Parkinson's Disease Detection in Early Stages Through Screening of Hand Tremor by Measuring the Vibrations in Hertz and the Difference Between Angles of Arm Swing

Rawashdeh, Ahmad (School: Jubilee School)
Mahmoud, Ghassan (School: Jubilee School)

Parkinson’s disease (PD) is the most prevalent type of parkinsonism, characterized by tremor, bradykinesia, postural instability, and muscle rigidity, along with various other motor and non-motor symptoms. Early motor symptoms include hand tremor and slightly reduced arm swing on one side. Early PD detection is essential, as it is cost-effective and may reduce the burden of living with PD through timely diagnosis and treatment. Therefore, using technology-based devices to screen hand tremor and arm swing can provide objective data for early detection and monitoring of PD. The study aimed to develop a reliable screening technology-based device that helps in early detection and provides clinicians with quantitative descriptions of hand tremor and arm swing during the early stages of PD, which could assist medical professionals in developing successful treatment plans and increasing prognostic accuracy. The final analysis included 44 participants. No significant differences were found between the PD and HE groups in basic characteristics. The average PD duration was 12.43±13.389 months, with most participants in Stage I. Tremor frequency and arm swing angle analysis showed significant differences between the PD and HE groups. The development of the screening technology-based device is a promising tool for the early detection and monitoring of hand tremor and arm swing in individuals with PD. The device’s low-cost and low-risk features make it an accessible and viable option for use in diverse clinical settings, including resource-limited environments.

Awards Won: