Chapter 5
AI in Managing Chronic Diseases

Priti Mangesh Bharambe
https://orcid.org/0009-0000-8700-9822
MIT Arts, Commerce, and Science College, India

Santosh Jagtap
MIT Arts, Commerce, and Science College, India

ABSTRACT

Chronic diseases, including diabetes, cardiovascular disorders, and cancer, are responsible for more than 70% of deaths worldwide, placing considerable pressure on healthcare systems. This chapter explores the revolutionary impact of artificial intelligence in the management of chronic illnesses. By utilizing machine learning, AI can predict disease progression and offer highly accurate personalized treatment options. It enhances diagnostic processes, supports remote patient monitoring through wearable technology, and allows for real-time management of treatments, thereby improving patient outcomes. Significant topics covered include AI applications for the early detection of diabetic retinopathy and cancer, customized treatment plans, and automated medication management. Additionally, AI improves telemedicine by facilitating at-home monitoring of chronic conditions through the collection of real-time data. The chapter also addresses challenges such as data privacy and biases in AI, highlighting the importance of ethical considerations.

DOI: 10.4018/979-8-3373-0179-2.ch005

1. INTRODUCTION TO CHRONIC DISEASES AND HEALTHCARE CHALLENGES

1.1 Overview of Chronic Diseases

Overview of Chronic Diseases Long lasting health conditions that take time to develop and need ongoing medical attention or significantly limit activities of daily living are referred to as chronic diseases or non-communicable diseases (NCDs) (Collins & Varmus, 2015; Ashley, 2016). Common chronic diseases include:

- Diabetes: A disorder of metabolism that results in an elevated blood glucose level, if untreated, can cause extreme complications including kidney disease, loss of vision, neuropathy and cardiovascular disease. Both Type 1 and Type 2 diabetes are prevalent, and they are the leading contributors to the world's healthcare burden (Rajkomar et al., 2019; Miotto et al., 2018).
- Cardiovascular Disease (CVD): CVD – or conditions affecting the heart and blood vessels – includes coronary artery disease, hypertension, stroke, and heart failure. High rates of CVD, which remains a major cause of death worldwide, are largely attributable to risk factors, including hypertension, smoking and sedentary lifestyles (Topol, 2019; Bodenheimer & Sinsky, 2014).
- Cancer: Unless it becomes cancer, it's normally just a supercell that grows out of control. High morbidity and mortality rates are associated with common cancers, which include lung, breast, colorectal and prostate cancers. Treatment is often complex and expensive, and comes at a high cost to patients, and to healthcare systems (Esteva et al., 2017; Hood & Friend, 2011).