of all developments.

The diversity of AI methodologies, study designs, outcome measures, and populations across the literature reviewed constrains the ability to draw definitive conclusions regarding the overall effectiveness of AI interventions in obesity management. The absence of standardized evaluation frameworks and outcome measures hampers the ability to compare results across various studies and AI platforms, which may result in incomplete or biased evaluations of effectiveness. Numerous studies included in this review were pilot studies, feasibility trials, or observational studies characterized by limited sample sizes and short follow-up durations, which may not sufficiently reflect the long-term

effectiveness and real-world performance of AI systems.

Publication bias may affect the findings presented in this review, as positive outcomes and successful AI implementations are more likely to be published compared to negative or inconclusive results. This bias could result in an excessively optimistic evaluation of AI capabilities and effectiveness in obesity management. Furthermore, many AI applications in obesity management are developed and assessed by commercial entities that may possess financial motivations to showcase favorable results, potentially impacting the objectivity of the available evidence.

Conclusion

AI can be ground-breaking in the management of obesity by identifying at-risk individuals early and creating personalised treatment plans. Despite its potential, AI has multiple challenges, including data privacy concerns, algorithmic bias, and lack of transparency. Addressing these concerns in the near future, it can be a transformative tool in the field of obesity. Researchers are firmly in favor of integrating AI into obesity management, having investigated its scalable, real-time, and sustainable capabilities through AI-driven coaching, precision nutrition, behavioral engagement, and preventive measures. We advocate for ongoing research to improve the accuracy and efficacy of these technologies while addressing the aforementioned limitations.

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