EVALUATION OF A PARKINSON'S DISEASE SCREENING QUESTIONNAIRE FOR USE IN A COMMUNITY-BASED SETTING

Christine B Hunter, RN, Lesly G Aguilar, MD, Muhammad M Nashatizadeh, MD, Michele K York, PhD and Joseph Jankovic, MD.
Parkinson's Disease Center and Movement Disorders Clinic,
Department of Neurology, Baylor College of Medicine, Houston, Texas

OBJECTIVE

To evaluate the utility of a Parkinson's disease (PD) screening questionnaire in community-based outreach and as a potential web-based diagnostic tool.

BACKGROUND

Validated screening instruments, designed to detect symptoms of PD with high sensitivity and specificity, are currently lacking, although written questionnaires and telephone interviews targeting parkinsonian symptoms have been previously reported (Tanner et al, 1990). Rest tremor, difficulty walking, difficulty arising from a chair and walking slowly have been found to be highly specific (93.8-95.9%), but less sensitive (35.9-49.1%) for detecting parkinsonian motor symptoms (Ishihara et al 2005). Wide variability exists in reports of arm and leg shaking and rest tremor between individuals in the general population (3.8-35%) and parkinsonian patients (49%) (Mutch et at, 1991; Rocca et al, 1998; Pramstaller et al, 1999; Teresi et al, 1999; Ishihara et al, 2005). Other parkinsonian features such as micrographia and olfactory dysfunction are less specific, but more sensitive (Ishihara et al, 2005). As PD is based on a clinical diagnosis, early symptom recognition can lead to earlier clinical evaluation and diagnosis, institution of appropriate therapy, and improvement of the patient's quality-of-life through effective treatment. To screen effectively for undiagnosed PD in a community setting or in a web-based survey, it is important to have a screening questionnaire with high diagnostic sensitivity and specificity.

METHODS

The questionnaire, originally designed as a self-administered instrument, consisted of eleven items (See question set below) highlighting key PD symptoms. Both English and Spanish versions of the questionnaire were used in a community-based wellness event attended by 1,500 participants. The booth provided a setting for completion of the questionnaire, bilingual PD educational materials, and stretching exercise recommendations and demonstrations. Two Movement Disorders clinical fellows and a nurse clinician evaluated the participants without knowledge of their answers on the questionnaire. The data were analyzed and the question set expanded. This 20-item version was subsequently administered to persons with parkinsonism, controls and other disease controls to measure the specificity and sensitivity of the tool. These items were then analyzed and compared to proposed diagnostic criteria for "parkinsonism" (Fahn and Jankovic, 2007).

An Alpha Factor Analysis was used to determine the latent factor structure of the measure. An item analysis was conducted to determine the Cronbach's alpha and the item-total correlations. The sensitivity, specificity, overall success rate, false negatives and positives, and odds-ratios were computed using a binary logistic regression.

Table 1: Baylor Health Screening Questionnaire (BHSQ)

	Yes	No	Don't Know
► *Is your handwriting smaller than it once was?	□	□	□
► *Do you have trouble arising from a chair?	□	□	□
► *Is your voice softer than it once was?	□	□	□
Have you noticed some drooling at night or during daytime?	□	□	□
► Have you recently consulted your doctor about shoulder pain?	□	□	□
*Do you feel or have you been told that your face is less expressive?	□	□	□
► Do your lips, hand, arms and/or legs shake?	□	□	□
► Have you noticed stiffness in your legs?	□	□	□
► *Do you have trouble buttoning buttons or dressing?	□	□	□
► *Do you shuffle your feet and/or take smaller steps when you walk?	□	□	□
► Have you or others noted that you don't swing one arm when walking?	□	□	□
► *Is your balance poor?	□	□	□
► *Do your feet seem to get stuck to the floor when walking or turning?	□	□	□
► Have you or others noted that you stoop or have abnormal posture?	□	□	□
► Has your ability to smell changed?	□	□	□
► Do you act on your dreams by screaming or fighting in your sleep?	□	□	□
Do you have pain and/or cramping in your legs?	□	□	□
► Do you have trouble concentrating or remembering?	□	□	□
Have you become less motivated and/or more withdrawn?	□	□	□
*Has anyone ever told you that you have Parkinson's disease?	□	□	□
*If (yes) Have you ever been diagnosed by a doctor?	□	□	□
*Have you ever taken levodopa or Sinemet?	□	□	□
► Have you been getting slower in your usual daily activities?	□	□	□

*Original 11-Question Set
►Current 16-Question Set

RESULTS

In Phase I, approximately 200 persons participated in exercise and educational activities and 46 completed the 11-item questionnaire. Of these 15 (33%) indicated the presence of movement disorder. Two (13%) were male, and had a mean age of 57 (range 36-79 years). Subsequent evaluation by the movement disorder neurologists indicated that 13 of the participants had possible or probable PD and two had probable essential tremor. All "positive" cases were referred to either their primary care physician for further information or to the Movement Disorders Center at Baylor College of Medicine. Based on the initial surveys, we deleted the following items:

In Phase II, 190 participants completed the revised 20-item questionnaire, termed Baylor Health Screening Questionnaire (BHSQ) (Table 1). Of these, 72 (38%) had parkinsonism, 30 (16%) were normal controls, and 88 (46%) were disease controls. Factor analysis revealed one latent factor for the entire questionnaire. Cronbach's alpha was 0.86 for the 20 items. Item-total correlations ranged from 0.18 (shoulder pain) to 0.63 (stooped posture).

Classification Table

	Predicted		
Observed	Parkinsonism	Other Diagnosis	Percentage Correct
Parkinsonism	112 True Positives	11 False Negative	91 Sensitivity
Other Diagnosis	5 False Positive	62 True Negatives	93 Specificity

Overall Success Rate = 92%

The specificity and sensitivity of the revised screening tool are more than adequate. The overall success rate of 92% is an excellent rate for a screening tool. Based on a panel of movement disorder experts, the item analysis, and patient feedback, the measure was revised a final time. The BHSQ 16-item questionnaire will be tested in a large number of controls and parkinsonism patients to test for sensitivity and specificity of the final questionnaire.

CONCLUSION

A self-administered screening tool may be used as an initial attempt to detect parkinsonism, but validation by an experienced clinician is required to determine its diagnostic utility. The instrument used in this study is easy to administer and may be used in mass screenings to identify individuals with undiagnosed PD. If high sensitivity and specificity are confirmed by large prospective studies, this instrument may be used for epidemiological studies as well as for referrals to appropriate health care or research facilities.

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