"The Impact of Falls on Cognitive and Mental Functionality in Elderly Patients with Moderate Dementia."

This research aims to investigate whether falls accelerate the progression of moderate dementia among elderly patients, focusing on cognitive and mental functionality. Through a longitudinal cohort approach, it will be examined if those who experience falls show more rapid cognitive decline compared to those without falls and whether gender-based differences influence these outcomes. This study will employ validated cognitive and mental health assessments alongside mixed-effects regression models to elucidate potential impacts of falls on dementia progression, offering insights into tailored care strategies for fall-prone dementia patients.

# Research Aims

1. To determine whether falls contribute to the progression of dementia severity in elderly patients diagnosed with moderate dementia.  
2. To assess how falls impact cognitive and mental functionality in this demographic.  
3. To explore any gender-based differences in the relationship between falls and dementia progression.

## Methods and Analytic Strategy

**1. Study Design**  
- Type: Longitudinal cohort study  
- Population: Individuals aged 65 years and older, both male and female, diagnosed with moderate dementia.  
**2. Sample Selection and Size**  
- Cohort: 200–300 elderly patients with moderate dementia who have experienced at least one fall in the past year, and a control group of those who have not had a fall.  
- Setting: Healthcare facilities, rehabilitation centers, and assisted living facilities.  
- Duration: One-year follow-up with assessments every 3–6 months.  
**3. Data Collection**  
- Structured assessments of cognitive and mental functionality, fall history, and physical status through medical records and direct patient assessments.  
- Caregiver input, if available, regarding cognitive or physical changes post-fall.

**4. Analytic Strategy**  
- Primary Analysis: Comparison of cognitive decline rates between those who have experienced falls and those who haven’t, using mixed-effects regression models.  
- Secondary Analysis: Evaluate gender-based differences and assess correlations between the number and severity of falls and changes in cognitive functionality.

## Variables

**1. Independent Variables**  
- Fall History: Binary (Yes/No) and ordinal (frequency and severity).  
- Demographics: Age, gender, and general health status.  
**2. Dependent Variables**  
- Cognitive Functioning: Assessed by Mini-Mental State Examination (MMSE) or Montreal Cognitive Assessment (MoCA).  
- Mental Health: Scored using tools like the Geriatric Depression Scale (GDS) and Neuropsychiatric Inventory (NPI).  
- Dementia Severity: Clinical Dementia Rating (CDR) and functional ability scales.  
**3. Control Variables**  
- Comorbidities: Presence of conditions such as cardiovascular disease, diabetes, or previous brain injuries.  
- Medication Use: Number and type of medications, particularly those affecting cognition or mood.

## Additional Notes:

* Will be conducted using R.
* GitHub Repository will be used.
* R markdown and Latex will be used to communicate results.

## Datasets

1. [OASIS-3 Dataset](https://sites.wustl.edu/oasisbrains/)
2. [Alzheimer’s Disease Neuroimaging Initiative](https://en.wikipedia.org/wiki/Alzheimer%27s_Disease_Neuroimaging_Initiative)
3. [PAQUID Cohort](https://en.wikipedia.org/wiki/PAQUID_cohort)
4. [TIHM Dataset](https://github.com/PBarnaghi/TIHM-Dataset)
5. [Dementia Prediction Dataset](https://www.kaggle.com/datasets/shashwatwork/dementia-prediction-dataset)