EJMR
ERA'S JOURNAL OF MEDICAL RESEARCH
p-ISSN: 2348-9839, e-ISSN: 2394-5222 | www.ejmr.org

Volum 12 Issue 2
REVIEW ARTICLE

Role of Artificial Intelligence in Studying Age-Associated Diseases: A Brief Review

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Received on: 17-05-2025 Published on: 29-208-2025

ABSTRACT

Aging and age-associated diseases such as cardiovascular diseases, neurological problems, diabetes, and cancer are all very serious health concerns for us. Sometimes, traditional ways of diagnosing and treating diseases don't take into account how genetic, metabolic, and environmental factors all work together to cause these conditions. AI is a powerful tool that helps older people learn more about their health, obtain diagnoses faster, get the right treatments, and improve healthcare. In this article we discuss how AI can help us learn more about health concerns that older people commonly have. We also discuss how AI might revolutionize the way we learn about aging and geriatric medicine in the future.

KEYWORDS: Artificial Intelligence, Aging, Neurodegeneration, Cardiac disease, Diabetes

Era's Journal of Medical Research. 12(2);2025 [doi: 10.24041/ejmr.2025.29]

INTRODUCTION

Aging and age-associated diseases are one of the leading challenges not only in developed countries but also in some developing countries, which also suffer from these multifactorial problems. It is a gradual, intricate, and temporally influenced process that results in functional decline, biological and physical deterioration, and the onset of numerous age-related disorders.[1,2] The complex interaction of environmental, mechanistic, biochemical, and evolutionary restrictions can profoundly influence the aging process. Several of the disorders in this group include Alzheimer's, Parkinson's, heart disease, osteoporosis, type 2 diabetes, several metabolic disorders, and several types of cancer.[3] According to data provided by the World Health Organization (WHO), by 2050 the number of aging people, especially those above 60 years old, in the whole world will reach 2.1 billion. This highlights how important it is to find innovative strategies to deal with the problems and diseases that come with getting older.[4]

AI, basically a combination of machine learning (ML) and deep learning (DL), has a lot of potential for study in health care and in the field of gerontology. AI-based systems have the capacity to analyse extensive information in a minimum and real time, such as whole genomes based on proteomics as well as metabolomics, high-quality imaging, and electronic health records (EHRs), to identify concealed patterns, predict disease progression, and recommend treatments. AI is opening a new way and idea in the research and diagnosis of age-related diseases because their causes are often intricate and there is a lot of long-term data on them, and it is a great concept to use AI in gerontology and geriatric medicine.[5,6]

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Corresponding Author: Asif Shaikh
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How to cite: Shaikh A. Role of Artificial Intelligence in Studying Age-Associated Diseases: A Brief Review. Era J Med Res. 2025;12(2):61–63.

This review briefly summarized the role of artificial intelligence in improving, understanding, and managing age-related chronic and serious diseases and how AI may help uncover biomarkers, predict how diseases will become worse, enhance therapies for everyone, and make healthcare better.

HOW AI IS TO LEARN ABOUT DISEASE

AI, is a general word that covers a lot of different techniques to make computers function like people which remember things for example:[7,8]

Machine learning: ML is the study of algorithms that use data to make guesses or sort objects into groups.

Deep Learning: DL is a way to use neural networks to look at data that isn't well organized and has a lot of dimensions. There are audio recordings, genetic sequences, and photographs in this collection.

Natural Language Processing: NLP is work like a sense of unstructured healthcare data and uncover research articles and tales from patients.

Reinforcement Learning: RL helps build healthcare systems and treatment plans that can be changed when they need to be.

AI TO ASSESS THE AGE RELATED DISEASES

In the Prediction of Neurodegenerative Disorders

Artificial intelligence (AI) has the potential to improve the accuracy of diagnostics and predictions about how diseases will progress by using complex pattern recognition. Brain- and neuron-related disorders such as Alzheimer's and Parkinson's disease are both common and dreadful neurological disorders that mainly afflict older persons. Artificial intelligence algorithms look at medical images, genetic data, and the results of cognitive tests to find early signs of neurodegeneration. A machine learning algorithm might be able to find small changes in how the brain works and how it is built by looking at pictures from MRI and PET scans. These changes could be the first signs of dementia, even years before any clear signs show up. Using AI to look at speech and handwriting is another easy and cheap way to find cognitive impairments early on.[8,9]

Cardiac Problems

Heart disease is the main cause of death for persons over 65, in particular. Artificial intelligence applications in cardiology use data from electrocardiograms (ECGs), echocardiograms, and signals from wearable sensors to find arrhythmias, heart failure, and vascular problems. Predictive analytics uses data from past patients to figure out cardiovascular risk scores. This helps doctors find patients who are at a high risk of getting heart disease and are ready to provide them therapies that will help them avoid getting it. AI may also look at data about how you live and act to find links between your food, exercise, and stress levels and your heart health.[10,11]

Metabolic Disorders and Type 2 Diabetes

Metabolic disorders and Type 2 diabetes can be deadly and can take years to show up. Artificial intelligence can help figure out how likely it is that someone has diabetes by looking at their DNA, metabolism, and way of life and life style. Wearable glucose monitors and smartphone apps that use artificial intelligence can keep an eye on blood sugar levels in real time and let both patients and caregivers know if anything out of the ordinary happens. AI can look at a lot of different things, like how you eat, how you sleep, and how your body reacts to insulin, to give you personalized advice on how to avoid or delay getting sick.[12,13]

In the Cancer Diagnostic and Preventive Strategies

Artificial intelligence is a key part of proactive disease care, especially when it comes to diagnosing and predicting cancer. This is done by finding risk factors that can be changed, encouraging healthy behaviours, and making it easy to keep an eye on health at all times. A personalized method for encouraging good health. Artificial intelligence-driven preventive strategies employ customized medicine by customizing treatments to an individual's genetic profile, lifestyle, and environmental context. Genomic data and electronic health records are used by models of precision medicine to figure out how likely it is that a person would get a chronic disease and to suggest specific measures to avoid getting the disease. Artificial intelligence powers these decision-support systems, which can assist doctors come up with plans for personalized therapy and changes to their patients' lifestyles.[14–16]

TOOLS FOR CHECKING HEALTH ON MOBILE DEVICES FOR OLDER PEOPLE

There are so many advance technology such as Wearable technology powered by artificial intelligence has changed healthcare for the elderly by letting people keep an eye on their health in every time and also monitor their health away from them. The AI based devices like smartwatches, smart bands, mobile apps, and biosensors can provide us important general health information's, such as heart rate, oxygen saturation, blood sugar levels, caloric burning , stress level and the quality of sleep. These devices utilize machine learning techniques to find problems, send alerts in real time, to us and our relatives if we live remote. There are two benefits to using remote patient monitoring: it reduces the number of times older patients need to go to the hospital, and it offers them more control over their own medical treatment.[17,18]

Utilization of Artificial Intelligence with Nutritional Therapy in older Patient

The utilization of artificial intelligence with nutritional therapy in the pursuit of innovative pharmaceuticals. Artificial intelligence (AI) speeds up the process of finding and repurposing drugs for age-related diseases by looking at how different drugs work together and making educated assumptions about how well they will perform. Machine learning models look through huge datasets of clinical trials to find possible remedies for heart and brain illnesses. Artificial intelligence-based food suggestions are better than nutrition programs since they look at a person's metabolic profile, which makes it even less likely that they will get sick.[19,20]

ETHICAL CONSIDERATION FOR USING AI TO CARE OLDER PEOPLE

As deep learning, natural language processing, and robots get better, it gets harder to use AI to help take care of old people without running into problems and moral issues. Chatbots and virtual health aides driven by artificial intelligence are projected to give the elderly ongoing medical advice and companionship. Because of this, they will feel less alone, which will be good for their mental health. Smart homes with AI and health monitoring equipment will also let people live on their own. These homes will give people access to emergency services and make sure they are completely protected. As artificial intelligence (AI) keeps becoming better, doctors, data scientists, and

politicians will work together to find new ways to stop and forecast health problems.[21,22] We need rules and guidelines for ethical AI to make sure that AI is utilized responsibly in geriatric medicine.

CONCLUSION

Artificial intelligence has changed the whole world and every field of science, especially medical sciences. AI provides us data-driven information that helps us to find these diseases early and how we solve them and come up with personalized plans to stop them. During aging people suffer from a wide range of problems, including neurological disease, cardiac problems, diabetes, and more. The use of AI in the field of geriatric medicine could change the whole way for older people and assist and make them aware of challenges that come with getting older. Advanced AI-based devices provide a time-to-time monitoring of daily health vitals such as blood pressure, heart rate, and oxygen level. But there are still a lot of lacking and ethical and safety problems to solve when it comes to data privacy, making it easy to safely use, and making sure it follows ethical and social concerns. More research and awareness are necessary, and how AI is becoming better at solving problems and precision treatment for older people will usher in a new era in the field of gerontology.

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