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Effect of ramadan fasting on fatigue severity and neurocognitive functions in patients with type 2 diabetes mellitus**Abdulrahman Alfahadi**
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Purpose/Objectives: One of the complications of diabetes is the progressive decrease in mental abilities and cognition, in particular; processing speed and verbal memory, ultimately leading to dementia. The purpose of the present study was to see the effect of fasting during the Ramadan month on cognitive functions and fatigue severity in type 2 diabetes mellitus (T2DM) and compare it with control group Muslims using The Cambridge Neuropsychological Test Automated Battery (CANTAB).

Methods: This observational case control study was conducted at the King Khalid University Hospital, Riyadh, Saudi Arabia in control subjects (n=41) and patients with T2DM (n=39). The groups subjects were matched for age, BMI, and gender. The tests included a validated Arabic form of standardized Fatigue severity scale (FSS). The tests selected from CANTAB battery were Motor Screening Task (MOT), Intra-Extra Dimensional Set Shift (IED) and Spatial Span (SSP) which test motor functions, rule acquisition and reversal and working memory capacity respectively. All subjects were metabolically stable without history of cognitive impairment or psychiatric disease (Anxiety and depression).

Results: During Ramadan there were significant differences in IED errors (24.43 ± 20.82 vs 50.73 ± 56.21 $P=0.007$), IED stages completed (7.43 ± 2.43 vs $8.69 \pm .73$, $P=0.003$), MOT (1466.32 ± 559.29 vs 1120.27 ± 343.09 , $P= 0.002$), and SSP SL (4.13 ± 1.36 vs 4.82 ± 1.60 , $P= 0.05$) in diabetics versus control. The differences significantly persisted even in the post Ramadan period among the two groups. IED errors (52.62 ± 60.62 vs 20.95 ± 16.90 $P=0.003$), IED stages completed (7.54 ± 2.50 vs $8.7 \pm .73$, $P=0.003$). Motor Screening Task (MOT) Mean latency significantly decreased after Ramadan (1268.91 ± 297.52 vs 1047.41 ± 375.32 , $P=0.002$). In T2DM there was significant decrease in MOT latency and a significant increase in SSP span length (4.32 ± 1.33 vs 4.71 ± 1.35 , $p= 0.025$). In control subjects the effect on all tests was non-significant. Among the FSS items there were no significant differences in all items of FSS in control while Significant differences were observed in many items that shows T2DM patients have more fatigue symptoms than control

Conclusions: Ramadan fasting significantly affects the fatigue scales and neurocognitive functions in patients with T2DM in terms of (MOT) motor performance, (IED) flexibility of attention & more errors and (SSP) working memory capacity. These indicators remain worse in the post Ramadan period also. Large scale studies with educational counseling and proper management protocols are required to control the effects of Ramadan on cognitive decline in T2DM patients.

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