Using Deep Brain Stimulation To Treat Parkinson's Disease

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Introduction

Parkinson's disease, a neurodegenerative disorder of the central nervous system, afflicts approximately 4 million individuals. Characterized by unintended movements, such as shaking and stiffness, it also affects balance and coordination. Symptoms develop gradually and worsen over time, causing challenges in physical movement and verbal communication. To enhance our understanding and potential treatment approaches, we conducted an analysis of the top 100 articles on how Parkinson's disease impacts neural circuits.

Objectives

The objective of our study is to use bibliometric data analysis to understand how Parkinson's disease affects neural circuits and programs in addition to whether deep brain stimulation is a viable treatment for Parkinson's.

Methods

First we used Web of Science to search for articles related to "Parkinson's disease" "neural circuits" and "treatment".. From the 11,321 research articles found through the preliminary search feature, we chose top 100 articles which were eligible to research. From there, we divided them into three separate categories: Articles, Review, and Proceeding papers which numbered 65, 25, and 11 respectively
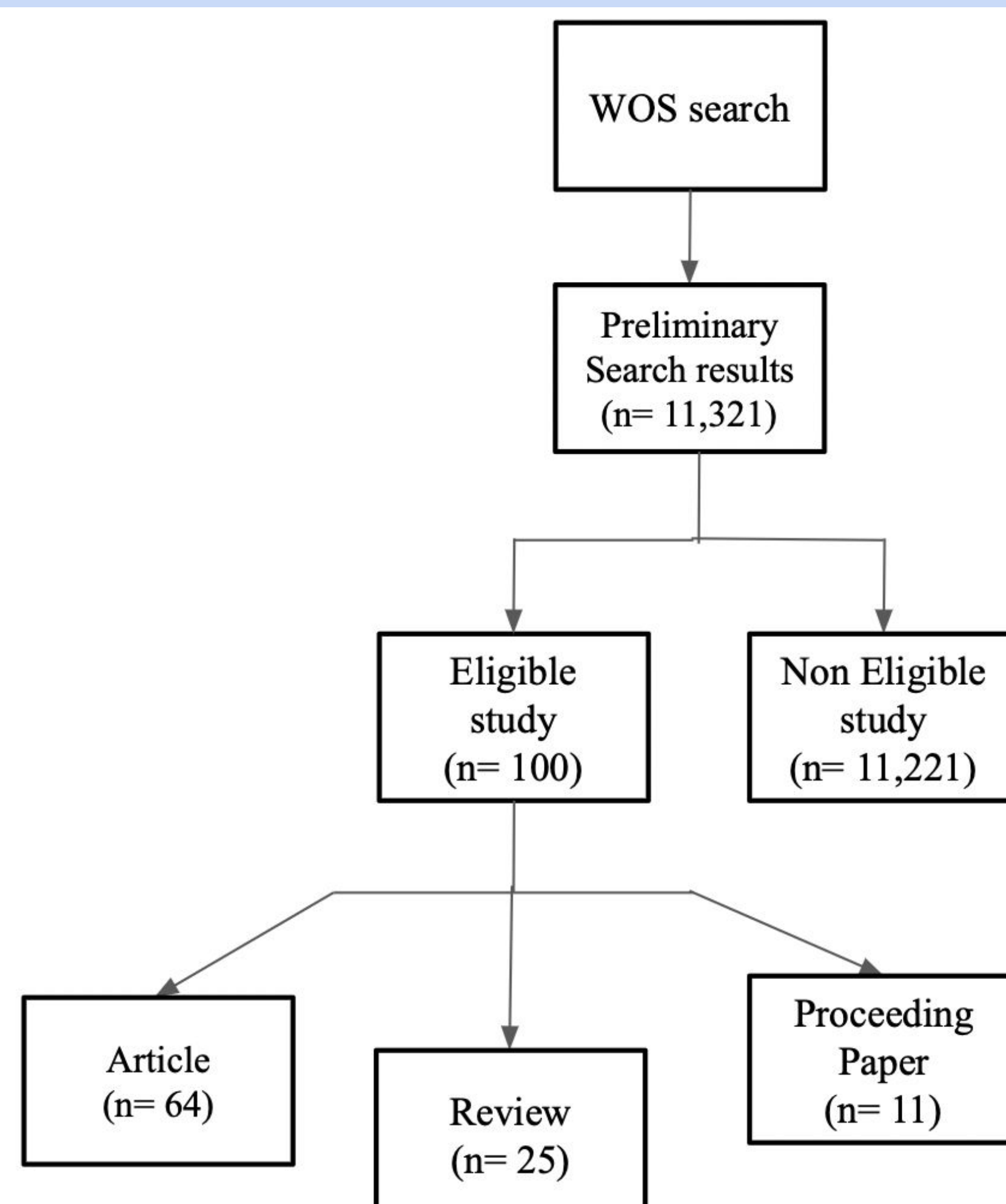

Figure 1: Flow Diagram of the literature search process outlining the number of studies that were identified, included, and excluded at each stage.

Results

Within the Top 100 cited sources pertaining to our research topic, a notable trend was observed concerning the use of deep brain stimulation (DBS) as a treatment for Parkinson's. DBS appeared as the primary treatment in 13.9% of the highly cited articles. This therapeutic approach involves the precise placement of electrodes in specific brain regions responsible for motor control, such as the subthalamic nucleus (STN) or globus pallidus interna (GPi). By delivering controlled electrical impulses, DBS aims to regulate abnormal neural activity associated with Parkinson's disease. The electrical signals seek to normalize the firing rates and synchronization of neurons within the targeted regions, thereby restoring more physiologically sound motor circuitry function. As a result, DBS effectively alleviates cardinal motor symptoms and can be tailored to accommodate individual needs.

Trending Topics In The Top 100 Cited Articles
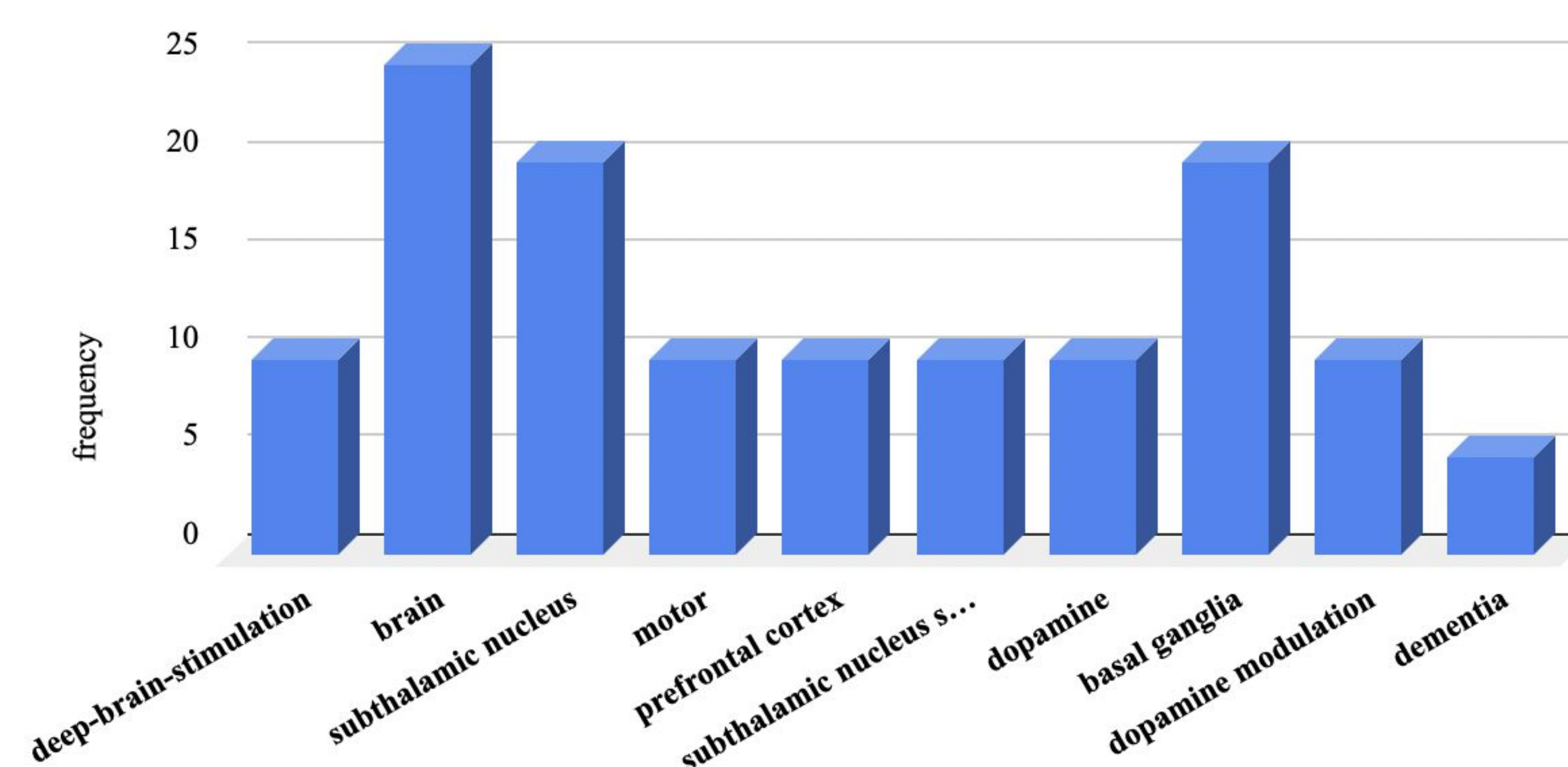
Most Relevant Words In The Top 100 Cited Sources
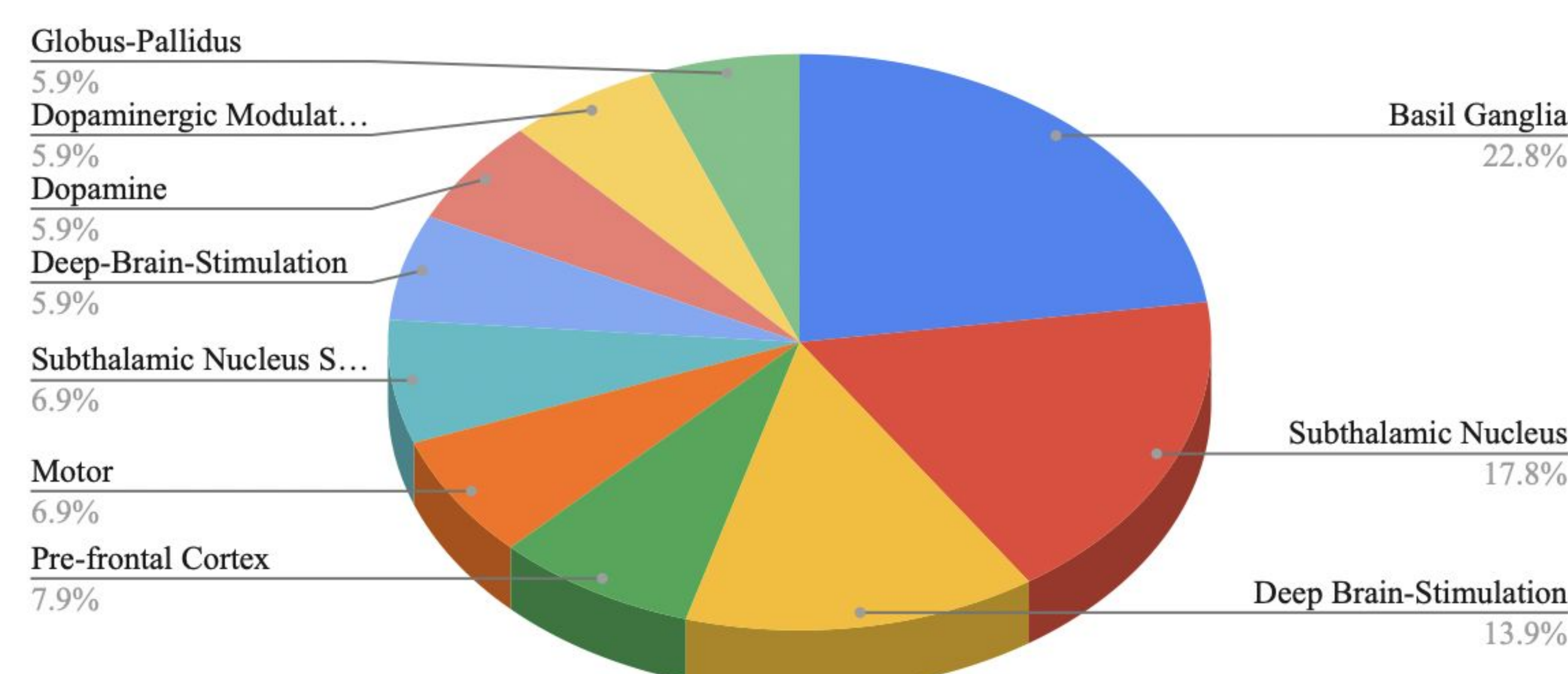
Conclusions

After going through the Top 100 sources, we concluded that deep brain stimulation is an effective way to treat Parkinson's disease. However, deep brain stimulation does have its limits for what it can do and how it treats parkinson's disease.

We would recommend DBS for individuals who have not responded adequately to medication or who experience medication-related complications. DBS is not a cure for Parkinson's disease and primarily addresses the symptoms and does not slow down or halt disease progression. It requires careful patient selection, a skilled surgical team, and ongoing post-operative management to ensure optimal outcomes

However, for patients with Parkinson's DBS can be quite effective in terms of symptom improvement, individualized treatment, medication reduction, and quality of life enhancement. DBS can effectively alleviate the cardinal motor symptoms of Parkinson's disease, including tremors, rigidity, bradykinesia, and dyskinesias), resulting in improved motor function. Its programmable neurostimulator also allows for flexibility and enables customization of therapy based on symptom severity and progression. In addition, by combining DBS with optimized medication management, patients can achieve better symptom control. Furthermore, DBS has also been shown to improve non-motor symptoms of Parkinson's disease, which can significantly enhance the overall quality of life for individuals with Parkinson's.

References

1. Web Of Science Database
2. R-studio application