

# **WHEELCHAIR SKILLS TEST VERSION 4.1: COMPARISON OF TOTAL PERCENTAGE SCORES FOR THE OBJECTIVE AND QUESTIONNAIRE VERSIONS**

<sup>1</sup>Paula W Rushton, PhD, <sup>2</sup>R Lee Kirby, MD, <sup>1</sup>William C Miller

- 1. University of British Columbia, Vancouver, British Columbia, Canada;*
- 2. Division of Physical Medicine and Rehabilitation at Dalhousie University and Queen Elizabeth II Health Sciences Centre, Halifax, Nova Scotia, Canada*

## **ABSTRACT**

The objective of this study was to test the hypothesis that the total scores of the objective Wheelchair Skills Test (WST) and subjective Wheelchair Skills Test – Questionnaire (WST-Q), version 4.1 are highly correlated, but that the WST-Q scores are slightly higher. This study involved a cross-sectional design. Eighty-nine wheelchair users completed the WST-Q followed by the WST. Results show that the WST and WST-Q are highly correlated ( $\rho = 0.89$ ), but that the WST-Q scores are slightly higher. To conclude, results of this study provide support for the use of the WST-Q in situations where it is not feasible to conduct the objective WST.

## **INTRODUCTION**

The Wheelchair Skills Program is used to assess and train wheelchair users, caregivers, and clinicians [1]. It has an objective testing component, the Wheelchair Skills Test (WST), and a subjective testing component, the Wheelchair Skills Test Questionnaire version (WST-Q). These tests have evolved over time based on clinical and research experience, as well as assessments of their measurement properties. The correlations between the WST and WST-Q total scores for version 2.4 [2,3] have been reported as excellent, although the WST-Q scores were slightly higher. No such comparison has been carried out for the latest version of the WST, Version 4.1.

## **OBJECTIVE**

The objective of this study was test the hypothesis that the total scores of the WST and WST-Q, version 4.1, are highly correlated, but that the WST-Q scores are slightly higher.

## **METHODS**

### Design

This study used a cross-sectional design.

### Participants

Eighty-nine (89) community-dwelling adults who used a manual wheelchair as their primary means of mobility were recruited for this study. These individuals were recruited from three major cities in Canada: Halifax, Nova Scotia, Hamilton, Ontario, and Vancouver, British Columbia.

### Procedure

Each participant completed the WST-Q and then the WST.

### Wheelchair Skills Test

The WST and WST-Q, version 4.1, both evaluate 32 wheelchair skills, ranging from basic skills, such as rolling the wheelchair forward to advanced skills, such as ascending and descending stairs [1]. The WST and WST-Q total performance score = the number of passes skills / the number of possible skills x 100%.

## Data Analysis

Descriptive statistics and total percentage scores were calculated for the WST and WST-Q. Normal distribution of the data was tested with the Kolmogorov-Smirnov test. Wilcoxon Signed Rank test was used to detect a statistically significant difference between the WST and WST-Q. A Spearman correlation coefficient was used to determine the relationship between the WST and WST-Q.

## **RESULTS**

The mean age of the participants was  $50.5 \pm 14.7$ . The sample was predominantly male (68.5%) and the most common diagnosis was spinal cord injury (60.7%). The mean length of time using a manual wheelchair for this sample was  $16.4 \pm 13.2$  years. The mean total percentage scores  $\pm$  standard deviation for the WST and WST-Q were  $79.8 \pm 14.7$  and  $83.0 \pm 12.1$  respectively. The WST and WST-Q scores demonstrated a negatively skewed distribution which was confirmed by the Kolmogorov-Smirnov test ( $p < .05$ ). The mean total percentage score of the WST-Q was significantly greater than the WST ( $p < 0.01$ ). The correlation between the WST and WST-Q was 0.89 ( $p < .01$ ).

## **DISCUSSION**

Similar to previous research [2,3], there was a positive, excellent correlation between the WST and WST-Q. This correlation supports the use of the WST-Q as a measure of manual wheelchair skills. However, also similar to previous research, the WST-Q scores were slightly higher than the WST.

## **CONCLUSION**

The total scores of the WST and WST-Q, version 4.1, are highly correlated, but the WST-Q scores are slightly higher.

## **ACKNOWLEDGEMENTS**

This study was funded by the Canadian Institutes of Health Research (CGA 86803). Salary/scholarship funds were provided by the Canadian Institutes of Health Research (PWR,

WCM) and the Michael Smith Foundation for Health Research (PWR).

## **REFERENCES**

- [1] Kirby RL. The Wheelchair Skills Program (version 4.1) Manual. Available at: [http://www.wheelchairskillsprogram.ca/eng/4.1/WST\\_Manual\\_Version4.1.51.pdf](http://www.wheelchairskillsprogram.ca/eng/4.1/WST_Manual_Version4.1.51.pdf). Updated October 16, 2008 Accessed May 9, 2010. A.
- [2] A.M. Newton, R.L. Kirby, A.H. MacPhee, D.J. Dupuis, D.A. MacLeod, Evaluation of manual wheelchair skills: is objective testing necessary or would subjective estimates suffice?, *Arch Phys Med Rehabil*, vol. 83, pp. 1295-1299, 2002.
- [3] A.D. Mountain, R.L. Kirby, C. Smith, The wheelchair skills test, version 2.4: validity of an algorithm-based questionnaire version, *Arch Phys Med Rehabil*, vol. 85, pp. 416-423, 2004.