Prevalence of low mobility and self-management self-efficacy in manual wheelchair-users and the association with wheelchair skills

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Abstract

Objective—To estimate the prevalence of low wheelchair mobility and self-management self-efficacy, and to evaluate the association with wheelchair skills.

Design—Cross-sectional

Setting—Community

Participants—Community-dwelling manual wheelchair users (n=123), 50 years of age and older (mean=59.7 years, sd=7.5) from British Columbia, and Quebec, Canada.

Intervention—None

Main Outcome Measures—The 13-item mobility, and 8-item self-management subscales from the Wheelchair-Use Confidence Scale–Short Form (standardized scores range from 0 to 100) measured self-efficacy, and the 32-item Wheelchair Skills Test–Questionnaire (scores range from 0 to 100) measured wheelchair skills. A score of 50 was used to differentiate individuals with high and low self-efficacy, and a score of 72 differentiated between high and low wheelchair skills.

Results—The prevalence of low wheelchair mobility and self-management self-efficacy was 28.5% (95%CI=20.6–36.4) and 11.4% (95%CI=5.8–17.0), respectively, and their bivariate association with wheelchair skills was $r=0.70$ and $r=0.39$, respectively. Sixteen percent of the sample reported conflicting mobility self-efficacy and skill scores; 25.0% reported low self-efficacy and high skills. Thirty-percent reported conflicting between self-management self-efficacy and wheelchair skills, with 8.1% reporting lower self-efficacy than skill.

Conclusion—Low self-efficacy was relatively high in this sample as was its discordance with wheelchair skills. Interventions to address low self-efficacy, and/or offset the discordant self-efficacy/skill profiles are warranted.

Keywords

wheelchairs; prevalence; mobility; self-efficacy

Introduction

Self-efficacy is the belief individuals have in their ability to perform specific behaviours to achieve desired outcomes.¹ According to Social Cognitive Theory it is a central construct for behaviour change because it has both direct and indirect influences on what people do.¹ In general, higher self-efficacy specific to health-related behaviours has positive effects on what people do, is associated with lower health risks, and better overall health.¹ Furthermore, evidence shows that various forms of the construct have the potential to be modified.^{1,2} Self-efficacy specific to wheelchair-use is a new construct defined as the belief individuals have in their ability to use their wheelchair in a variety of challenging situations.³ Given evidence on the benefits of high self-efficacy specific to other areas of health, wheelchair-use self-efficacy is currently receiving research attention and demonstrating positive results related to social participation and wheelchair mobility.^{4,5}

Our previous research indicates that 39.0% of wheelchair-users have low wheelchair-use self-efficacy,⁶ measured using the Wheelchair-Use Confidence Scale (WheelCon).³ Moreover, 27.0% report having disproportionate levels of self-efficacy and wheelchair skills, which may lead to sedentary lifestyles if people have less self-efficacy than ability, or unsafe performance of activities if self-efficacy exceeds ability. Although these estimates contribute to an appreciation of the potential impact of healthcare and rehabilitation strategies to prevent and minimize the consequences of low self-efficacy in wheelchair-users, the estimates are based on a composite score from a multidimensional measure. There remains a lack of evidence on the prevalence of the various and more specific forms of wheelchair-use self-efficacy (i.e. mobility and self-management self-efficacy found within the WheelCon measure) that have recently been established using Principal Components Analysis, along with Item Response Theory,⁷ and their association with wheelchair skills. Such specific knowledge will further aid researchers and clinicians to develop and plan appropriate rehabilitation services.

The objectives of this study are to estimate the prevalence of low wheelchair mobility and self-management self-efficacy. We also estimate the association, and amount of discordance between the self-efficacy constructs and wheelchair skills.

Methods

Study design and participants

This is a secondary analysis of cross-sectional data from community-dwelling volunteers from British Columbia, and Quebec, Canada, who were aged 50 and over, had at least 6-months experience with manual wheelchair use on a daily basis, and able to communicate in either English or French.⁴ Individuals with a Mini Mental State Examination score less than 23, and/or not medically stable were excluded from study. Rehabilitation therapists from

various health authorities in British Columbia, seating clinics in Quebec, as well as community groups provided study information to recruit potential participants.

Study protocol

After participants provided consent they met with a trained research assistant who gathered demographic information, explained and administered the self-efficacy, and wheelchair skill measures. The ethics boards from all participating sites approved the study protocol.

Measures

The demographic information questionnaire gathered data on sex, age, marital and health status, as well as wheelchair related variables.

The self-efficacy constructs were estimated using the 21-item Rasch derived WheelCon–Short Form (WheelCon-SF),⁷ which is comprised of mobility (13-items) and self-management (8-items) subscales. Standardized scores from each subscale range from 0 to 100 with higher scores indicating higher self-efficacy. A standardized score of 50 was used to differentiate between high and low self-efficacy.

Wheelchair skills were captured using the Wheelchair Skills Test-Questionnaire, a self-report measure comprised of nine advanced skills and 23 basic indoor and community skills.⁸ Individuals report their ability (yes/no) to complete each skill. Total percentage scores are derived by dividing the number of skills individuals can do by the total number of applicable skills. Higher scores indicate more wheelchair skill. Scores from this measure are highly correlated with measurements from the performance based Wheelchair Skills Test version 4.1 ($r_s=0.89$).⁸ A score of 72 (i.e., 23 basic skills/32 total skills) differentiated between high and low wheelchair skills in this study.

Ability to perform activities of daily living, and depression and anxiety were measured using the Barthel Index,⁹ and Hospital Anxiety and Depression Scale,¹⁰ respectively, and were used as sample descriptors. Evidence supports the hypothesized magnitude and direction of the associations between the Barthel Index and Hospital Anxiety and Depression Scale with relevant variables in wheelchair users.³

Data analyses

Descriptive statistics are presented as frequency and percentages, and as means and standard deviations.

Prevalence of low mobility and self-management self-efficacy are estimated using proportions and 95% confidence intervals.

The bivariate association between the self-efficacy constructs and skill were estimated using Pearson's correlation coefficient, and the discordance between the variables was evaluated using crosstab analyses and reported as proportions and 95% confidence intervals.

Results

The mean age of this sample ($n=123$) of experienced wheelchair-users was 59.7 years ($SD=7.5$), and 74 (60.2%) were male. Fifty-nine (48.0%) participants had a spinal cord injury. Sample characteristics are detailed in table 1.

The prevalence of low wheelchair mobility and self-management self-efficacy (quadrants 3 and 4; figures 1A and 1B), was 28.5% (95%CI=20.6–36.4) and 11.4% (95%CI=5.8–17.0), respectively.

The bivariate association between the wheelchair mobility self-efficacy and wheelchair skills was $r=0.70$, and the association between self-management self-efficacy and wheelchair skills was $r=0.39$.

Conflicting wheelchair mobility self-efficacy and wheelchair skill scores were reported by 16.3% of the sample. Of these individuals, 25.0% (i.e. 4% of the entire sample) reported low self-efficacy and high skill (quadrant 3; figure 1A). In addition, 24.4% of the entire sample reported having both low wheelchair mobility self-efficacy and wheelchair skills (quadrant 4; figure 1A). Thirty-percent reported discordant self-management self-efficacy and wheelchair skills. Of these individuals, 8.1% (i.e. 2.4% of the entire sample) reported lower self-efficacy levels than skill (quadrant 3; figure 1B). Only 9.0% reported having both low self-management self-efficacy and wheelchair skills (quadrant 4; figure 1B).

Discussion

Close to 25.0% of wheelchair-users report both low mobility self-efficacy and wheelchair skills, and therefore are at risk for low mobility and low participation frequency.^{4,5} Although these individuals may benefit from efficacy and/or skill intervention, it is important for clinicians to be cautious when prescribing treatment because those individuals who may appear to be in greatest need of efficacy enhancements may first require development of their wheelchair skills, and vice-versa. Complete understanding of reasons for low self-efficacy is necessary for treatment planning, and may warrant a multidisciplinary approach that includes important physical and cognitive considerations utilizing the four sources of information (performance accomplishment, vicarious learning, verbal persuasion, and interpretation of physiological and affective states¹) theorized to modify self-efficacy.

The shared variance between self-management self-efficacy and wheelchair skills might be low (15.2%) because items in the self-management self-efficacy measure largely focus on decision-making and problem-solving, and not on ability to use a wheelchair. This does, however, speak to issues relevant to the validity of the measures with respect to discrimination and convergence. Although the shared variance between mobility self-efficacy and wheelchair skills was higher (49.0%), 16.0% of the sample reported discordant mobility self-efficacy and wheelchair skills, with the majority reporting a high self-efficacy and low skill profile. This finding has both positive and potentially negative implications. Recent evidence hypothesizes a causal path, in which skills mediates the self-efficacy and life-space mobility association.⁵ This suggests that the high self-efficacy reported by those individuals in our study might act to improve their wheelchair skills, which may lead to

better mobility. Alternatively, because high levels of self-efficacy lead people to do things regardless of ability,¹ individuals with high mobility self-efficacy who are less able to use their wheelchair may attempt risky maneuvers, potentially leading to injury.

The anticipated increase of wheelchair-users aged 50 and over due to population aging, combined with the results of this study, are reasons to believe that there will be greater numbers of wheelchair-users with low mobility and self-management self-efficacy. Furthermore, given theory that self-efficacy in older individuals tends to diminish with aging,¹ it is plausible that the prevalence rates of both mobility and self-management self-efficacy will also increase. Whereas wheelchair mobility requires physical ability, and self-management requires greater cognitive abilities, our findings indicate greater issues concerning beliefs related to physically using the wheelchair than those related to problem solving, decision-making, and action planning. Therefore, finding that the prevalence of low mobility self-efficacy was relatively high, and that discordance exists with wheelchair skill suggests research on efficacy enhancing interventions focusing on wheelchair mobility are warranted. This may be especially true for those wheelchair-users who have greater ability than mobility self-efficacy (i.e. 25.0% of those reporting discordance) because high skill alone is likely insufficient to promote participation and mobility.

Limitations

This study has several limitations including the small sample size used to generate the prevalence estimates. In addition, generalizability of the findings is limited to community-living, wheelchair-users with similar characteristics to that of the sample in this study.

Conclusion

Prevalence of low self-efficacy is high, and in 16.3% to 30.0% of cases does not match well with level of skill. Both self-efficacy and skills have important implications on rehabilitation outcomes, therefore research on interventions to improve low mobility self-efficacy, and/or offset the discordant mobility self-efficacy-skill profiles is warranted.

Acknowledgments

Supported by the Canadian Institutes of Health Research with a postdoctoral fellowship and grant (grant no. 107848-1).

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Figure 1.

The prevalence of low self-efficacy and discordance with wheelchair skills

Prevalence of low wheelchair mobility SE (A) and low self-management SE (B), and their discordance with wheelchair skills. Scores of 50 and 72 were used to differentiate between low and high SE and wheelchair skills, respectively. Abbreviations: SE, self-efficacy; 1, high self-efficacy/low skill; 2, high self-efficacy/high skill; 3, low self-efficacy/high skill; 4, low self-efficacy/low skill.

Table 1

Descriptive statistics (N=123)

Variable	Value
Age	59.7±7.5
Sex (male)	74 (60.2)
Education (high school graduate)	85 (69.1)
Married (yes)	58 (47.2)
Employed/volunteer (yes)	46 (37.4)
Comorbidities	2.7±2.4
Activities of daily living (0–20) *	14.4±2.8
Depression symptoms (0–21) †	3.8±3.1
Anxiety symptoms (0–21) †	5.1±3.9
Diagnosis	
Spinal cord injury	59 (48.0)
Multiple sclerosis	16 (13.0)
Stroke	12 (9.7)
Other ‡	36 (29.3)
Wheelchair factors	
Formal training (ever) (yes)	21 (17.1)
Wheelchair assistance (as of now) (yes)	38 (30.9)
Wheelchair experience (years)	22.5±16.0
Daily use (h)	12.3±4.3
Wheelchair-mobility self-efficacy (0–100)	61.0±18.7
Self-management self-efficacy (0–100)	69.8±20.0
Wheelchair skills (0–100)	75.5±15.0

NOTE. Values are mean ± SD or frequency (%).

* Barthel Index.

† Hospital Anxiety and Depression Scale.

‡ Parkinson disease, cerebral palsy, brain injury, polio, arthritis, and amputation.