



Physical activity among people with spinal cord injury: a comparison between Canada and the Netherlands

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Abstract. The purpose of this study is to compare participation in leisure time physical activities among Canadian and Dutch individuals with a spinal cord injury (SCI). This international comparative study used cross-sectional data from Canadians with SCI (n=695) and Dutch individuals with SCI (n=429). Leisure time physical activity was measured using a selection of items from the PASIPD and the PARA-SCI. Physical activity levels were reported in MET h/day. In both countries, 50% of the participants reported no or low levels of leisure time physical activities (Canada: <0.1 MET h/day; the Netherlands: <3.1 MET h/day). While the results showed that leisure time physical activity levels tend to be higher among Dutch individuals with SCI compared to Canadians with SCI (p<.001), the results need to be interpreted with caution due to differences in terminology and questionnaires used in both countries. In this study, a unique dataset is created including information on leisure time physical activity of more than 1000 individuals with SCI in the Netherlands and Canada. The study highlights challenges and opportunities related to international comparative studies on physical activity levels among SCI. International collaborations are needed to standardize terminology and measurements for sport, leisure time physical activities and daily physical activities used in SCI research and to create an international SCI dataset on sport and physical activities.

Keywords Physical activity, spinal cord injury, international comparative study

Introduction

Strategies to promote physical activity among people with physical disabilities can vary between countries depending on differences in culture, political system and/or infrastructure (Hoekstra et al. 2018). As a result, participation in leisure time physical activity (LTPA) in this population may differ

between countries. For example, Canada and the Netherlands share similar interests in stimulating physical activities among people with physical disability (e.g., spinal cord injury [SCI]), but differ in infrastructure and organization of the rehabilitation care. Moreover, in both countries, research groups collected information on LTPA of a large number of individuals with SCI, giving a unique opportunity to conduct a between-country comparison of LTPA among SCI. Therefore, the aim of this study was to compare participation in LTPA among Canadian and Dutch individuals with SCI.

Methods

This international comparative study used data from the following three existing datasets:

- Dutch dataset (n=147) from the prospective cohort study “Physical strain, work capacity and mechanisms of restoration of mobility in the rehabilitation of persons with SCI” (de Groot et al. 2006)
- Dutch dataset (n=282) from “Active Lifestyle Rehabilitation Interventions in aging Spinal Cord injury (ALLRISC)” (van der Woude et al. 2013)
- Canadian dataset (n=695) from the “Study of Health and Activity in People with Spinal Cord Injury (SHAPE SCI)” (Martin Ginis et al. 2008)

LTPA was defined as activities that the individual chooses to do during free time, such as sports activities, walking, or swimming. In the Dutch datasets, the Physical Activity Scale for Individuals with Physical Disabilities (PASIPD) was used to assess physical activity. LTPA was determined using the four questions related to sports and recreational activities, and expressed in metabolic equivalent (MET in h/day). In the Canadian dataset, the Physical Activity Recall Assessment for People with Spinal Cord Injury (PARA-SCI) was used to assess physical activity. LTPA measured using PARA-SCI was converted to MET in h/day.

Descriptive statistics were used to describe participants' characteristics. Several regression analyses (between and within countries) were performed to compare LTPA between Canadian and Dutch individuals with SCI. To adjust for the non-normal distribution of the LTPA data, a square root transformation was applied.

Results

Table 1. Participants' characteristics

Characteristic	Total dataset (n=1124) <i>Mean ± SD or % (N)</i>	Canadian dataset (n=695) <i>Mean ± SD or % (N)</i>	Dutch datasets (n=429) <i>Mean ± SD or % (N)</i>
Age	47.0 ± 12.5	46.8 ± 13.4	47.3 ± 10.85
Gender (% Female)	24.5 (274)	23.6 (164)	25.9 (110)
BMI	25.7 ± 5.4	25.7 ± 5.7	25.6 ± 5.0
Time since injury (years)*	16.3 ± 11.1	15.3 ± 11.1	18.0 ± 11.1
% paraplegia	51.6 (570)	49.6 (212)	52.8 (358)
% lesion complete (ASIA A)*	48.1 (534)	39.2 (268)	62.1 (266)
% motor complete (ASIA A or B)*	63.3 (711)	54.7 (376)	78.3 (335)
Manual wheelchair user*	62.0 (633)	56.0 (389)	74.8 (244)
Power wheelchair user*	25.9 (264)	31.8 (221)	13.2 (43)
Gait aid user*	12.1 (124)	12.2 (85)	12.0 (39)

*The number of participants varies for each variable due to missing data. * Significantly different ($p < .05$) between the Canadian and Dutch dataset.*

Participants' characteristics are shown in Table 1. In both countries, 50% of the participants reported no or low levels of LTPA (Canada: <0.1 MET h/day, $n=347$; the Netherlands: <3.1 MET h/day, $n=197$). The crude and adjusted models showed that LTPA is significantly higher among Dutch individuals compared with Canadian individuals with SCI (adjusted model: $B = -1.82$, $CI: -1.97 - 1.66$). In addition, the percentage of individuals participating in strength training activities seems to be higher among Dutch individuals with SCI compared to Canadians with SCI (16% versus 44%).

The regression analyses conducted within the Canadian and Dutch datasets showed that in both countries, men are more active than women, people with paraplegia are more active than those with tetraplegia, and manual wheelchair users are more active than power wheelchair users. In contrast to the Dutch dataset, the Canadian dataset showed that manual wheelchair users are more active than individuals who use gait aids. Lastly, while in the Canadian dataset years post injury was significantly associated with LTPA, this association was not found in the Dutch dataset.

Discussion

In this study, a unique dataset was created including information on LTPA of more than 1000 individuals with SCI in Canada and the Netherlands. While the findings suggest that LTPA is higher among Dutch individuals compared to Canadian individuals, the results need to be interpreted with caution due to differences in terminology and questionnaire used in both countries.

Expanding this international comparative study with datasets from other countries (e.g., Sweden, Switzerland, Malaysia) will provide the opportunity to compare physical activity levels among SCI between countries using similar measurements for physical activity (PASPID or PARA-SCI). The

findings of such a large international comparative study may provide new directions for optimizing strategies to promote LTPA among people with SCI.

In summary, this study highlights challenges and opportunities related to international comparative studies on physical activity levels among SCI. International collaborations (e.g., www.insci.network) are needed to standardize terminology and measurements for sport, LTPA, and daily physical activities used in SCI research and to create an international SCI dataset on sport and physical activities.

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