Project Overview

This project aims to analyze patient data related to Alzheimer's disease, focusing on various factors such as demographics, medical history, cognitive assessments, and lifestyle choices. The primary goal is to uncover insights that can inform healthcare strategies for Alzheimer's management.

2. Project Phases

Phase 1: Data Cleaning

Objective: Prepare the raw data for analysis.

Steps Taken:

Removed duplicate entries and records with missing essential fields (e.g., PatientID, Age, Diagnosis).

Handled inconsistent data formats (e.g., standardizing date formats, ensuring consistent categorical values for variables like gender or diagnosis).

Imputed missing values where appropriate (e.g., replacing missing MMSE scores with median values).

Eliminated outliers based on domain knowledge (e.g., unrealistic ages or BMI values).

Phase 2: Data Categorization

Objective: Segment data into meaningful categories for analysis.

Steps Taken:

Age Grouping: Divided the age data into categories (60-65, 66-70, 71-75, 76-80, 81-85, 86-90).

BMI Categorization: Created BMI categories (Underweight, Normal Weight, Overweight, Obesity Class 1, Obesity Class 2) based on standard BMI ranges.

Cholesterol Levels: Grouped patients into cholesterol categories (High, Normal, Borderline).

MMSE Scores: Grouped patients into cognitive function categories based on MMSE scores (Low, Moderate, High).

Phase 3: Data Model Development

Objective: Construct a relational data model to facilitate analysis in Power BI.

Steps Taken:

Linked the FactTable (clinical and assessment data) with Demographic Details and Medical History using PatientID as the primary key.

Established one-to-one relationships between tables to ensure seamless data aggregation across different dimensions (e.g., demographics, medical conditions).

Defined necessary Measures (e.g., count of Alzheimer's patients, diabetes incidence) using DAX formulas in Power BI for advanced analysis.

3. Tools and Technologies Used

Power BI: For data visualization, report creation, and interactive dashboard development.

DAX (Data Analysis Expressions): To create measures and calculated columns.

Excel: For preliminary data exploration and cleaning tasks.

SQL Server: For data storage and integration.

Python : For complex data cleaning or preprocessing.

4. Project Details and Analysis

Key Insights:

Cognitive impairments (MMSE scores) are significantly associated with patients suffering from diabetes, hypertension, and head injuries.

Patients with higher cholesterol levels tend to have higher rates of cardiovascular disease and hypertension.

There are correlations between BMI categories and overall health, with normal weight patients generally having better health outcomes compared to those in obesity categories.

Cholesterol Analysis: Patients were categorized based on cholesterol levels (High, Normal, Borderline), and trends across various health conditions were identified (e.g., diabetes, hypertension, cardiovascular disease).

Functional Analysis: Functional impairments (based on ADL) were studied across various patient conditions, showing a decline in functional abilities in patients with cardiovascular disease.

Demographic Breakdown: Age, gender, and ethnicity were considered to find trends in the distribution of Alzheimer's patients, with older age groups showing a higher prevalence.

This project provided valuable insights into the relationships between medical conditions, lifestyle factors, and Alzheimer's disease. The use of Power BI for data modeling and visualization enabled the creation of interactive reports to support healthcare professionals in identifying key risk factors and potential intervention points for managing Alzheimer's disease.

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