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ORIGINAL RESEARCH

Reliability and responsiveness of the Self-Efficacy in Assessing, Training and Spotting wheelchair skills (SEATS) outcome measure

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ABSTRACT

Objectives: The aim of this study was to evaluate the internal consistency, test–retest reliability and responsiveness of the Self-Efficacy in Assessing, Training and Spotting manual wheelchair skills (SEATS-M) and Self-Efficacy in Assessing, Training and Spotting power wheelchair skills (SEATS-P).

Methods: A 2-week test–retest design was used with a convenience sample of occupational and physical therapists who worked at a provincial rehabilitation centre (inpatient and outpatient services). Sixteen participants completed the SEATS-M and 18 participants completed the SEATS-P.

Results: For the SEATS-M assessment, training, spotting and documentation sections, Cronbach's alpha coefficients ranged from 0.90 to 0.97, the 2-week intraclass correlation coefficients ($ICC_{1,1}$) ranged from 0.81 to 0.95, the standard error of measurements (SEM) ranged from 5.06 to 8.70 and the smallest real differences (SRD) ranged from 6.24 to 8.18. For the SEATS-P assessment, training, spotting and documentation sections, Cronbach's alpha coefficients ranged from 0.83 to 0.92, the ICCs ranged from 0.72 to 0.86, the SEMs ranged from 4.54 to 8.91 and the SRDs ranged from 5.90 to 8.27.

Conclusions: There is preliminary evidence that both the SEATS-M and the SEATS-P have high internal consistency, good test–retest reliability and support for responsiveness. These tools can be used in evaluating clinician self-efficacy with assessing, training, spotting and documenting wheelchair skills included on the Wheelchair Skills Test.

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Self-efficacy; confidence; wheelchair skills; measurement; reliability; responsiveness

➤ IMPLICATIONS FOR REHABILITATION

- There is preliminary evidence that the SEATS-M and SEATS-P are reliable and responsive outcome measures that can be used to evaluate the self-efficacy of clinicians to administer the Wheelchair Skills Program.
- Measurement of clinicians' self-efficacy in this area of practice may enable an enhanced understanding of the areas in which clinicians lack self-efficacy, thereby informing the development of improved knowledge translation interventions.

Introduction

Evidence suggests the provision of a manual or power wheelchair for an individual with mobility limitations has a positive impact on participation, health and health-related quality of life [1]. However, simply providing a wheelchair does not ensure its safe and effective use. It is important to address assessment and training of wheelchair skills [2]. Without wheelchair skills training, there are important costs to the wheelchair user (e.g., decreased independence [3], chronic [4,5] and acute injuries [6–10] and society (e.g., caregiver burden [11]). Regrettably, results from a recent survey indicated that only 23.5% of Canadian rehabilitation clinicians use a validated wheelchair skills training program [12]. Furthermore, only 66% of Canadian rehabilitation clinicians provided basic manual wheelchair skills training to their clients and only 12% provided advanced wheelchair skills training [12]. Thus, many wheelchair users who could benefit from wheelchair skills training may not be provided with this opportunity.

The Wheelchair Skills Program (WSP), a free, evidence-based set of protocols that can be used to test and train manual wheelchair, power wheelchair and scooter users [13] is available to guide clinicians through this process. It has a testing component, the Wheelchair Skills Test (WST), and a training component, the Wheelchair Skills Training Program (WSTP). The WST assesses a variety of wheelchair skills from those as basic as moving forward to those as difficult as ascending level changes. Its measurement properties have been confirmed [14–17]. The effectiveness of the WSTP in improving wheelchair skills among manual wheelchair users [18–24] and more recently power wheelchair users [25,26] is well documented.

One means of improving the wheelchair skills testing and training practices among clinicians, and thus the interventions provided to wheelchair users, is through knowledge translation of existing, evidence-based resources, such as the WSP. Several studies have demonstrated the effectiveness of knowledge translation of the WSP among occupational therapy students [27,28] and

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medical students [29]. Specifically, these studies have measured participants' wheelchair-related knowledge [29], wheelchair skill capacity [27–29] and confidence to perform the skills [28], using a WSP written knowledge test, the Wheelchair Skills Test (WST) [13] and the WheelCon [30,31] respectively. However, although these studies have measured the participant's knowledge, wheelchair skill and wheelchair confidence, they have not measured the participant's self-efficacy to implement the WSP (e.g., assess and train wheelchair skills to others), a primary influence on successful implementation of evidence-based practice [32] and predictor of future behaviour [33].

To address this gap and facilitate a more comprehensive evaluation of WSP knowledge translation activities, we have developed the first measures of clinician self-efficacy to test and train wheelchair skills, the Self Efficacy in Assessing, Training, and Spotting (SEATS) wheelchair skills, a version for manual wheelchair skills (SEATS-M) and a version for power wheelchair skills (SEATS-P). Based on the Wheelchair Skills Tests (WSTs) for manual wheelchair users and power wheelchair users [3], the SEATS measures clinicians' self-efficacy to administer the WSP. To facilitate the use of the SEATS in research and knowledge translation, it is important to establish the reliability and responsiveness of the tool. The objective of this study was to evaluate the internal consistency, test–retest reliability and responsiveness of the SEATS-M and SEATS-P for use in knowledge translation and/or train the trainer contexts.

Methods

Design

We used a 2-week test-retest design, using data from a larger knowledge translation study. Ethical approval was obtained by the Behavioural Research Ethics Board of the University of British Columbia. Each participant provided informed consent.

Participants

Participants were clinicians (occupational therapists and physical therapists) who worked in inpatient or outpatient services at a large provincial rehabilitation centre. Clinicians were included if they had worked in clinical practice for a minimum of 6 months, and treated a minimum of five wheelchair users/month. This convenience sample was recruited as part of the larger knowledge translation study; the number of participants was determined for that purpose.

SEATS

The SEATS-M and SEATS-P are self-report outcome measures of clinicians' self-efficacy to assess, train and spot each of the 32 wheelchair skills in the WST (version 4.2) for manual wheelchair users (SEATS-M) or the 30 wheelchair skills in the WST (version 4.2) for power wheelchair users (SEATS-P). The measures also ask clinicians to rate their self-efficacy for documentation of the wheelchair skills assessment results, goals, treatment plan, progress and discharge. The stem for assessing, training and spotting wheelchair skills was "As of now, how confident are you that you can assess, train and spot your clients to … ". For the documentation items, the stem was "As of now, how confident are you that you can document … ". Clinicians rated their confidence level for each item using a 0 (not at all confident) to 5 (completely confident) response scale. The term confidence, as opposed to self-efficacy, was used in the outcome measures stems as it is a term more easily understood. When scoring the SEATS-M, separate percentage scores for assessing, training and spotting were calculated using the following formula: Total SEATS-M Assessment/Training/Spotting Score (%) = (sum of individual skill scores/32 $\times$ 5) $\times$ 100%. The documentation score was calculated by: total SEATS-M Documentation (%) = (sum of individual scores/5 $\times$ 5) $\times$ 100%. Possible percentage scores range from 0% to 100% with higher scores representing higher self-efficacy. The SEATS-P is calculated in the same way.

Data collection

Participants completed the self-administered SEATS-M or SEATS-P at two time points, approximately two weeks apart. No wheelchair skill training was provided during that time.

Analyses

Descriptive statistics were calculated to describe the sample. The normality of the data was tested with the Kolmogorov–Smirnov test. Cronbach's alpha was used to measure the internal consistency of the SEATS-M and SEATS-P. To evaluate retest reliability, we calculated $ICC_{1,1}$ with a 95% confidence interval (CI) for within-person (T1–T2) SEATS scores for each subscale. To determine responsiveness, we calculated the minimum amount of change detectable based on measurement error at a between-person level for each subscale by calculating the standard error of measurement (SEM) (SEM = baseline SD $\times \sqrt{1}$ – test retest ICC) [34]. We also calculated the smallest real difference (SRD) for a single individual using SRD = $1.96 \times \sqrt{2} \times$ SEM [35]. All analyses were conducted using the Statistical Package for the Social Sciences 24.0 (IBM Corp., Released 2016, IBM SPSS Statistics for Windows, Version 24.0. Armonk, NY).

Results

Participants

We recruited 16 clinicians to complete the SEATS-M, and 18 clinicians to complete the SEATS-P (Table 1). Participants represented a variety of practice areas, largely inpatient or outpatient spinal cord injury and inpatient acquired brain injury. Sixty-nine percent (68.8%) of the SEATS-M participants and 58.8% participants of the

Table 1. Participant demographics.

Demographic characteristic	SEATS-M participants	SEATS-P participants
Profession, *n* (%)		
Physical therapist	11 (68.8)	7 (41.2)
Occupational therapist	5 (31.3)	10 (58.8)
Program, *n* (%)		
Acquired brain injury inpatient	4 (25)	3 (17.6)
Acquired brain injury outpatient	–	1 (5.9)
Arthritis & neurology inpatient	1 (6.3)	2 (11.8)
Neurology outpatient	1 (6.3)	–
Adolescent and young adult	1 (6.3)	1 (5.9)
Spinal cord injury outpatient	4 (25)	3 (17.6)
Spinal cord injury inpatient	7 (43.8)	4 (23.5)
Intensive rehabilitation day program	1 (6.3)	3 (17.6)
Seating service	–	1 (5.9)
Years of clinical practice, mean (SD)	16.0 (9.4)	20.3 (13.6)
Years experience with manual/power wheelchair users, mean (SD)	13.5 (9.5)	15.5 (11.4)
Previous attendance at wheelchair skills workshop, *n* (%)	11 (68.8)	10 (58.8)

SD: standard deviation.

Table 2. SEATS-M and SEATS-P test–retest reliability and responsiveness.

	SEATS for Manual Wheelchair Users (SEATS-M)			
	Assessment	Training	Spotting	Documentation
Median (%)	70.08	62.29	85.63	44.00
IQR (%)	56.41–97.66	51.41–95.94	61.79–99.84	25.00–63.00
Cronbach's alpha	0.90	0.97	0.93	0.94
Retest $ICC_{1,1}$	0.81	0.95	0.87	0.89
(CI)	(0.55–0.93)	(0.86–0.98)	(0.68–0.95)	(0.71–0.96)
SEM (%)	8.22	5.06	8.70	6.60
SRD (%)	7.95	6.24	8.18	7.12
	SEATS for Power Wheelchair Users (SEATS-P)			
	Assessment	Training	Spotting	Documentation
Median (%)	82.00	73.33	80.67	60.00
IQR (%)	73.00–99.33	64.33–80.00	69.00–90.00	56.00–66.00
Cronbach's alpha	0.92	0.91	0.88	0.83
Retest $ICC_{1,1}$	0.86	0.84	0.80	0.72
(CI)	(0.67–0.95)	(0.61–0.94)	(0.54–0.92)	(0.39–0.89)
SEM (%)	4.54	4.63	5.12	8.91
SRD (%)	5.90	5.96	6.27	8.27

IQR: interquartile range; ICC: intraclass correlation coefficient; SEM: standard error of measurement; SRD: smallest real difference.

SEATS-P participants had previously completed some wheelchair skills training prior to this study.

SEATS scores

SEATS scores demonstrated a non-normal distribution, as determined by the Kolmogorov–Smirnov test ($p > .05$). The median (interquartile range [IQR]) SEATS-M scores for assessment, training, spotting and documentation at T1 were 70.08 (56.41–97.66), 62.29 (51.41–95.94), 85.63 (61.79–99.84) and 44.00 (25.00–63.00)%, respectively. The median (IQR) SEATS-P scores for assessment, training, spotting and documentation at T1 were 82.00 (73.00–99.33), 73.33 (64.33–80.00), 80.67 (69.00–90.00) and 60.00 (56.00–66.00)%, respectively.

Internal consistency

Cronbach's alpha coefficients for the SEATS-M and SEATS-P for assessment, training, spotting and documentation ranged from 0.90 to 0.97 and 0.83 to 0.92, respectively. All coefficients are above the recommended minimum acceptable value of 0.70 [36].

Test–retest reliability

The SEATS-M ICCs for assessment, training, spotting and documentation ranged from 0.81 to 0.95 and for the SEATS-P ICCs from 0.72 to 0.86 (Table 2).

Responsiveness

The SEMs for the SEATS-M and SEATS-P for assessment, training, spotting and documentation ranged from 5.06 to 8.70 and 4.54 to 8.91 providing an indication of the minimal change in score that would reflect a meaningful change beyond measurement error for a group of individuals. The SRDs for the SEATS-M and SEATS-P for assessment, training, spotting and documentation ranged from 6.24 to 8.18 and 5.90 to 8.27 indicating the minimal amount of change in score that would reflect a meaningful change beyond measurement error for an individual.

Discussion

We achieved our objective of evaluating internal consistency, test–retest reliability and responsiveness of the SEATS-M and SEATS-P, the first measures of clinician self-efficacy to test and train wheelchair skills. This study provides preliminary evidence of high internal consistency, overall good test-retest reliability and support for responsiveness for both measures. Participants in this study were a mix of experienced occupational and physical therapists who worked in a range of inpatient and outpatient rehabilitation programs. Their self-efficacy varied for the different aspects of assessing, training, spotting and documenting manual and power wheelchair skills.

Interestingly, participants' scores on the SEATS-M were lower for assessment and training than on the SEATS-P. This finding may be related to the relative complexity of manual wheelchair skills compared to power wheelchair skills. For example, there are more steps required to teach the same skill (e.g., ascending a 5 degree ramp) for a manual wheelchair user than for a power wheelchair user [13]. Additionally, the WST for power wheelchair users contains a number of items that are easily assessed and trained, such as turning the chair on and off, which may contribute to higher scores. Documentation scores were lower than assessment, training and spotting for both the SEATS-M and the SEATS-P. This result is consistent with clinical observations. Poor documentation of outcome measures has been identified as an issue in both occupational therapy [37] and physical therapy [38] practice.

The SEATS-M and the SEATS-P had high internal consistency. These outcome measures also had good test–retest reliability. ICCs for all subscales of the SEATS-M and three subscales SEATS-P were excellent [39]. The ICC for Documentation in the SEATS-P was in the good to moderate range [39].

The lower $ICC_{1,1}$ for the SEATS-P documentation score may reflect the small sample size and relatively small number of items within the documentation subscale (only 5 versus 30 in each of the other SEATS-P subscales).

The range of SEMs from 4.54 to 8.91 and SRDs from 5.90 to 8.27 represents the minimal change in SEATS scores that reflect a meaningful change beyond measurement error for a group and individual, respectively. These values allow for important statistical changes to occur following knowledge translation or train-the-trainer interventions given the 0–100% scores. These values meet Smidt et al.'s standard of 10% or less of the possible score range [40].

There are limitations to this study. Specifically, the findings of this study are specific to self-efficacy associated with assessing, training, spotting and documenting the specific skills found in the WSP, and may not be generalizable to wheelchair skills training which does not employ this program. As this study had a small sample of convenience, there is an opportunity for this study to be repeated using a larger sample to verify these results.

There is preliminary evidence that the SEATS-M and SEATS-P are internally consistent, reliable and responsive self-report measures for assessing clinician self-efficacy for assessing, training, spotting and documenting manual and power wheelchair skills. These measures may be useful in determining the effectiveness of clinician focused wheelchair skills knowledge translation interventions or train the trainer workshops from the self-efficacy perspective. Future research may investigate the relationship between assessment/training self-efficacy and wheelchair skills capacity.

Disclosure statement

No potential conflict of interest was reported by the authors.

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