

**ORIGINAL RESEARCH**

# Balance Confidence: A Predictor of Perceived Physical Function, Perceived Mobility, and Perceived Recovery 1 Year After Inpatient Stroke Rehabilitation



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**Abstract**

**Objective:** To estimate the effect of balance confidence measured at 1 month poststroke rehabilitation on perceived physical function, mobility, and stroke recovery 12 months later.

**Design:** Longitudinal study (secondary analysis).

**Setting:** Multisite, community-based.

**Participants:** Community-dwelling individuals (N=69) with stroke living in a home setting.

**Interventions:** Not applicable.

**Main Outcome Measures:** Activities-specific Balance Confidence scale; physical function and mobility subscales of the Stroke Impact Scale 3.0; and a single item from the Stroke Impact Scale for perceived recovery.

**Results:** Balance confidence at 1 month postdischarge from inpatient rehabilitation predicts perceived physical function (model 1), mobility (model 2), and recovery (model 3) 12 months later after adjusting for important covariates. The covariates included in model 1 were age, sex, basic mobility, and depression. The covariates selected for model 2 were age, sex, balance capacity, and anxiety, and the covariates in model 3 were age, sex, walking capacity, and social support. The amount of variance in perceived physical function, perceived mobility, and perceived recovery that balance confidence accounted for was 12%, 9%, and 10%, respectively.

**Conclusions:** After discharge from inpatient rehabilitation poststroke, balance confidence predicts individuals' perceived physical function, mobility, and recovery 12 months later. There is a need to address balance confidence at discharge from inpatient stroke rehabilitation.

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Every year an estimated 10 million people worldwide survive the onset of a stroke and 5 million remain with a permanent disability.<sup>1</sup> Problems with activities of daily living (ADL) and social roles are therefore common and often last for a period of at least 2 to 4 years poststroke.<sup>2,3</sup> In fact, 26% of individuals living in the community poststroke have problems with ADL, 48% have

limitations to perform more complex ADL (ie, household tasks), and 72% do not have a meaningful activity to participate in during the day.<sup>4</sup> This puts the community-dwelling population with stroke at risk for depression, deterioration of physical functioning, and reduced quality of life.<sup>5,6</sup>

To achieve important health-related outcomes such as community participation, well-being, and overall quality of life in people who had a stroke, Patient Reported Outcome Measures are increasingly being used because they require individuals to make a personal judgment about their own health.<sup>7</sup> For example, the Stroke Impact Scale (SIS) measures the amount of self-perceived difficulties in executing a range of functional tasks and activities and overall self-perceived recovery poststroke.<sup>8</sup> Given the

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frequent loss of physical abilities poststroke, the perception individuals have of their physical function, mobility, and overall recovery are important outcomes. Perceived physical function refers to the amount of difficulties individuals judge themselves having when performing tasks or activities that require physical bodily function.<sup>8-12</sup> Perceived mobility refers to the amount of difficulties individuals judge themselves experiencing when changing body position and getting around.<sup>8-12</sup> Perceived recovery reflects the perception an individual has about the magnitude of his/her recovery poststroke.<sup>8-12</sup>

Recently, self-perceived recovery at 6 months poststroke was identified as a predictor for resuming leisure activities physically more challenging (eg, swimming, biking, and playing team sports).<sup>9</sup> In another study, a lesser amount of perceived difficulties for accomplishing activities in a given functional area (eg, instrumental activities of daily living [IADL]) predicted higher functional achievements in the same area.<sup>10</sup> Many individuals face constant changes in abilities and limitations poststroke, and some underestimate their capabilities.<sup>11</sup> This may increase the burden on caregivers and on the utilization of health care services and may set up barriers to achieve a better quality of life.

Similarly, higher scores of perceived physical function and mobility have been associated with better performance in ADL<sup>13-15</sup> and lower scores of depressive symptoms.<sup>13,15,16</sup> Further, higher scores of perceived mobility were associated with higher walking capacity<sup>17</sup> and lower scores of depression and anxiety symptoms poststroke.<sup>16</sup> Thus, identifying factors that affect perceived physical function, mobility, and overall perceived recovery poststroke is of extreme relevance to better guide rehabilitation interventions.

Balance confidence, a self-efficacy construct, refers to one's belief that she/he possesses the abilities required to execute activities that challenge balance.<sup>18</sup> Balance confidence is modifiable,<sup>19</sup> associated with perceived abilities in performing ADL,<sup>20</sup> and an independent predictor of activities and participation,<sup>21</sup> community integration satisfaction,<sup>22</sup> functional mobility,<sup>23</sup> perceived physical function, and perceived health status<sup>24</sup> poststroke. Balance confidence is also an independent predictor of health-related quality of life 6 months poststroke,<sup>24</sup> which, in turn, affects activity and participation,<sup>13,15,16,25</sup> depression,<sup>13,16,26</sup> and hospital length of stay.<sup>16</sup>

In addition, Salbach et al<sup>24</sup> identified balance confidence as an independent predictor of perceived physical function 6 months later after controlling for age, sex, and walking capacity. Similarly, Robinson et al<sup>27</sup> found that balance confidence was independently associated with perceived mobility. Balance confidence, however, remains low for at least 12 months poststroke,<sup>28</sup> and minimal focus has been placed on enhancing it during rehabilitation. Because balance confidence is modifiable,<sup>29</sup> estimating the extent to which it affects perceived physical function, mobility, and recovery over a longer period of time than 6 months may provide new insight for stroke rehabilitation, especially if a wider

range of covariates are taken into consideration. Thus, the primary objective of this study was to estimate the effect of balance confidence measured at 1 month postdischarge from inpatient stroke rehabilitation on perceived physical function 12 months later after controlling for important covariates, and the secondary objective was to estimate the effect of balance confidence on perceived mobility and recovery 12 months later after controlling for important covariates. We hypothesized that balance confidence 1 month postdischarge from inpatient rehabilitation was an independent predictor of perceived physical function, mobility, and recovery 12 months later.

## Methods

### Design

A secondary analysis of data on balance confidence and related outcomes collected at 1 month postdischarge from inpatient rehabilitation and 3, 6, 12, and 24 months later was performed.<sup>28</sup> All participants enrolled at 12 months and satisfying our inclusion criteria were included.

### Participants

Participants were recruited from subacute inpatient rehabilitation stroke dedicated programs in British Columbia (Canada). Inclusion criteria were as follows: a confirmed diagnosis of stroke by computed tomography or magnetic resonance imaging; discharged home from inpatient rehabilitation; able to walk 10m with or without assistive devices; 50 years or older; English speaking; and able to provide informed written consent. Exclusion criteria were as follows: significant musculoskeletal or neurological problems unrelated to the stroke, such as a hip replacement less than a year before the stroke, multiple sclerosis, or Parkinson disease; living further than 50km from the testing site; a cognitive status<sup>30</sup> score of <20; and inability to speak with the investigator over the phone. The study was approved by the local hospitals and health authority research ethics boards.

### Data collection

Data included balance confidence measured at 1 month postdischarge from inpatient rehabilitation and perceived physical function, mobility, and recovery measured 12 months later.<sup>28</sup> Questionnaires and functional performance assessments were administered by a trained research assistant in a quiet space at the hospital study site closest to the participant's home.

### Measurement

To estimate the effect of balance confidence on perceived physical function, mobility, and recovery, we identified possible covariates based on previous findings or theoretical rationale: age,<sup>13,15,16</sup> sex,<sup>15,16</sup> marital status,<sup>26</sup> comorbidities,<sup>31</sup> balance capacity,<sup>24,28</sup> basic mobility,<sup>24,28</sup> walking capacity,<sup>24,28</sup> depressive symptoms,<sup>13,28</sup> anxiety,<sup>28</sup> and social support.<sup>14,32</sup> These variables were measured at baseline.

### Balance confidence

We assessed balance confidence using the Activities-specific Balance Confidence (ABC) scale,<sup>18</sup> which is reliable,<sup>33</sup> valid,<sup>33</sup>

#### List of abbreviations:

<b>6MWT</b>	<b>6-minute walk test</b>
<b>ABC</b>	<b>Activities-specific Balance Confidence</b>
<b>ADL</b>	<b>activities of daily living</b>
<b>IADL</b>	<b>instrumental activities of daily living</b>
<b>ISEL</b>	<b>Interpersonal Support Evaluation List</b>
<b>SF-36</b>	<b>36-Item Short Form Health Survey</b>
<b>SIS</b>	<b>Stroke Impact Scale</b>

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