Determinants of Satisfaction With Community Reintegration in Older Adults With Chronic Stroke: Role of Balance Self-Efficacy

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[Pang MYC, Eng JJ, Miller WC. Determinants of satisfaction with community reintegration in older adults with chronic stroke: role of balance self-efficacy. *Phys Ther.* 2007;87:282–291.]

Background and Purpose

Many people with stroke have a low level of satisfaction with community reintegration. Although previous studies focused on the effect of physical factors on community reintegration, the effect of psychological factors, such as balance self-efficacy, has been ignored. The purpose of this study was to determine the contribution of balance self-efficacy to satisfaction with community reintegration in older adults with chronic stroke.

Subjects

A sample of 63 community-dwelling older adults (50 years of age or older) with chronic stroke (onset of 1 year or more) participated in this study.

Methods

This study involved a secondary analysis of data collected from a stroke exercise clinical trial. Satisfaction with community reintegration was measured with the Reintegration to Normal Living (RNL) Index, and balance self-efficacy was measured with the Activities-specific Balance Confidence (ABC) Scale.

Results

Bivariate correlation analyses showed that the RNL Index scores were moderately correlated with the ABC Scale scores. In a multiple regression analysis, after adjusting for age, sex, depression, and other impairments after stroke, balance self-efficacy remained independently associated with the RNL Index scores, accounting for 6.5% of the variance in the RNL Index scores.

Discussion and Conclusion

Balance self-efficacy is an independent predictor of satisfaction with community reintegration in older adults with chronic stroke. Improving balance self-efficacy may be instrumental in enhancing community reintegration in this population.

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Self-perceived participation in community activities represents an individual's perception of and satisfaction with her or his involvement in life situations.[1] Many people with stroke have a low level of satisfaction with community reintegration after they are discharged from the hospital and return to the community.[2,3] As many as 39% to 65% of community-dwelling people with stroke reported limitations in daily activities and restrictions in reintegration into community activities.[4] These limitations and restrictions may at least partly contribute to the low level of satisfaction with community reintegration.

Several studies have examined the effect of stroke-related factors (eg, physical impairments and mental status) on satisfaction with community reintegration.[2,5–8] A link between physical function and satisfaction with community reintegration has been reported for people with stroke,[2,7–10] as for people with other chronic diseases, such as arthritis and coronary artery disease.[10] In addition to physical function, mental health problems also contribute to a lower level of satisfaction with community reintegration. A study of people with subarachnoid hemorrhage found that those without depression were much more likely to be fully satisfied with their level of community reintegration (odds ratio=15.2).[6]

Another factor that may influence community reintegration is *self-efficacy*, which is defined as an individual's judgment of his or her ability to organize and execute given types of performances.[11] A reduction of self-efficacy after a serious health event, such as a stroke, may contribute to a self-imposed decline in activity not accounted for by the physical impairments, such as that seen in older populations and various patient populations.[12–15]

Two related areas of self-efficacy that are particularly relevant to people with stroke are falls self-efficacy and balance self-efficacy. *Falls self-efficacy* is self-efficacy at avoiding a fall during basic activities of daily living (BADL),[16] and *balance self-efficacy* is the level of confidence that a person has in performing tasks without losing balance or becoming unsteady.[16–18] There is mounting evidence that reduced falls self-efficacy or balance self-efficacy is associated with poorer functioning in people with stroke.[19–24] Falls self-efficacy at discharge from a rehabilitation hospital is also a strong predictor of functioning in terms of balance ability and activities of daily living at 10 months after stroke.[22] A recent study[24] showed that balance self-efficacy is a significant predictor of perceived health status in people with stroke. The emergence of these studies in the last few years has reflected an increasing awareness of the importance of self-efficacy in stroke rehabilitation.

In this article, we focus on balance self-efficacy in people with stroke. To our knowledge, no study has investigated the effect of balance self-efficacy on community reintegration. Moreover, most of the studies on community reintegration in stroke have focused on people within 1 year of stroke onset.[2,5,7,8] The same applies to studies of balance self-efficacy.[24,25] There is evidence, however, that people who have been discharged from the hospital for more than 6 months after stroke have less satisfaction with community reintegration than those who have been discharged for fewer than 6 months, suggesting a possible deterioration of community reintegration over time.[3] Therefore, it is important to identify the determinants of satisfaction with community reintegration in people who are well into the chronic stage of recovery from stroke. The purpose of this study was to determine whether balance self-efficacy makes an independent contribution in explaining satisfaction with community reintegration in ambulatory, older adults with chronic stroke when other important physical and psychological parameters are taken into account.

Method

Participants

The data presented in this study were collected from people who had chronic stroke and who were originally enrolled in a clinical intervention trial to evaluate the effects of an exercise program.[26] Community-dwelling people with stroke were recruited on a volunteer basis through a local rehabilitation hospital database, local clubs for people with stroke, and newspaper advertisements. All potential participants were screened by a telephone interview and had to fulfill the following inclusion criteria: had only 1 episode of stroke, were in the chronic stage of recovery from stroke (ie, stroke onset of ≥1 year), were independent in ambulation (ie, needed no physical assistance) with or without an assistive device for at least 10 months, were 50 years of age or older, and were living at home (ie, were not living in an institution).

People were excluded from the study if they had other neurological conditions in addition to stroke, had unstable cardiovascular disease, or had other serious diseases that precluded participation in the study. For people who were previously admitted to local hospitals, medical records were obtained to confirm the diagnosis of stroke on the basis of imaging results (eg, computed tomography scan). In addition, the primary care physician was required to complete a form to confirm the diagnosis of stroke and to provide the relevant medical and surgical history of the subjects (ie, characteristics of stroke and contraindications to exercise). Potential participants gave informed written consent to participate in the study.

Table 1.
Subject Characteristics

Characteristic	Value
Demographics	
Age, y, $\bar{X}$±SD (range)	65.4±8.7 (50–87)
Sex, no. (%)	
Men	36 (57.1)
Women	27 (42.9)
Race, no. (%)	
White	40 (63.4)
Asian	22 (34.9)
Black	1 (1.6)
Education, y, $\bar{X}$±SD	14.1±3.3
Stroke characteristics	
Side of paresis, no. (%) of subjects	
Left	41 (65.1)
Right	22 (34.9)
Type of stroke, no. (%) of subjects	
Ischemic	26 (41.3)
Hemorrhagic	37 (58.7)
Time since stroke, y, $\bar{X}$±SD (range)	5.5±4.9 (1–28)
Functional classification (level I/II/III/IV/V)[28], no. of subjects	7/36/17/3/0
Measures,[a] $\bar{X}$±SD (range)	
MMSE (0–30)	27.9±2.1 (23–30)
RNL Index (0–100)	83.1±13.8 (45.5–100.0)
FMA upper-extremity subscale (0–66)	46.9±19.8 (8–66)
6MWT (m)	316.3±133.4 (34.0–615.0)
BBS (0–56)	47.4±6.4 (25–56)
GDS (0–30)	6.5±5.7 (0–25)
ABC Scale (0–100)	70.5±19.1 (10.6–98.8)

[a] ABC=Activities-specific Balance Confidence, BBS=Berg Balance Scale, FMA=Fugl-Meyer Motor Assessment, GDS=Geriatric Depression Scale, MMSE=Mini-Mental State Examination, RNL=Reintegration to Normal Living, 6MWT=Six-Minute Walk Test.

People who passed the initial interview were brought into the research laboratory for further screening. First, a Folstein Mini-Mental State Examination was administered, and scores of 22 or higher were required for inclusion.[27] Second, the ability to pedal a cycle ergometer was evaluated. A participant had to be able to pedal at a rate of 60 rpm and increase the heart rate to at least 60% the age-predicted heart rate maximum. This evaluation was done to ensure that the participant could tolerate the graded exercise test on the cycle ergometer later as part of the cardiorespiratory evaluation, as the exercise program was originally designed to improve cardiorespiratory fitness.

A total of 63 people fulfilled all criteria and were enrolled in the study. Table 1 shows the basic demographics and stroke characteristics of the study participants. All enrolled participants were classified according to the functional classification level of the American Heart Association Stroke Outcome Classification.[28] Each participant was rated according to the ability to perform BADL (eg, bathing, feeding, climbing stairs, dressing) and instrumental activities of daily living (IADL) (eg, shopping, managing finances, preparing meals). Participants were classified into the following levels: level I—independent in BADL and IADL, level II—independent in BADL but partially dependent in routine IADL, level III—dependent in IADL and fewer than 3 areas of BADL, level IV—dependent in 3 or more areas of BADL, or level V—dependent in 5 or more areas of BADL. The study was conducted in accordance with the Helsinki Declaration for human experiments.

Outcome Measures

Satisfaction with community reintegration was evaluated with the Reintegration to Normal Living (RNL) Index (Appendix 1).[29] This instrument is an 11-item questionnaire developed to measure a person's perception of and satisfaction with her or his reintegration into normal daily functional activities, social and recreational activities, and interactions with family members and other people.[29] Participants were asked how much they agreed with each item (eg, "I participate in social activities with my family, friends, or business acquaintances as is necessary or desirable to me"; "In general, I am comfortable with my personal relationships"). Each item was rated with a 4-point ordinal scale (1–4), with higher scores indicating a higher level of satisfaction. The scores for each item were summed and then normalized to 100, with a score of 100 indicating that the participants were fully satisfied, scores of 60 through 99 indicating mild to mod-

erate restrictions in self-perceived community reintegration, and scores less than 60 indicating severe restrictions in self-perceived community reintegration.[5] The RNL Index has been used for people with stroke.[2,5,6,29,30] The RNL Index has excellent internal consistency[29] and a high correlation with the Spitzer Quality of Life Index[29] and is responsive to changes in clinical status in people with stroke.[3]

The following impairments after stroke were evaluated: impairments in upper-extremity motor function, walking endurance, and balance and depression. Upper-extremity impairment was included because it was previously found to be associated with community reintegration.[31] The Fugl-Meyer Motor Assessment (FMA) was used to evaluate upper-extremity motor impairment.[32] This test consists of 33 tasks that assess the quality of movements, reflex activity, and coordination. A score based on a 3-point ordinal scale (0–2) was given to each task, with higher scores indicating less impairment in the upper extremity (maximum score=66). The FMA upper-extremity subscale score has been shown to have high interrater reliability (intraclass correlation coefficient=.97).[33]

Walking endurance was measured with the Six-Minute Walk Test (6MWT).[34] The total distance walked was recorded to the nearest meter. Walking endurance has been identified as the most significant area of difficulty in community-dwelling people with stroke and therefore may affect community reintegration.[35]

The Berg Balance Scale (BBS) was used to measure functional balance.[36] The BBS is a 14-item test with a 5-point ordinal scale (0–4), yielding a maximum score of 56. The higher the score, the better the balance ability. The BBS is a reliable and valid tool for assessing functional balance.[36,37]

Depression was evaluated because it was previously reported that patients with depression are more likely to be less satisfied with reintegration.[6] The Geriatric Depression Scale (GDS), a 30-item questionnaire, was used to measure depression.[38] The participants were instructed to respond to each question with a "yes" or "no" answer. The scores ranged from 0 to 30, with scores between 0 and 9 indicating a normal mood, scores between 10 and 19 indicating mild depression, and scores between 20 and 30 indicating severe depression. The GDS is a reliable and valid tool for assessing depression in people with stroke.[39,40]

Balance self-efficacy was evaluated with the Activities-specific Balance Confidence (ABC) Scale (Appendix 2).[17,18] The scale consists of 16 functional activities, and the rating is based on an 11-point scale ranging from 0% ("no confidence at all") to 100% ("completely confident"). Participants were asked to rate their level of confidence in performing each of the 16 activities without losing their balance or becoming unsteady (eg, walk around the house, walk in a crowded mall). The scores for the items were summed and then averaged to yield the mean ABC Scale score. The higher the score, the higher the level of balance self-efficacy.

The ABC Scale was originally developed to measure balance confidence in older people.[17] A series of 4 subsequent studies were conducted to evaluate the psychometric properties of the ABC Scale. The subjects were older adults with various diagnoses (including stroke) and a wide range of mobility levels (eg, homecare clients, older people in retirement homes, older people with chronic health conditions, and older people in community exercise programs).[18] The results suggested that ABC Scale scores of less than 50 were indicative of a low level of functioning characteristic of homecare clients. Scores between 50 and 80 indicated a moderate level of physical functioning characteristic of people in retirement homes and people with chronic health conditions. Scores of more than 80 indicated a high level of functioning characteristic of people in community exercise programs.[18] The ABC Scale has been shown to have good internal consistency (Cronbach alpha=.94) and test-retest reliability (intraclass correlation coefficient=.85) and significant moderate correlations with the BBS (Spearman rho=.36) and gait speed (Spearman rho=.48) (ie, construct [convergent] validity) for people with stroke.[41]

Data Analysis

For dichotomous variables such as sex, type of stroke, and side of hemiparesis, Mann-Whitney *U* tests were used to determine whether there was a significant difference in the mean RNL Index scores. For variables that were not normally distributed (ie, time since stroke, upper-extremity FMA, ABC Scale, BBS, and RNL Index), log transformation was performed. First, Pearson correlation coefficients (*r*) were used to determine the associations between the RNL Index scores and the following variables: age, years of education, time since stroke, FMA upper-extremity subscale scores, 6MWT distance, BBS scores, GDS scores, and ABC Scale scores. The strength of the relationships was defined by the magnitude of the correlation coefficients obtained (.00–.25=little or no relationship, .25–.50=fair, .50–.75=moderate to good, and .75–1.00=good to excellent).[42]

Second, multiple linear regression analysis (enter strategy) was performed to determine the contribu-

Table 2.
Relationship Between Reintegration to Normal Living (RNL) Index Scores and Balance Self-Efficacy and Other Variables

Variable[a]	Pearson *r* Correlation With RNL Index Scores
Age	.096
Time since stroke[b]	.197
Education	−.006
FMA upper-extremity subscale[b]	.084
6MWT	.347[c]
BBS[b]	.455[c]
GDS	−.490[c]
ABC Scale[b]	.527[c]

[a] ABC=Activities-specific Balance Confidence, BBS=Berg Balance Scale, FMA=Fugl-Meyer Motor Assessment, GDS=Geriatric Depression Scale, 6MWT=Six-Minute Walk Test.
[b] Log transformation was performed for this variable.
[c] $P<.01$.

tions of balance self-efficacy to the RNL Index scores while taking into account other potential contributing factors (eg, demographics and impairments after stroke). Variables were entered into the regression model in the following order: age, sex, FMA upper-extremity subscale scores, GDS scores, 6MWT distance, and BBS scores. The ABC Scale scores then were entered into the regression model. This was done to identify the additional variance accounted for by the ABC Scale scores. With 63 participants, if up to 7 variables were modeled at an effect size of .30 (medium to large) and an alpha level of .05, then the estimated statistical power would be .87. All statistical analyses were performed with SPSS version 12.0 software* with a significance level of .05 (2-tailed).

Results

Participant Characteristics

Twenty of the 63 participants used a walking aid (wheeled walker, n=5; crutch, n=1; quad cane, n=4; or cane, n=10) and 9 participants used an ankle-foot orthosis during the 6MWT. The RNL Index score ($\bar{X}\pm$SD) was 83.1±13.8, with 52 participants (83%) having mild to moderate deficits (ie, scores of 60–99) and 4 participants (6%) having severe deficits (ie, scores of <60). The ABC Scale score ($\bar{X}\pm$SD) was 70.5±19.1, with 37 participants (59%) having scores of less than 80.

Relationships Between RNL Index Scores and Other Variables

The RNL Index scores were not significantly different between men (81.4±14.4) and women (85.4±13.0) ($P=.244$), between participants with ischemic stroke (84.4±11.0) and those with hemorrhagic stroke (82.2±15.6) ($P=.922$), or between participants with left hemiparesis (83.8±14.5) and those with right hemiparesis (81.8±12.6) ($P=.325$).

The correlations between the RNL Index scores and other variables are shown in Table 2. The ABC Scale scores showed the highest correlation with the RNL Index scores ($r=.527$, $P<.001$). Significant fair correlations were found between the RNL Index scores and 6MWT distance ($r=.347$, $P=.005$), BBS scores ($r=.455$, $P<.001$), and GDS scores ($r=-.490$, $P<.001$). There was no statistically significant correlation between the RNL Index scores and age, sex, education, time since stroke, or FMA upper-extremity subscale scores.

Contributions of Balance Self-Efficacy to Satisfaction With Community Reintegration

Multiple regression analysis was performed to determine the contribution of balance self-efficacy to satisfaction with community reintegration over and above the basic demographics (ie, age and sex) and other impairments after stroke. The results are shown in Table 3. After adjusting for age, sex, upper-extremity impairment, walking endurance, balance, and depression, balance self-efficacy remained independently associated with the RNL Index scores, accounting for 6.5% of the variance in the RNL Index scores ($P=.010$). The addition of balance self-efficacy significantly improved the model prediction ($F\ change_{1,55}=7.066$, $P=.010$). A total of 49.2% of the variance in the RNL Index scores was predicted by the final regression model ($F_{7,55}=7.597$, $P<.001$).

Discussion

This is the first study to show that balance self-efficacy makes independent contributions to satisfaction with community reintegration comparable to the contributions from balance ability itself. Enhancement of balance self-efficacy should be an important treatment aim for promoting community reintegration in older adults with chronic stroke.

Low Level of Satisfaction With Community Reintegration in People With Chronic Stroke

The results of the present study indicated that the majority of community-dwelling people with stroke were not fully satisfied with their reintegration to normal living. Only 11% of the participants were fully satisfied with their level of community reintegration (ie, RNL Index score of 100). The mean RNL Index score obtained for our sam-

* SPSS Inc, 233 S Wacker Dr, Chicago, IL 60606-6307.

Table 3.
Multiple Regression Analysis: Predicting Satisfaction With Community Reintegration[a]

Predictor[b]	R^2 Change	B[c]	95% Confidence interval	β[d]	P
Age	.009	−0.001	−0.003, 0.001	−.074	.479
Sex	.015	0.018	−0.015, 0.051	.110	.291
FMA upper-extremity subscale[e]	.001	0.005	−0.073, 0.083	.017	.896
6MWT	.134	9.534×10^{-5}	-2.956×10^{-4}, 1.049×10^{-4}	−.160	.344
BBS[e]	.097	0.439	0.038, 0.839	.359	.032
GDS	.171	−0.006	−0.009, −0.003	−.404	<.001
ABC Scale[e]	.065	0.163	0.040, 0.287	.334	.010

[a] The dependent variable was Reintegration to Normal Living Index score.
[b] ABC=Activities-specific Balance Confidence, BBS=Berg Balance Scale, FMA=Fugl-Meyer Motor Assessment, GDS=Geriatric Depression Scale, 6MWT=Six-Minute Walk Test.
[c] Nonstandardized regression coefficient.
[d] Standardized regression coefficient.
[e] This variable was entered into the regression model after log transformation.

ple (83.1) is consistent with the findings obtained in previous studies of people with stroke and with mild to moderate residual disability.[2,3,6] The findings of the present study, however, are in contrast to those of Carter et al,[6] who reported that 55% of their study participants had an RNL Index score of 100.

There may be several reasons for the discrepancies in the results. First, the stroke characteristics were different. People with aneurysmal subarachnoid hemorrhage were used in their study, whereas the participants in the present study had either ischemic or hemorrhagic stroke. Only subjects with a time since aneurysmal subarachnoid hemorrhage of between 1 and 6 years ($\bar{X}$=2.75 years) were used in their study, whereas the participants in the present study had a time since stroke of up to 28 years ($\bar{X}$=5.5 years).

Second, the demographics were different. Their subjects were much younger ($\bar{X}$=52 years) than those in the present study ($\bar{X}$=65 years). Third, the functional abilities also were different. In their study, 77% of the participants reported no residual physical disability, as measured with the Barthel Index, whereas the majority of the participants (89%) in the present study had some deficits in the performance of activities of daily living (Tab. 1). In summary, despite the ability to walk independently, the majority of older adults with chronic stroke were not satisfied with their level of community reintegration.

Balance Self-Efficacy Predicts Level of Satisfaction With Community Reintegration

In the multivariable analysis, balance ability and depression remained as independent predictors of the RNL Index scores, accounting for 9.7% and 17.1% of the variance in the RNL Index scores, respectively (Tab. 3). Therefore, our findings are consistent with those of previous studies of older adults[43] and people with stroke,[24] in which an association was found between balance deficits and balance self-efficacy. Previous studies[2,6,9] also identified depression as a determinant of satisfaction with community reintegration in people with stroke. These findings, taken together, suggest that improving balance ability and relieving symptoms of depression in people with chronic stroke may be instrumental in promoting community reintegration.

The ABC Scale scores remained independently associated with the RNL Index scores after we controlled for basic demographics and other impairments after stroke, indicating that inadequate balance self-efficacy itself may adversely influence satisfaction with community reintegration. A substantial proportion of the participants in the present study (59%) reported deficits in balance self-efficacy (ABC Scale scores of <80). The average level of balance self-efficacy obtained in the present study ($\bar{X}$=70.5) was higher than that reported in a recent study with a sample of community-dwelling people within 1 year after stroke ($\bar{X}$=59.2).[24] The higher scores obtained in the present study probably occurred because all of the participants were independent in walking, whereas a considerable proportion of people in the study of Salbach et al[24] required either supervision (20%) or physical assistance (8%) to walk. However, the ABC Scale scores observed in the present study were much lower than those reported previously for older adults (mean age=91 years) who are

healthy,[17] indicating that stroke has a major effect on balance self-efficacy despite independent walking function.

Our regression model predicted a total of 49.2% of the variance in the RNL Index scores. After we controlled for all of the other factors, the ABC Scale scores remained a significant predictor of the RNL Index scores, explaining 6.5% of the variance in the RNL Index scores (ie, more than 13% of the total variance was accounted for by the model) (Tab. 3).

One could ask whether the 6.5% contribution is clinically important. How does the contribution of balance self-efficacy compare with that of other factors already reported in the literature? Unfortunately, direct comparisons with other studies of stroke cannot be made for several reasons. First, different outcome measures were used for evaluating satisfaction with community reintegration in some studies.[7–9,31] Second, some studies did not use multiple regression to estimate the contributions of different factors to satisfaction with community reintegration.[6–8,31] Finally, for studies in which multiple regression analysis was performed, the specific level of contribution of each factor (R^2) was not reported.[2,9]

Nevertheless, we believe that balance self-efficacy is an important factor to consider because, among other factors, balance self-efficacy showed the highest correlation with the RNL Index scores (Tab. 2). Moreover, we used a conservative regression model in which the ABC Scale scores were entered last. That was done to estimate the contribution of balance self-efficacy to satisfaction with community reintegration over and above basic demographics and functional abilities. Had we used a stepwise multiple regression model (not shown), the ABC Scale scores would have been the most important contributors to the RNL Index scores (R^2=.278).

Fear of falling, reflected by poor balance self-efficacy, is a major psychological barrier that may lead to self-imposed activity avoidance which, in turn, may result in further deterioration of functioning and thus poor community reintegration.[12,14,44] Therefore, enhancement of balance self-efficacy should be an important goal in stroke rehabilitation in order to optimize community reintegration. It is not known whether the enhancement of balance self-efficacy would be most effective in affecting community reintegration during the acute, subacute, or chronic stage of stroke recovery. It was previously reported that people who have been discharged from the hospital for more than 6 months after stroke have a significantly lower level of satisfaction with community reintegration than those who have been discharged for fewer than 6 months.[3] Therefore, early intervention may be critical in promoting community reintegration, although further study is required in this important area.

It is intriguing that walking endurance (ie, 6MWT) and upper-extremity motor impairment were not significant determinants of community reintegration. Although the 6MWT distance was significantly correlated with the RNL Index scores in a correlation analysis (r=.347) (Tab. 2), the effects of the 6MWT distance were diminished in multivariable modeling. This result was partly attributable to the strong correlation of the 6MWT distance with the BBS scores (r=.782, P<.001). Regarding the insignificance of upper-extremity impairment, one explanation is that mobility is given more weight in the RNL Index, as a substantial proportion of items are specifically devoted to evaluating mobility participation (items 1–3). Another explanation is that we measured upper-extremity impairment, not the functional use of the upper extremity. We cannot eliminate the possibility that the functional use of the upper extremity may have an effect on satisfaction with community reintegration. The participants in the present study were well into the chronic stage of recovery and may have learned to use compensatory strategies effectively in performing the daily activities that normally require the use of the affected upper extremity.

Clinical Implications

Some suggested mechanisms for enhancing self-efficacy are positive experiences in performing a given task, including successful execution of a task (mastery experience), observing others successfully complete a task (vicarious experience), and receiving verbal affirmation of ability from others (verbal persuasion).[45,46] Therefore, for rehabilitation practitioners, one possible way to enhance balance self-efficacy in people with chronic stroke is through group exercise training programs, in which participants can experience success in performing a particular task, observe their peers achieve success, and receive verbal encouragement from professionals and peers. Improvements in balance self-efficacy in older adults[47–49] and people with stroke[25,50] have been reported after group-based exercise programs in the form of resistance training,[47,48] agility training,[47,48,50] weight-shifting exercises,[48,50] tai chi,[49] and task-oriented training programs.[25] Further study is needed to examine the effects of such programs on community reintegration.

Limitations of the Study

The present study has several limitations. First, the regression model that we used accounted for only 49.2% of the variance in the RNL Index scores. That is, more than 50% of the variance in the RNL Index scores remained unexplained. One explanation is that satisfaction with community reintegration is complex and

may involve multiple determinants, some of which were not measured in our study (eg, language impairment, socioeconomic status). Nevertheless, the amount of variance in the RNL Index scores that was explained by our model (49%) is larger than that in a previous study in which balance self-efficacy was not taken into account (42%–44%).[2]

Second, all participants in the present study could ambulate independently. The results may not be generalizable to people who are wheelchair dependent for mobility or require physical assistance to walk. However, the majority of people who survive a stroke are able to regain walking function.[51] Finally, the present study involved a cross-sectional data analysis; therefore, a causal relationship between balance self-efficacy and satisfaction with community reintegration could not be established.

Conclusion

Generally, the majority of community-dwelling older adults with mild to moderate chronic stroke are not satisfied with their level of community reintegration. The results of this study show that in addition to balance ability and depression, balance self-efficacy is a significant determinant of satisfaction with community reintegration in this population. Therefore, balance self-efficacy should be an important component of evaluation and treatment for older people with stroke. Enhancement of balance self-efficacy may further promote community reintegration in this population.

All authors provided concept/idea/research design, writing, and data analysis. Dr Pang and Dr Eng provided data collection. Dr Pang provided project management. Dr Eng provided fund procurement, subjects, and facilities/equipment. Dr Eng and Dr Miller provided consultation (including review of manuscript before submission).

This study was approved by research ethics committees at the University of British Columbia and the G. F. Strong Rehabilitation Centre.

Dr Pang was supported by a postdoctoral fellowship from the Natural Sciences and Engineering Research Council of Canada. This study was supported by a grant-in-aid from the Heart Stroke Foundation of BC and Yukon and by career scientist awards from the Canadian Institute of Health Research (Dr Eng and Dr Miller) and the Michael Smith Foundation for Health Research (Dr Eng).

This article was received May 20, 2006, and was accepted October 11, 2006.

DOI: 10.2522/ptj.20060142

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Appendix 1.

Reintegration to Normal Living Index[a]

1. I move around my home as I feel is necessary (wheelchairs, other equipment or resources may be used).
2. I move around my community as I feel is necessary (wheelchairs, other equipment or resources may be used).
3. I am able to take trips out of town as I feel are necessary (wheelchairs, other equipment or resources may be used).
4. I am comfortable with how my self-care needs (dressing, feeding, toileting, bathing) are met. (Adaptive equipment, supervision, and/or assistance may be used.)
5. I spend most of my days occupied in a work activity that is necessary or important to me. (Work activity could be paid employment, housework, volunteer work, school, etc. Adaptive equipment, supervision, and/or assistance may be used.)
6. I am able to participate in recreational activities (hobbies, craft, sports, reading, television, games, computers, etc.) as I want to. (Adaptive equipment, supervision, and/or assistance may be used.)
7. I participate in social activities with my family, friends and/or business acquaintances as is necessary or desirable to me. (Adaptive equipment, supervision, and/or assistance may be used.)
8. I assume a role in my family that meets my needs and those of other family members. (Family means people with whom you live and/or relatives with whom you don't live but see on a regular basis. Adaptive equipment, supervision, and/or assistance may be used.)
9. In general, I am comfortable with my personal relationships.
10. In general, I am comfortable with myself when I am in the company of others.
11. I feel that I can deal with life events as they happen.
The subject rates each item by the following scale:
1=does not describe my situation
2=describes my situation a little
3=describes my situation a lot
4=fully describes my situation

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Appendix 2.

Activities-specific Balance Confidence Scale[a]

Each subject indicates the level of self-confidence of not losing balance or becoming unsteady when doing the following activities (0%–100%).
1. Walk around the house.
2. Walk up and down stairs.
3. Pick up a slipper from the floor.
4. Reach at eye level.
5. Reach while standing on your tiptoes.
6. Stand on a chair to reach.
7. Sweep the floor.
8. Walk outside to nearby car.
9. Get in and out of a car.
10. Walk across a parking lot.
11. Walk up and down a ramp.
12. Walk in a crowded mall.
13. Walk in a crowd or get bumped.
14. Ride an escalator holding the rail.
15. Ride an escalator not holding the rail.
16. Walk on icy sidewalks.

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