Dementia, Beyond Memory Loss: A Neuroimaging Study of the Hippocampus and Amygdala Utilizing OASIS and FreeSurfer

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Alzheimer's affects about 70-80% of all dementia patients around the world. This neuroimaging study is aimed to examine the various numerical and quantifiable differences in volumetric measurements in patients with Alzheimer’s related dementia. The purpose of the study is to assist in furthering progress in the field of dementia research. This project examined at the changes in hippocampus and amygdala volumes between demented and nondemented patients (measured in mm3), and the hypothesis was that the demented patients would have overall lower brain volumes compared to nondemented patients. The hippocampus affects memory, while the amygdala affects emotion. Patients were around the mean age of 70-80 years and there were three in each CDR (Clinical Dementia Rating) group (0: normal, 0.5: very slightly demented, 1.0: slightly demented, 2.0: moderately demented) except for 2.0 which had 2 patients, resulting in 11 total subjects. The MRI data sets were selected, downloaded, and unzipped. Next was installing FreeSurfer and Linux OS. The data sets were imported into Linux. After all processing with FreeSurfer (multiple steps taking up to 36 hours total), data was extracted and examined for trends. The results show the means (between replicates) of the volumes in mm3 decreasing as dementia gets worse (or as CDR goes up). Although the data sets were limited, the results supported the hypothesis.

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