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EMPARK - Internet of Things for Patient Empowerment and Improved Treatment in Parkinson’s Disease
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BACKGROUND

There is a need to empower patients with Parkinson’s disease (PD) and improve treatment efficacy to achieve better disease control. PD patient requires continuous engagement in disease self-management, as they may need to adjust the medication in accordance with the daily fluctuation of their symptoms. EMPARK research project aims to provide PD patients with feedback about their disease activities regarding motor function, time-in-bed and drug delivery along with subjective symptom scoring, time of meals and physical activities. Data generated by this system holds promise for a substantial improvement in patient and clinician understanding of the disease and patient empowerment and disease control.

AIMS AND OBJECTIVES

• EMPARK research project aims to develop an Internet of Things (IoT) system of sensors, mobile devices (EMPARK system) to deliver home monitoring of objective motor function, medication use and patient-reported symptoms.
• Empower patients and improve their self-management through better understanding of their disease with the help of feedback from the home monitoring system.
• Provide physicians with relevant and useful information derived from EMPARK system regarding the symptoms, treatment response and individual patient coping strategies for better clinical assessment and treatment strategy.
• Establish the EMPARK system as a tool for researchers to better understand the complexity of the disease and to develop and monitor new drugs.

METHODS

Study design and intervention
Randomized controlled trial where 30 PD patients from 2 university clinics in Sweden will be randomized to receive (intervention group, n=15) or not to receive (control group, n=15) feedback from the results of the EMPARK home monitoring.

System development
The EMPARK system is being developed and tested with pilot patients. The plan is to deploy it in patients homes as part of the trial. Interfaces for patients and clinicians are being developed based on the user-centered design methodology to ensure maximal user acceptance [1].

Measured parameters
• Objective disease activity
  • IoT system of tools to continuously measure motor function (bradykinesia and dyskinesia, Parkinson’s Kinetigraph™, Global Kinetics Corporation), time-in-bed (Kanopy™, Cuvigo) and drug delivery from a micro-dose levodopa system (MyFID™, Sensidose).
• Patient-reported disease activity and outcomes
  • Subjective symptom scoring, time of meals and physical activities daily via a smartphone application.
  • Disease-specific (UPDRS, PDQ-39), modified EuroQol, EQ-5D and empowerment questionnaires will be used prior and after the intervention.
• Disease management parameters
  • Interviews with the clinicians and observations about the patient-clinician interaction to assess the potential treatment benefits of the intervention.

STUDY OUTCOMES

Primary outcome: Effect of intervention on patient empowerment
Secondary outcome: Effect of intervention on patient reported outcomes
Tertiary outcome: Effect of intervention on disease management parameters

EXPECTED RESULTS

• Preliminary results from workshops with patients and clinicians show potential to improve patient empowerment and disease control among patients.
• Completion of the trial will show the effect of the intervention on patient empowerment, QoL, level of individualized treatment, and patient-clinician interactions.
• We also expect that simultaneous development and testing of the EMPARK system will allow further, larger-scale studies in the future

REFERENCE


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