



Case Study: Biochemical Effects of Drugs on a Parkinson's Disease Patient

Allison Cheng¹, Dr. Jeong Choe², Dr. Barry Hart³
Palo Alto High School¹, Palo Alto Unified School District², Innovation Pathways³

RESEARCH QUESTION

This project utilizes a case study of a Parkinson's disease patient to answer the following question:

What mental and physical effects do drugs have on a Parkinson's disease patient?

BACKGROUND AND SIGNIFICANCE

Parkinson's disease affects approximately 13 per every 100,000 people living in the United States. (Parkinson 1)

In general, neurons in the brain of a Parkinson's disease patient undergo death or some form of malfunction. (What 1)

Parkinson's mostly affects the substantia nigra, a region of the brain that is responsible for producing dopamine. (What 1)

A decrease in dopamine ultimately leads to limited control of one's movement, body, and emotions. (What 1)

As a result, the symptoms of Parkinson's disease are:

Tremoring in hands, arms, legs, jaw, and face; bradykinesia (slowness of movement); and impaired balance and coordination (What 1)

For people over age 60, there is a 2-4% risk for Parkinson's (1-2% risk for other ages) (What 1)

About 15-25% of Parkinson's disease patients report having a relative with the disease (What 1)

CASE STUDY

- One patient of Parkinson's disease was selected to be the subject of this project/case study
- The case study is an overall profile on the patient in terms of their symptoms before and after taking medications, as well as the effects of their symptoms on daily life
- In addition to the data from the rating scale, direct quotes from the patient were also gathered as qualitative data points as another form of data to support and elaborate on the observations from the rating scale

RESEARCH METHODOLOGIES

1. The Unified Parkinson's Disease Rating Scale (UPDRS) was used as a preliminary diagnostic test to analyze the patient's current symptoms, including their mental and physical capabilities.
1. The UPDRS was administered to the patient a second time to ensure that the data from the preliminary administration was accurate.
1. Subsections in the rating scale that ranked significantly high were further analyzed through an in-person interview with the patient to gain a personal account of how the patient's life, in terms of movement and thinking, was affected.

- Handwriting
- 0-normal
- 1-slightly small or slow
- 2-all words small but legible
- 3-severely affected, not all words legible
- 4-majority illegible

Figure 1: Example of a subsection in the UPDRS, with the highlighted row as the response.

DATA ANALYSIS AND RESULTS

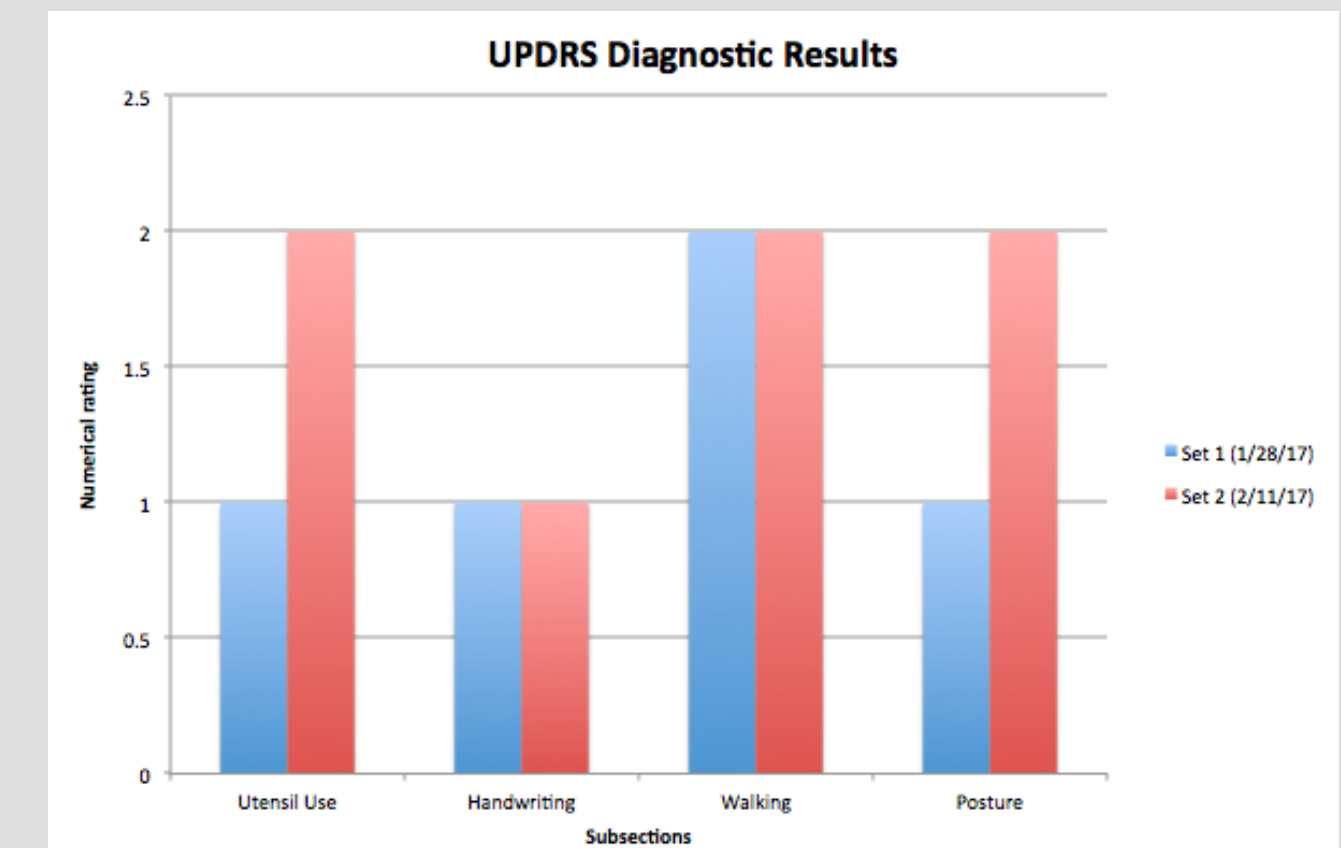


Figure 2: Graph of two sets of UPDRS diagnostic tests. Each color (blue and red) denotes the data from that subsection during a particular visit (1/28/17 visit and 2/11/17 visit, respectively). 0 on the rating scale represents that the subsection is normal, while 5 represents that the symptom has severely affects the patient's daily actions.

Interview Quotes:

- "I gradually became unable to write. The medicine helped a little bit, but did not reduce the symptoms because it was too late."
- "Using utensils is difficult because it takes a long time and it is hard to pick up food. It was harder before I took the medicine; the medicine helped make it easier."

CONCLUSION

While the symptoms of Parkinson's disease patients vary, this case study addresses the mental and physical effects that Parkinson's disease has on a patient, as well as the impacts of medications and drugs to alleviate certain symptoms. Case studies such as the one conducted in this project allow care providers and medication companies to gain multiple perspectives on how best to support Parkinson's disease patients by addressing symptoms similar to those mentioned and surveyed in this case study.

ACKNOWLEDGEMENTS / REFERENCES

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