

ORIGINAL RESEARCH

Fear Avoidance Behavior, Not Walking Endurance, Predicts the Community Reintegration of Community-Dwelling Stroke Survivors



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Abstract

Objective: To examine the contribution of walking endurance, subjective balance confidence, and fear avoidance behavior to community reintegration among community-dwelling stroke survivors.

Design: Cross-sectional study.

Setting: University-based rehabilitation center.

Participants: Patients with chronic stroke (N=57) aged ≥ 50 years.

Interventions: None.

Main Outcome Measure: The Chinese version of the Community Integration Measure (CIM).

Results: Our correlation analyses revealed that fear avoidance behavior as measured by the Chinese version of the Survey of Activities and Fear of Falling in the Elderly (SAFE) scores had the highest significant negative correlation with CIM scores among all the variables tested. Our regression analyses also revealed that walking endurance and subjective balance confidence were not significant predictors of CIM scores. Based on scores on the number of falls in the previous 6 months, Chinese version of the Geriatric Depression Scale scores, distance covered in the 6-minute walk test, and Chinese versions of the Activities-specific Balance Confidence Scale scores and SAFE scores, our final regression model predicted 49.7% of the variance in the Chinese version of the CIM scores.

Conclusions: The levels of walking endurance and subjective balance confidence are not significant predictors of community reintegration of community-dwelling stroke survivors but the fear avoidance behavior. Future studies addressing fear avoidance behavior is clearly warranted for stroke rehabilitation.

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Stroke is an age-related, disabling, and burdensome global disease.¹ With an aging population, it is estimated that the number of strokes will reach 23 million² in 2030 causing >7 million deaths worldwide annually.³ After stroke, most people are left with some level of dependency in their activities of daily living⁴ and therefore restriction of social participation¹ resulting from sensorimotor impairment⁵ and perhaps psychological disturbances.⁶ For stroke recovery, community reintegration is the ultimate goal of rehabilitation aiming at reducing handicap and enhancing quality of life.

Community reintegration is the process of promoting those impaired after disabling injuries or illnesses to reaccommodate into society.⁷⁻¹⁰ Previous studies on satisfaction with community reintegration after stroke revealed inconsistent findings.¹¹⁻¹³ For example, Carter et al¹¹ reported 55% of 182 patients with subarachnoid hemorrhage had reintegrated to their previous lifestyle satisfactorily as measured by the Reintegration to Normal Life Index,¹⁴ whereas Pang et al¹² reported only 11% of 63 community-dwelling stroke survivors were fully satisfied with their level of community reintegration as measured by the Chinese version of the Reintegration to Normal Life Index.¹⁵

Identifying predictors of community reintegration is important in stroke rehabilitation. Several studies have explored predictive

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models of community reintegration to provide insight for stroke rehabilitation.^{11,12} Some studies suggest that the distance covered in the 6-minute walk test (6MWT)^{16,17} is the best predictor of community reintegration for people suffering from respiratory problems,¹⁶ cardiovascular diseases,¹⁷ and chronic stroke.⁵

Another important predictor of community reintegration after stroke is the subjective balance confidence test.¹⁸ The Activities-specific Balance Confidence (ABC) scale is based on the theoretical ground of Bandura's theory of efficacy self-perceptions.^{18,19} Previous studies revealed that the ABC scale was a stronger predictor than walking speed, walking endurance, or balance performance among patients with stroke¹² and significantly correlated with level of community reintegration.²⁰ However, fear avoidance behavior has not been addressed.

Fear avoidance behavior is the behavioral translation and reflection of impaired subjective balance confidence.²¹ For community-dwelling older adults, fear avoidance behavior has been shown to be associated with fall history ($r=.33$), physical frailty ($r=-.49$), postural control (forward end point excursion, $r=-.31$), and muscle performance ($r=-.37$ to $-.44$).²² In addition, fear avoidance behavior was reported to have a prevalence of up to 54% among community-dwelling older adults.^{23,24}

Although fear avoidance behavior is self-protection in preventing falls, excessive fear avoidance behavior could eventually lead to physical deconditioning and compromise one's community reintegration. The exact mechanism translating fear of falling into behavior is unclear, but it is believed to be associated with catastrophic thinking²⁵ that magnifies worries and negatively overstates the consequences of events.²⁶ Indeed, those with low subjective balance confidence could be further delineated as having low subjective balance confidence with or without fear avoidance behavior.^{27,28} These behavioral discrepancies highlight the importance of studying fear avoidance behavior when investigating the impact of fear of falling on community reintegration.

The role of fear avoidance behavior has been explored in community-dwelling older adults and patients with other chronic illnesses (eg, Parkinson disease). For community-dwelling older adults, fear avoidance behavior was reported to be a significant independent predictor of disability in activities of daily living and poor lower-extremity performance.²⁹ In another study,³⁰ fear avoidance behavior as measured by the Survey of Activities and Fear of Falling in the Elderly (SAFE)³¹ was found to be a significant predictor of the quality of life of patients with Parkinson disease. However, the role of fear avoidance behavior has not been investigated among patients with stroke. Therefore, this study aimed to determine whether fear avoidance behavior makes an independent contribution to community reintegration; and to quantify its relative contribution to community reintegration when walking endurance and subjective balance confidence were also considered.

List of abbreviations:

ABC	Activities-specific Balance Confidence
AMT	Abbreviated Mental Test
BMI	body mass index
CIM	Community Integration Measure
GDS	Geriatric Depression Scale
ICC	intraclass correlation coefficient
SAFE	Survey of Activities and Fear of Falling in the Elderly
6MWT	6-minute walk test
TUG	timed Up and Go

Methods

Participants

Community-dwelling stroke survivors were recruited from local self-help groups via poster advertisement. Participants were recruited if they aged ≥ 50 years, had a stroke at least 12 months previously, were able to understand Cantonese, were able to walk 10m with or without assistance, and were able to score ≥ 7 on the Chinese version of the Abbreviated Mental Test (AMT).³²

People were excluded if they had any unstable medical conditions (eg, angina pectoris) or other conditions that might hinder the progress of assessment (eg, dementia). The study protocol was approved by the ethics committee of the administering institution. The study was conducted according to the principles of the Declaration of Helsinki for human experiments. Written informed consent was obtained from all participants prior to the study.

Sociodemographic data

Five types of sociodemographic data were collected during the intake interviews. They consisted of the following: (1) background characteristics, including sex, age, and living arrangements; (2) illness-related variables, including cause of stroke and years since stroke; (3) number of falls in the previous 6 months; (4) mobility-related variables, including hemiplegic side, use of walking aids, and time on the timed Up and Go (TUG) test³³; and (5) score on the Chinese version of the AMT³² (an exclusion criterion).

Outcome measures

Level of community reintegration

Community integration was quantified using scores on the Chinese version of the Community Integration Measure (CIM).¹⁰ The Chinese version of the CIM has 10 items with responses on a 5-point scale. The CIM³⁴ has been used on people with brain injury,^{9,34,35} spinal cord injury,³⁶ and chronic stroke.¹⁰ The Chinese version of the CIM has been reported to have good internal consistency (Cronbach $\alpha=.84$) and good test-retest reliability (intraclass correlation coefficient [ICC]=.84) on people with stroke.¹⁰

Fear avoidance behavior

The extent to which activities were being avoided because of fear of falling was assessed using the Chinese version of the SAFE.³⁷ This instrument consists of 22 self-rating items on a 4-point scale. The Chinese version of the SAFE has been reported as having excellent internal consistency (Cronbach $\alpha=.95$) and construct validity.³⁰

Subjective balance confidence

The original ABC scale was developed to assess self-perceptions of balance efficacy among older adults.¹⁸ It consists of 16 items related to indoor and outdoor activities, with self-ratings from 0% (no confidence) to 100% (complete confidence) on each item. The Chinese version³⁸ has been psychometrically tested on community-dwelling older adults and has been reported as having excellent internal consistency (Cronbach $\alpha=.97$), excellent test-retest reliability (ICC=.99), and good interrater reliability (ICC=.85).

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