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# Validation of Mobile Application for Detecting Wearing-off in Patients with Parkinson's Disease: A Prospective, Blind Comparison to Gold Standard Study

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**Background:** Treatment of idiopathic Parkinson's disease is mainly symptomatic treatment with dopaminergic therapy. Complications of chronic dopaminergic treatment including motor and non-motor fluctuations become major problems experienced by patients. Thai Parkinson's disease and movement disorders society (Thai-PDMDS) has developed an application in Thai language (text and voice) for tablets and smart phones to detect wearing-off (WO) in Parkinson's disease patients, but never before validated as a tool for diagnosis of WO.

**Objective:** This study aimed to determine 1) the usefulness of this application as a tool to assist physicians to detect WO in clinical practice, 2) the relationship between the results of application and factors concerning the clinical conditions and disease course, and 3) the relative frequency of symptoms associated with WO as assessed by the application.

**Methods:** This prospective, blind comparison, cross-sectional study was conducted at Neurology Division of Phramongkutklao Hospital during the period from June to September 2018. The sensitivity and specificity of the application to detect WO were determined by comparing the identification of WO from the clinical evaluation performed by neurologists.

**Results:** A total of 125 patients were included in this study. According to the criterion, 51(40.8%) and 81(64.8%) had WO detected by clinical diagnosis and application, respectively. The application showed a sensitivity of 100%, with 59.5% specificity, 63% PPV, and 199% NPV. Patients with WO were significantly younger than those without ($73.3\pm11$ vs. $76.6\pm9.6$, p=0.031), and also longer disease duration ($5.9\pm3.0$ vs $4.9\pm3.2$, p=0.048). The three most prevalent symptoms in the complete sample were slowness in movement (41.6%), cloudy mind/dullness thinking (37.6%), and reduced dexterity (36%).

**Conclusion:** The specifically designed WO detecting application for Thai patients has a potentially useful role in both everyday clinical practice and clinical research. Both patients and clinicians are convenient with the useful adjunct to clinical practice.

**Keywords:** Wearing off, Parkinson's disease, Mobile application