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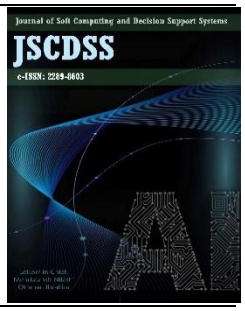

An Analysis of Patients' Reviews for Drugs Side Effects in Parkinson's Disease: A Machine Learning Method

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Abstract

A timely and accurate diagnosis of Parkinson's Disease (PD) is very important for its effective management and treatment. Medications play a crucial role in managing PD symptoms and improving patients' quality of life. In this work, four drugs for the treatment of PD are reviewed for their use and side effects. While clinical trials and medical literature provide valuable information about the efficacy and safety profiles of drugs, they often have limitations such as small sample sizes, short duration of observation which may not fully capture the diverse experiences and potential side effects encountered by patients. Thus, we provide a complementary study on these drugs from patients' reviews in drugs.com using text mining approach. The analysis of patients' reviews is important as it provides real-world insights into the experiences of individuals who have actually used these medications for PD. The outcome of this work may help healthcare providers make more informed decisions about treatment options and provide better support and guidance to patients with PD.

Keywords: Knowledge Discovery, Drugs, Patients' Reviews, Parkinson's Disease, Text Mining, Side Effects

1. Introduction

Parkinson's Disease (PD) is movement disorder of the nervous system that gets worse over time [1-8]. PD occurs as a result of the degeneration of neurons in the brain that produce dopamine [9, 10]. It is mostly affecting people 65 years of age and above. The primary cause of this disorder is still unknow. It has been found that environmental factors and genetic predisposition are considered to be the main contributors. PD is defined by the progressive deterioration of dopaminergic neurons located in the substantia nigra pars compacta. This degeneration is accompanied by the presence of Lewy Neurites (LNs) or Lewy Bodies (LBs), which are proteinaceous inclusion bodies found within surviving neurons. Oxidative stress is another major factor contributing to neurodegeneration in PD. Dopaminergic neurons are uniquely susceptible to oxidative damage owing to their heightened metabolic activity and relatively diminished levels of antioxidants, such as glutathione, within the nigrostriatal region [11]. PD's development and progression are linked to inflammation, but the exact mechanism is unknown. Changes in the expression of genes coding for the immune-regulating Human Leukocyte Antigen (HLA) complex have been found in genetic studies [12]. Motor symptoms have traditionally been associated with PD, as demonstrated in 187 patients with bradykinesia, postural instability, rigidity, and resting tremors [13]. Nonmotor symptoms of PD, such as cognitive decline, anxiety, depression, dysautonomia, and sleep disturbances, have been identified over time and in ongoing research [13].
PD features are expressed in a variety of ways due to changes in dopaminergic and nondopaminergic neurotransmitters, as well as comorbid pathophysiology (see Fig. 1). Symptomatic treatment primarily aims to improve dopamine function, with levodopa being the most commonly prescribed medication [14, 15], often in combination with carbidopa. Other medications that target the dopaminergic system include COMT inhibitors [16], MAO-B inhibitors [17], dopamine agonists [18], and amantadine [19], which also stimulates dopamine receptors [20]. Anticholinergics can be used to treat tremors, but they should be used with caution because they can affect gait and cognition. Nonmotor symptoms of PD require additional medications, such as acetylcholinesterase inhibitors for cognitive problems, antidepressants or anxiolytics for neuropsychiatric symptoms, and selective antipsychotics for hallucinations. However, as the disease progresses, the efficacy of these medications decreases, putting an additional burden on patients and caregivers. Targeting comorbid pathologies to address the diverse features of PD