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A validation study of the Chinese wearing off questionnaire 9-symptom for Parkinson's disease

A. Chan[a], **Y.F. Cheung**[b], **M. Au Yeung**[c], **J. Yeung**[d], **T.H. Chung**[e], **K.L. Tsang**[e], **J. Chan**[b], **C. Lau**[a], **P. Kwan**[a], **Sheng-Han Kuo**[f], and **V. Mok**[a,*]

[a]Department of Medicine and Therapeutics, Prince of Wales Hospital, Pamela Youde Nethersole Eastern Hospital, Hong Kong, China

[b]Department of Medicine, Queen Elizabeth Hospital, Pamela Youde Nethersole Eastern Hospital, Hong Kong, China

[c]Department of Medicine, Pamela Youde Nethersole Eastern Hospital, Hong Kong, China

[d]Department of Medicine, Alice Ho Miu Ling Nethersole Hospital, Hong Kong, China

[e]Private Clinics, Hong Kong, China

[f]Department of Neurology, College of Physicians and Surgeons, Columbia University, New York, NY, USA

Abstract

Objective: Development of wearing off (WO) often goes unnoticed for both patients with Parkinson's disease (PD) and physicians due to the complexity of this phenomenon. A brief 9-symptom WO questionnaire (WOQ-9) was recently found to be highly sensitive in its detection. We aimed to validate a Chinese version WOQ-9 (CWOQ-9) among Chinese patients with PD.

Methods: We recruited 101 literate Chinese PD patients among 4 different neurology or movement disorders clinics in Hong Kong to participate in this study by completing the CWOQ-9. Clinical judgment by the specialists was considered the gold standard for diagnosing WO.

Results: The mean age (±SD) of the patients was 61 (±9) years and 35 (34.7%) of them were female. The disease duration was 7.4 (±5.4) years and 69 (68.3%) of them were diagnosed clinically to have WO by the specialists. The positive and negative predictive values, sensitivity and specificity of CWOQ-9 were 86%, 71%, 87%, and 69% respectively. The area under curve (AUC) was 0.78 ($p < 0.001$).

Conclusion: This simple patient questionnaire is a valid tool for the detection of WO among Chinese PD patients.

Keywords

Chinese; Parkinson's disease; Wearing off questionnaire

*Corresponding author at: Department of Medicine and Therapeutics, The Chinese University of Hong Kong, Shatin, Hong Kong, China. Tel.: +852 2632 2195; fax: +852 2637 3852., vctmok@cuhk.edu.hk (V. Mok).

1. Introduction

Development of WO may represent a critical time point to adjust medications for PD patients. However, its development may often go unnoticed for both PD patients and physicians due to various reasons. First, patients may not aware that reemergence of certain symptoms before scheduled doses of medication may represent WO and thus they may not volunteer to report such symptoms to the physicians. Second, consultation time for many busy clinics may not allow physicians to have sufficient time in exploring its development. Last, WO symptoms may be complex, which may involve various motor and/or non-motor symptoms and the symptoms vary between individuals. Hence, less informed patients or inexperienced physicians may not aware its development. The delay in recognizing and managing WO development may affect patients' quality of life.

An English version 32 items patient questionnaire was developed to enhance detection of WO symptoms [1]. This questionnaire was found to be more sensitive in detection of WO relative to clinician's evaluation among centers in North America and Europe [1]. More recently, this questionnaire was simplified into 9-symptom WO questionnaire (WOQ-9) [2]. This WOQ-9 covers 4 motor symptoms (any slowness in movement, tremor, any stiffness, reduced dexterity) and 5 non-motor symptoms (cloudy mind/slowness, mood changes, muscle cramp, anxiety/panic attacks, pain/aching). Completion of this questionnaire usually takes less than 5 min. A more recent study showed that it has excellent sensitivity and fair specificity in the evaluation of WO (3). In the present study, we aimed to validate a Chinese version WOQ-9 (CWOQ-9) among Hong Kong Chinese patients with PD. To date, no such screening tool is available for clinical use in our ethnic group.

2. Material and methods

The original English version of the questionnaire was translated into traditional Chinese by a movement disorders specialist (AC). As a pilot trial, the questionnaire was first given to 5 literate PD patients to test whether they understood the instructions. Minor revisions were further made regarding the format and wordings of the questionnaire after this pilot trial. Backward translation was then performed by a research psychologist (PK) who was not involved with the forward translation. Another movement disorders specialist (VM) compared the backward translation with the original English version. Given that the meaning of the backward translation bears close proximity in meaning with the original English version, the translated Chinese version was endorsed. We recruited literate Cantonese speaking Hong Kong Chinese PD patients among 4 different neurology or movement disorders clinics in Hong Kong to participate in this study by asking the patients to self complete the CWOQ-9. Demented or illiterate patients and those who were not on any PD medications were excluded from this study. The presence of WO based on the questionnaire was defined as the presence of at least 1 out of the 9 symptoms, which improved after the next dose of medications (i.e. the patient put a tick in the first and second column of any one or more items of the questionnaire). Assistance in filling in the questionnaire from accompanied persons (e.g. caregivers, spouses) was allowed. However, detailed instructions by the specialists were not allowed. After completing the questionnaire, the patients were then assessed by movement disorders specialists. Clinical judgment by the specialists was

considered the gold standard for diagnosing WO. Five movement disorders specialists diagnosed WO based on the clinical observation of the improvement of symptoms before and after levodopa use, or global impression based on the report from patients, their family members or caregivers. All the specialists adhered to the clinical definition of wearing off, i.e. the reemergence of PD symptoms before scheduled doses of medication and the resolution of such symptoms with the use of PD medications. All participating specialists understood the objectives of the study and took special care and adequate consultation time to evaluate the presence of both motor and non-motor WO symptoms. In case the specialists noted that the patients had interpreted the questionnaire incorrectly (e.g. the patient only put a tick at the second column of the item(s) but without putting a tick at the respective first column), the specialists would clarify with the patients of their actual WO condition. However, the data of this questionnaire would be regarded as incorrect in the detection of WO irrespective of whether the patients had definite WO or not. We constructed a Receiver Operating Curve (ROC) to assess the ability of the CWOQ-9 in differentiating patients with and without WO by calculating the area under curve (AUC). Based on the ROC we determined a cutoff value with an optimal balance of sensitivity and specificity. The positive and negative predictive values and the percentage of patients classified at this cutoff value were calculated. Basic demography, education, disease duration, presence of on-dyskinesia, and dosage of levodopa were also recorded for each patient. Ethics approval was obtained from the respective institutional ethics committee. Signed informed consent was obtained from the included subjects. Based on the English WOQ-9 with the sensitivity of 96.2% and the specificity of 40.9% [3], we set the priori hypothesis that CWOQ-9 has similar sensitivity and specificity as WOQ-9.

3. Results

One hundred and one patients participated in the study. The mean age (±SD) of the patients was 61 (±9) years and 35 (34.7%) of them were female. The disease duration was 7.4 (±5.4) years and 69 (68.3%) of them were diagnosed clinically to have WO by the specialists. Patients with WO as judged by the specialists had longer disease duration, higher Hoehn and Yahr (H&Y) staging, higher levodopa requirement, and higher percentage of having on-dyskinesia relative to those without WO (Table 1). Among the 9 items, bradykinesia (57.4%) and cloudy mind/slowness (22.8%) were the commonest motor and non-motor symptoms respectively. All our subjects had at least 1 symptom that was covered in this CWOQ-9. Among the 69 patients having WO, majority (n = 43, 62%) had a combination of both motor and non-motor related WO symptoms. Twenty-five patients (36%) had pure motor related WO symptoms and only 1 patient (2%) had pure non-motor related WO symptom. The patient who had pure non-motor related WO symptom experienced reemergence of anxiety/panic attacks (item 8) after a dose of medication and such symptom improved after the next dose of medication.

The sensitivity and specificity of the CWOQ-9 for detection of WO were 87% and 69% respectively. The positive and negative predictive values were 86% and 71% respectively. The area under ROC curve was 0.78 (95%Confidence interval 0.67 – 0.89, p value <0.001) and it correctly classified 81% of cases. Twelve (11.9%) patients had misinterpreted the questionnaire. The commonest mistake was that patients only put a tick in the second

column (i.e. “usually improves after my next dose”) but without putting a tick at the first column (i.e. “experience symptoms”).

4. Discussion

Our study showed that this brief patient questionnaire has good sensitivity (87%) and fair specificity (69%). Comparing with the English WOQ-9, CWOQ-9 has slightly lower sensitivity but much higher specificity. Apart from the ethnicity, another notable difference between the 2 studies is the age of the subjects. The mean age of our subjects (61 years) is almost 10 years younger that that of subjects of the counterpart study (70.5 years) [3]. Whether a younger age may associate with a higher specificity of this scale requires further investigation.

In another similar study using a Spanish “19-item QUICK questionnaire”, the sensitivity and positive predictive value are similar to that to our CWOQ-9 in the detection of WO [4].

The advantages of the CWOQ-9 are its brevity. It usually takes less than few minutes for patients to complete and that it requires no or minimal assistance from health care professionals. Such properties are important for clinical use in busy clinics. Furthermore, despite that the CWOQ-9 only contains 9-items, all our participating subjects had at least 1 symptom that was covered by CWOQ-9. This supports that this 9-item questionnaire dose capture majority of PD related motor or non-motor symptoms even in our Chinese ethnic group. Apart from its ability in identification of WO, an additional benefit of the CWOQ-9 is that it gives the physicians a better understanding on the various types of symptoms that the patients are experiencing, in particular, those non-motor symptoms, which may be affecting patient’s quality of life but may somehow be neglected by physicians. In this study we observed that the majority of patients with WO phenomenon actually had both motor and non-motor related WO symptoms. Such high prevalence of non-motor related WO symptoms is consistent with finding of previous study [5].

We observed that 12 patients (11.9%) might have misinterpreted the questionnaire by incorrectly completing the questionnaire. The most common mistake was that patients only ticked the items of the second column without ticking the respective items of the first column. Hence it was uncertain whether the patient really had WO phenomenon or simply he/she just experienced that particular symptom(s). In such case, the misinterpretation might be avoided by better explanation to patients prior to filling out the questionnaires. A limitation of the study is that we recruited patients who were relatively educated (mean years of education of 11) and young (mean age of 61 years). Hence, the validity of CWOQ-9 among a less literate and older age group needs to be further explored.

5. Conclusion

This study shows that this simple CWOQ-9 is a valid tool for the detection of WO among Chinese PD patients.

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Table 1

Characteristics of patients with and without WO.

	All patients (*n* = 101)	Absent (*n* = 32)	WO according to clinical judgment	
			Present (*n* = 69)	*p*
Age (years)	61	63	61	NS
Disease duration (years)	7.4	5	8.6	0.002
Education (years)	11	11	11	NS
Gender (% male)	65.3	18.8	47.5	NS
H&Y	2.5	2	3	0.003
Levodopa dosage (mg)	525	277	638	<0.0001
On-dyskinesia (%)	26.3	0	26.3	<0.0001

NS = not significant.