Do mobility, occupation, or social integration activities have effects on health of people with disabilities?

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Introduction

In the United States, the estimated number of people with SCI is about 296,000 persons, with a range from 252,000 to 373,000 persons (Lasfargues et al., 1995). And the estimated annual incidence of SCI is approximately 17,900 new cases (Jain et al., 2015). Symptoms of SCI may include partial or complete loss of sensory function or motor control of arms, legs, and body, which barriers to basic mobility result in declining health status and reduced life expectancy compared to the general population (Chamberlain et al., 2015). Health emerged as an important life domain for people with SCI (Simpson et al., 2012), and improving their health status is urgent.

The previous study has shown that joining in physical activity and social activities are positively associated with health in populations without disabilities (Fernhall et al.,2008). However, limited research on the person with SCI suggests a similar relationship. Meanwhile, most of the past studies use cross-section data.

Study Objectives

This study aims to explore whether participation in mobility, occupation and social integration activities will lead to the health status change of people with SCI using longitudinal data. The hypotheses include:

1) Participation in mobility activities has relation to the self-perceived health status change of people with SCI.
2) Participation in occupation activities has relation to the self-perceived health status change of people with SCI.
3) Participation in social integration activities has relation to the self-perceived health status change of people with SCI.

Data source and sample sizes

The study uses secondary data from National Spinal Cord Injury Statistical Center. It has 229 variables totally and 29, 672 observations obtained at post-injury years 1, 5, 10, 15, 20, 25, 30, 35, 40 and 45, and there are 12,176, 8,460, 6,240, 5,164, 4,364, 3,593, 2,788, 1,918, 856 and 117 cases in these ten waves respectively. Since post-injury 40 and 45 years only have 856 and 117 cases respectively, which is a high attrition, this study will not include these two waves. After deleting invalid values, missing values, and less than three wave values, there are 6,609 observations across 8 waves.

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Variable Measurement

Self-perceived health status (HS) uses a single question on a 5-point scale, “In general, would you say that your health is Excellent (5), Very Good (4), Good (3), Fair (2), or Poor (1)?”
Participation in mobility activities (Mob), participation in occupation activities (Occu), and participation in social integration activities (SI) are auto-calculated by NSCISC ranging from 0 to 100.

Method

Multilevel models for change was utilized to achieve the two objectives.
Beginning with an unconditional means model (Model 1), we decomposed the variance into within- and between-person components.
Then, we examined an unconditional growth model (Model 2) to examine the linear effect of post-injury years on health status, in which post-injury years were entered as a level 1 predictor. This model included random effects for both the intercept (initial level of health status) and the linear slope of health status for each person with SCI.
Next, we constructed a conditional growth model (Model 3), and added the mobility activities, occupation activities, and social integration activities to the model as level 1 predictors. In this model, we only included random effects for the intercept and the slope of post-injury years.

Table 1

Descriptive statistics of variables

BYear	Sample sizes	Mean				Standard deviation			
		HS	Mob	Occu	SI	HS	Mob	Occu	SI
Post-injury 1 year	3,157	3.32	76.86	53.86	89.91	1.04	24.1	37.72	20.09
Post-injury 5 years	3,757	3.37	81.1	63.53	89.03	1.02	23.03	36.65	21.34
Post-injury 10 years	4,382	3.31	79.49	62.79	87.76	1.03	24.82	36.9	22.16
Post-injury 15 years	3,887	3.34	80.07	64.4	88.11	1.01	25.09	36.66	21.78
Post-injury 20 years	3,241	3.37	80.03	65.73	87.97	1.01	24.51	35.96	21.86
Post-injury 25 years	2,624	3.36	79.5	67.3	88.19	1	24.85	35.32	21.39
Post-injury 30 years	1,831	3.28	76.87	64.75	87.21	1.02	26.45	35.78	22.71
Post-injury 35 years	1,127	3.16	75.01	60.7	87.01	1.03	27.48	36.32	22.86
Grant mean	24,006	3.33	79.16	62.93	88.3	1.02	24.78	36.72	21.67

Table 2

Multilevel models for change analysis result

Parameters		Model 1	Model 2	Model 3
Fixed effects				
Initial status	Intercept	3.317 ***	3.439***	2.297***
Rate of change	Intercept		-0.008***	-0.005***
	mobility			0.007***
	occupation			0.003***
	social integration			0.004***
Random effects				
Level-1	Within-person	0.616***	0.578***	0.56***
Level-2	Intercept	0.429***	0.534***	0.445***
	Rate of change		0.0005***	0.0005***
	Co-variance		-0.008***	-0.007***
	logLik	-32388.41	-32283.52	-31484.93
	AIC	64782.81	64579.03	62987.86

Results

The results showed that 41.05% of the total variance in perceived health status was attributed to differences between people with SCI. The health status of people with SCI declined over time, however, participation in mobility activities, occupation activities, and social integration activities had positive effects on their health status, which means participation in these activities can help improve their health status of people with SCI.

Limitations

First, the self-perceived health status is an ordinal variable, but the study considers it a continuous variable.
Second, the scales of participation in mobility activities, occupation activities, and social integration activities range from zero to 100, but the scale of the self-perceived health status range from zero to five. They are in different magnitude levels, which leads to a very small coefficient value.
In the future study, we should transform the scale to the same level and use ordinal logistic regression or ordinal probit regression to conduct analysis.

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