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Chapter 14: Role of Artificial Intelligence in Pharmacovigilance

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Abstract: According to the definition offered by the World Health Organization (WHO), pharmacovigilance refers to the study of adverse drug reactions (ADRs) as well as other issues surrounding drugs and the overall aim is to make certain that patients can be safely and effectively treated. Not only does it ensure the safety of drugs, it also enhances patient care and health because it prevents and treats drug complications. The increased levels of ADRs awareness in India have made it clear that pharmacovigilance is an important tool in the healthcare system, and techniques like spontaneous reporting, intensive follow-ups, and data analysis are applied to enhance drug safety measures. This review provides information on the current state, the challenges, and new methodological techniques of pharmacovigilance and its significant role in ensuring the safer use of medicines through therapy. The pharmaceutical industry is among the early ones to enjoy the power of artificial intelligence (AI), which has only implored to be utilized in numerous places of society. The review is focused on the drug discovery and development, drug recycling, drug product development, clinical trials, etc., to minimise human labour and accomplish objectives within a short period. It emphasises the advantages of the intellectual property in many operations of pharmaceutical industry, Crosstalk also discusses the future of AI in the pharmaceutical industry, challenges and solutions and tools and strategies of implementing AI. It assists in the discovery of new compounds. In order to develop medicines and other effective methods of treating rare illness, it may carry out research and compare the scientific publications with other sources, such as the results of clinical trials.

Keywords: Pharmacovigilance (PV), Artificial Intelligence (AI), World Health Organization (WHO), Adverse Drug Reactions (ADRs), Artificial Neural Networks (ANNs), Individual Case Safety Reports (ICSRs), National Pharmacovigilance Programme (NPPV)

14. 1 Introduction

Pharmacovigilance (PV) is the science of detecting, assessing, understanding, and preventing adverse effects or any other problems related to medicines. According to the World Health Organization, it involves monitoring both short- and long-term side effects of drugs to ensure patient safety [1]. PV is a key pillar of healthcare as it helps track how medicines interact in the body and uncover potential risks, especially adverse drug reactions (ADRs) [2,3]. ADRs are harmful or unintended responses to medicines,