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Introduction

Alzheimer's disease is a very complex and degenerative disorder commonly associated with the elderly population. It affects the brain causing deep rooted physical and mental behavioral problems that only worsen as time progresses. It is an irreversible condition and thus far affects a large part of the population. It can cause memory loss, decline in your cognitive function, and severe changes in behavior. It is a very aggressive form of dementia. It is caused by an excess of protein in the brain. With the overload of these proteins, neurons in the brain begin to degenerate causing much atrophy of the brain. Over the century, even with medical advancements, the cause and underlying factors of this degenerative disease remains a mystery to medical professionals. This scientific approach to the disease will in hopes shed light upon the concerns of this aggressive form of dementia. This paper aims to provide an overview of the possible contributing factors to this disease. We have recorded data from two differing states to provide correlation factors between the two sets. Proposed questions, lifestyle choices, medical treatment availability and other risk assessments were implemented to further facilitate usable and clean results. Using the provided dataset and our sources we pulled from the CDC, our methods of questioning and data manipulation have revealed interesting points and correlations with the disease and lifestyle factors. With the information and data manipulation tools stated above, our findings have been documented and reviewed for the following representation.

Methods

Our data set has provided us with a comprehensive look at targeted groups following Alzheimer's indication. The differing states, New York and Mississippi were our targeted groups. Our methods and line of questioning relates to the uniqueness of human beings, regarding their race, ethnicity, gender, and geographic location. Before starting our methods and questioning, it was important to pull data from different sources for our findings to have something to compare. For this, we consulted the Center for Disease Control. Their website offers a database that is fully functional in terms of searching through data and implementing search filters to read the data properly and accurately. When reviewing the CDC's data, filtering the results to cognitive decline better represents the affected majority including patients suffering from Alzheimer's or the similar form of Dementia. It is important to note the data from the CDC was filtered to show cognitive decline in the state of New York from the years of 2016-2021. The data retrieved showed the percentage of affected adults who reported subjective cognitive decline or memory loss. The state of New York reported adults within the range of 50-64 years of age 10.1% were affected. In contrast, Mississippi had reported that adults within the range of 50-64 years of age was about 14% (13.9). The data from the CDC also reported on those 65 years of age and older for both states, including an overall percentage as well. To quickly cover this data: Mississippi had adults within the 65 and older report 12.4%, and overall had 13.1%. While New York reported in adults 65 and older had 13.5% and overall, only an 11.7% finding.

To comparatively represent our findings, it was important to have a set of data to compare them against. Our methods and algorithms not only cleaned the data that was provided to us but were able to show correlations that would have otherwise gone unnoticed. Our algorithms count the number of rows

with each data type, calculate the average percentage value, and calculate the average mean value. It then prints out various statistics related to these calculations. This function is mostly responsible for the cleaning and parsing of the values. It iterates through the dataset looking for rows with any missing information or values and replaces it with the calculated average for the respective data type. Once it has finished its processing it takes the finished data and saves it to a csv file. Following the creation of the new file the data has any duplicate rows removed, it uses the function "caseStudy' to calculate the statistics of Data_Value and Data_Value_Alt. It then calls dataCleaner to replace missing values within the set with calculated averages. In simpler terms, it reads the dataset, it calculates the averages for the specific types of data, replaces the missing values with the averages and it does this for different columns inside our set.

This first method allowed us to properly clean our data as it prepares for its line of questioning. Importing the necessary packages, it begins by calling the question based cleaner method. This fills in the missing data values with question based specific average values. Continuing, the state separator method then separates the values based upon which state it represents. The surveyQuestionAverager function calculates the average values for certain questions in the dataset. It analyzes the data and calculates the average Data_Value for each query. The stateComparator function determines the differences between two lists of values, presumably for comparing data between two states. The generateQuestionList function generates a list of questions based on a specified question ID. The toCombinedToCSV function utilizes numerous lists and creates a new CSV file with the collected data. These above methods within our python algorithm assist the manipulation to better understand the correlations when the output has been received. Additionally, the script initializes data files, sets display options, and reads CSV files related to New York and Mississippi. While the separation cuts the original dataset into two separate datasets for New York and Mississippi. When using the questionBasedCleaner function, it cleans up the data for both sets and prepares it for the state comparison output.

Results

Understanding the development of this algorithm helps to gather different methods of manipulating this dataset. For example, using the question averages, it allows the reader to form an opinion or make connections to underlying factors that can be seen through both states. This means, if one state is showing cognitive decline in patients that are 65 years or older that also may have, for example, high blood pressure, this would be worth noting and taking a second look at. This new way of crunching numbers and comparing different lifestyle choices, age, race, or geographic location has produced telling results. Among those factors, the questions within the algorithm yielded interesting data as well. For example, the outliers with a percentage difference of ten or more wouldn't seem to correlate to one another. Regarding this difference, only three questions seemed to yield a difference of ten percent or higher, making the rest of the questions have a reasonable amount of correlation to one another. The data that has a percentage of five and lower would be our best options to assume a connection. These can include anything from adults who suffer from mental distress to those who have ever received the vaccine for pneumococcal. For clarification those two examples both have less than a three percent difference between the two states.

Discussion

The results gathered from this data manipulation/cleaning process have provided a very unique insight to understanding more about Alzheimer's. Given the cleaned data, it is also important to note outliers on the underside of the data, those being less than three percent. It's to be believed these have the strongest correlation to one another. Examples include the percentage of older adults who have fallen and

sustained an injury within last year, percentage of older adults who reported influenza vaccine within the past year, and percentage of older adults who reported binge drinking within the past 30 days. While these outputs don't necessarily correspond on the basic level, they all indeed share a similar percentage to both states in adults that have reported having Alzheimer's.

Considering the data that was pulled from this set, and when comparing these results to our sources from the CDC, we take note of all possible links to Alzheimer's disease. It poses a question, does any of these factors contribute to the facilitation of this form of dementia? If the answer is yes, what do we have to compare to? A scientific study was used as reference alongside the information pulled from the CDC website. Findings include preventative measures are most likely the best way to combat this disease. For example, one measure to take would be to limit the amount of saturated and trans-fat in a regular diet. Now this may sound like a general preventative measure, but when looking at the data and questions within our findings, they seem to have a bit of correlation. It focused heavily upon dietary habits and vitamin intake. These factors line up well with the percentage of people reporting little to no healthy lifestyle habits, for example note in the findings that New York and Mississippi yielded the highest percentages of relevancy within the columns that pertained to health and lifestyle choices and habits. Their differences were also below two percent. These findings comparatively show healthy lifestyle and health habits better prepare and heal brain tissue that could possibly lead to a form of dementia if left untreated or unchanged.

If we take a last look at the data from the questions we took, it demonstrates high percentages of those currently diagnosed with Alzheimer's in fact share much of the same health and diet tendencies. New York and Mississippi have very high reports of older adults without diabetes who reported a blood sugar test or diabetes test within 3 years, many older adults who were ever told they have high blood pressure, and a portion of older adults who have less than five teeth due to ongoing gum disease. These three factors alone show great correlation to health and lifestyle decline among those diagnosed with Alzheimer's. The research and methodology used in this study revealed the strong relation between Dementia/Alzheimer's and one's overall dietary and lifestyle choices. Limiting saturated and trans fats were found to be of great importance to avoid when considering taking health more seriously. Increasing the number of B-12 vitamins was found to support health cognitive function. The results concluded within the two states that were chosen for these tests offered insight on the percentages of people participating in healthy lifestyle choices had the lowest percentage of relevance and the lowest number of differences between the two states.

With access to this new data, preventative measures will be more uniform in someone's daily life. Cognitive function is the most important function in the human body. It accounts for the control of the respiratory, circulatory, nervous, skeletal, muscular, and digestive systems. They are the major functions of the human body all controlled by the brain, or how well someone's cognitive function operates. Alzheimer's disease slowly attacks the most important aspect of the human body, deteriorating the tissue in real time. Currently, there is no cure for this disease. It ravages over six million and seven hundred thousand Americans today in twenty twenty-three. It is important to continue these types of studies to better understand the disease. In doing so, future generations may have better luck in finding a new way to battle Alzheimer's or another form of aggressive dementia.

References

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