

EXPLORING COGNITIVE FUNCTION IN DIABETES AND NON-DIABETES SAMPLES USING ELECTROENCEPHALOGRAPHY (EEG) AND PSYCHOMETRIC ASSESSMENT: A COMPARATIVE STUDY

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Objective: Increasing evidence indicates diabetes mellitus-both type 1 and type 2- is associated with accelerated central nervous system decay; however, little is known about the cognitive complications of diabetes mellitus, particularly the neurophysiological changes. Also unclear are the precise cognitive domains detrimentally affected by diabetes or the relationship between blood glucose concentration and cognitive deficits.

Methods: In the present ongoing comparative investigation, cognitive function is being assessed in non-diabetes (control) (n=48) and in those with diabetes mellitus (Type 1 or Type 2) (n=19) using 32-channel electroencephalography (EEG) and neuro-psychometric batteries. Global cognitive performance is being examined using the Mini-Mental State Examination (MMSE); domain-specific cognitive performance using the Cognistat. Blood glucose levels following a 2-hour fast are also being determined.

Key Findings: Preliminary analysis of electrophysiological and neurocognitive data reveal subjects with diabetes demonstrate slightly altered brain activity and worse overall cognitive performance in specific cognitive domains. Specifically, subjects with diabetes exhibit significantly worse performance in the construction domain ($p= 0.005$) compared to controls. Correlation analysis additionally revealed a significant negative association between pre-study blood glucose and the similarity domain ($p=0.002$).

Conclusions: Present electroencephalographic and psychometric data indicate that patients with diabetes mellitus show early changes in brain electrical activity and perhaps worse overall cognitive performance. Data obtained highlight the importance of short-term and long-term glycaemic control, and raise the possibility that EEG could be used to non-invasively monitor changes in neuronal activity long before irreversible deficits in cognition have manifested, potentially delaying progression to dementia.