Original Research

Perceived Community Participation and Associated Factors in People With Stroke

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Abstract

Objective: To examine individual- and environmental-level factors associated with perceived participation performance and satisfaction in people with chronic stroke.

Design: Cross-sectional study using secondary data analysis of baseline data from a randomized controlled trial.

Setting: Community-based setting.

Participants: Community-dwelling adults with mild to moderate stroke (N=113; mean age=57 years; 58 males).

Interventions: Not applicable.

Main Outcome Measures: Main outcomes were measured with the Reintegration to Normal Living Index (perceived participation performance) and Patient-Reported Outcome Measure Information System satisfaction with participation in social roles (perceived participation satisfaction). Other variables collected included personal (eg, age, perceived recovery), health-related (eg, time since stroke, number of comorbidities), body function–related (eg, Stroke Impact Scale, Center for Epidemiologic Studies Depression Scale), and environmental (eg, World Health Organization Quality of Life Short Form Environmental subscale) data.

Results: Depression, fatigue, mobility, and environmental support showed moderate to strong, statistically significant associations with participation performance and satisfaction in people with stroke. Perceived recovery was moderately associated with participation performance but not with participation satisfaction.

Keywords

Stroke; Community Participation; Rehabilitation

List of abbreviations: ICF, International Classification of Functioning, Disability and Health; NIHSS, NIH Stroke Scale; PROMIS, Patient-Reported Outcome Measure Information System; RNLI, Reintegration to Normal Living Index; SIS, Stroke Impact Scale; WHOQOL-BREF, World Health Organization Quality of Life Short Form.

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Stroke is a common global health problem that frequently results in a complex matrix of physical, communication, cognitive, and emotional impairments. This chronic effect of stroke on body and mind, in conjunction with environmental barriers, makes it difficult for many people with stroke to pursue participation in life roles. People with stroke experience participation restrictions in daily activities, social roles, employment, mobility, and economic self-sufficiency. They constantly show lower levels of community participation when compared to a control group without a stroke or when compared to pre-stroke participation.

A recent systematic review used the International Classification of Functioning, Disability and Health (ICF) as a framework to identify factors associated with participation outcomes for community-dwelling adults with stroke. The ICF highlights that participation dynamically interacts with environmental factors in addition to one’s health condition, body functions and structures, and personal factors. Based on 92 articles, they identified stroke severity, number of comorbidities (health condition), lower limb function and balance, cognition, affect, pain and fatigue (body functions), age (personal factor), and social support (environmental factor) as significant factors associated with community participation outcomes. The review revealed that most factors investigated for association with participation outcomes were related to body functions and that there was insufficient evidence to draw conclusions about the effect of environmental factors other than social support. This further emphasized the need for future research to develop understanding on how environment enables or restricts stroke survivors’ participation.

As seen in the systematic review, there has been much research on factors influencing community participation outcomes poststroke. However, to our knowledge, literature on comprehensively evaluating the association of multiple factors with participation within 1 study is less common. In addition, most studies tend to focus on 1 side of community participation, either participation performance (eg, frequency of engagement or perceived restriction to activities) or the subjective meaning of participation (eg, satisfaction with participation), though literature has consistently pointed to the distinctive importance of measuring both. Using the ICF as a framework, the aim of this study was to examine personal, medical, and environmental factors associated with participation performance and satisfaction among people with stroke.

Methods

This cross-sectional study analyzed secondary data collected at baseline of a randomized controlled trial. The Human Subject Division at the University of Washington determined that the study did not involve human subjects and thus did not require approval.

Data source and participants

Data included baseline data from a randomized controlled trial evaluating the efficacy of a stroke specific self-management intervention called the Improving Participation After Stroke Self-Management Program. The recruitment for the original study occurred between November 2010 and June 2013. Participants were recruited using convenience sampling through existing stroke registries and flyers at 2 major urban rehabilitation hospitals in Chicago, Illinois, and St. Louis, Missouri. The inclusion criteria included (1) be over 18 years old; (2) have a mild (ie, NIH [National Institutes of Health] Stroke Scale [NIHSS] score<8) or moderate stroke (ie, NIHSS score<16); (3) be at least 3 months post-stroke; (4) reside in a community-based setting; and (5) have completed initial acute/rehabilitation care. Individuals were excluded if they were not medically stable, had moderate or severe cognitive impairment (ie, Short Blessed Cognitive Test score>8), or had severe aphasia (ie, Boston Diagnostic Aphasia Examination score<9; 15-item Boston Naming Test<10). All participants provided informed consent to participate in this study.

Outcomes of interest

The outcome measures included perceived level of participation and satisfaction with participation. Using the ICF as a guiding framework, other variables included in the analysis were data related to personal factors, health conditions, body structure and functions, and social and environmental factors.

Perceived performance of participation (participation performance)

The Reintegration to Normal Living Index (RNLI) captures participation in areas such as recreational and social participation, community mobility, family roles, and other relationships. It consists of 11 items with a Likert scale of 0-10 (0=minimal integration; 10=complete integration) in which higher score indicates higher level of community participation. The RNLI has been extensively used in people with stroke and has shown to have good psychometric properties.

Perceived satisfaction of participation (participation satisfaction)

The Patient-Reported Outcome Measure Information System (PROMIS) Satisfaction With Participation in Social Roles—Short Form assesses satisfaction with performing one’s usual social roles and activities, such as satisfaction in ability...
to participate in family activities. Its items were developed using item response theory and it consists of 14 questions with a maximum total score of 70 points and has been found to be responsive to changes in social roles.

**Personal factors**
Variables included sociodemographic characteristics such as sex (male or female), age (in years), marital status (married or unmarried/divorced/widowed), household income (in dollars), community living situation (living independently or with assistance), and employment status (working or not working). Perceived recovery was measured using a single item from the Stroke Impact Scale (SIS), which has been validated with people with acute and chronic stroke.

**Health conditions**
Variables included time since stroke (in months) and number of past medical conditions, calculated as a sum of medical conditions reported by participants.

**Body functions and structures**
Depression symptoms were measured using the Center for Epidemiologic Studies Depression Scale, which has been shown to have good psychometric properties. The score ranges from 0 to 60, with higher numbers meaning greater depressive symptoms. Fatigue was measured using a single question asking the severity of fatigue on a scale of 1 (mild) to 10 (severe). The effects of stroke on mobility, strength, hand function, communication, and cognition were assessed using the SIS, which was validated in people with acute and chronic stroke. Scores of each domain range from 0 to 100, with higher scores indicating less impairment.

**Environmental factors**
Environmental factors were measured using the environment subdomain of the World Health Organization Quality of Life Short Form (WHOQOL-BREF), a cross-cultural quality of life measure. The environment domain includes items on finances, freedom, safety, health and social care, home environment, access to opportunities, physical environment, and transportation, all of which collectively measure various aspects of one’s physical, social, and attitudinal environments. The score ranges from 0 to 100, with a higher score indicating a more supportive environment.

**Statistical analyses**
Characteristics of the participants were described by means, standard deviations, medians, and interquartile range for numeric variables and by frequency and percentages for categorical variables. The association between the 2 participation measures (RNLI and PROMIS Satisfaction With Social Roles) and numeric personal, health- and function-related, and environmental factors was assessed by the Spearman correlation. For categorical factors, we calculated the means of the outcome measures by category and compared them using analysis of variance. Significance level was kept at .05 for all tests, without correction for multiple comparisons, because of the exploratory nature of the study, which was taken into consideration when interpreting the results. Strength of correlation was defined as weak if $0.2 \leq |r| <0.4$, moderate if $0.4 \leq |r| <0.6$, and strong if $|r| \geq 0.6$.

**Results**
All 113 participants from the original data set were included in this study. Demographic characteristics including personal, social, and health-related and environmental factors are presented in the table below. Approximately half of the participants (51%) were males, were married/divorced/widowed (63%), were living without assistance (56%), and were retired or unemployed (55%). The mean age of the sample was 57 years (SD=10), and mean time since stroke was 51 months (SD=61). The mean NIHSS was 4.9 (SD=3.0), with a majority having a mild stroke (56%). Mean depression score at baseline was 12 (SD=12), and mean number of medical conditions was 6 (SD=4).

**Discussion**
The goal of this study was to assess factors associated with participation outcomes among community-dwelling people who had a mild or moderate stroke. The study found that higher participation performance and satisfaction were moderately to strongly associated with having fewer depressive symptoms and fatigue, having more mobility, and having more environmental supports. Higher participation performance was also moderately associated with better perceived recovery. Increased age weakly correlated with increased participation performance and satisfaction. Previous reports often state that increased age correlates with reduced participation performance. Additionally, reaching a stage of acceptance or content with participation after stroke takes about 7-8 years. This incongruity in results could be because our sample was relatively younger in age and less time had passed since their stroke (median=23 months, table 1) compared to the other studies.

The body function–related variables (ie, depression, fatigue, and mobility) moderately associated with participation outcomes were consistent with factors found to be associated with participation outcomes in a previous systematic
Unlike our study, this systematic review also identified number of comorbidities and cognition as associated factors. In our study, these variables were significantly associated with community participation outcomes, although the strengths of the associations were weak. Weak associations with cognition scores could be explained by the fact that participants in this study only had mild cognitive impairments, and the correlation was calculated with a subgroup of a cognitively impaired population. Most of the identified variables may be modifiable with targeted interventions. Though mobility is already a focus of rehabilitation, the findings suggest that rehabilitation should focus more on building participants’ self-management skills for managing the chronic effects of stroke such as fatigue and depression. Integration of the chronic care model into stroke rehabilitation with trainings for health care providers to provide self-management support (eg, goal setting, problem solving, mastery experience) with traditional rehabilitation could help build stroke survivors’ self-management skills early on while in rehabilitation.

**Table 1** Demographic characteristics and descriptive statistics of the participants

| Factors                                      | Descriptive Statistic                  |
|----------------------------------------------|----------------------------------------|
| **Personal factors**                         |                                        |
| Age, years, mean±SD; min-max                 | 57.2 (10.0); 32-93                     |
| Median (IQR)                                 | 56 (52, 63)                            |
| Monthly income ($), mean±SD; min-max         | 6255 (1627); 0-150,000                 |
| Median (IQR)                                 | 2720 (1190, 5333)                     |
| Sex, n (% males)                             | 58 (51.3)                              |
| Marital status, n (% single [never married]) | 42 (37.2)                              |
| Community living status, n (% living without assistance) | 63 (55.8)                              |
| Employment status, n (%)                     | 38 (33.6); 24 (21.2)                  |
| Unemployed; retired                          |                                        |
| Long-term disability status                  | 33 (29.2)                              |
| On formal leave                              | 7 (6.2)                                |
| Part-time                                    | 7 (6.2)                                |
| Full-time                                    | 3 (2.7)                                |
| Missing                                      | 1 (0.9)                                |
| **Health conditions**                        |                                        |
| Time since stroke (months), mean±SD; min-max | 51 (61); 3-295                         |
| Median (IQR)                                 | 23 (9, 25)                             |
| Number of medical conditions, mean±SD; min-max | 6.3 (3.5); 1-15                     |
| Median (IQR)                                 | 6 (4, 8)                               |
| Stroke severity (NIHSS); min-max              | 4.9 (3.0); 1-12                        |
| Median (IQR)                                 | 4 (2, 7)                               |
| **Body functions and structures**            |                                        |
| Depression (CES-D), mean±SD; min-max         | 12.0 (11.7); 0-55                      |
| Median (IQR)                                 | 11.0 (5, 21)                           |
| Fatigue severity, mean±SD; min-max           | 3.7 (2.9); 1-10                        |
| Median (IQR)                                 | 3.0 (0.0, 10.0)                        |
| Mobility (SIS), mean±SD; min-max             | 79.9 (16.5); 35-100                    |
| Median (IQR)                                 | 84.4 (68.9, 93.3)                      |
| Strength (SIS), mean±SD; min-max             | 59.5 (19.2); 20-100                    |
| Median (IQR)                                 | 60.0 (40.0, 75.0)                      |
| Hand function (SIS), mean±SD; min-max         | 54.9 (28.8); 20-100                    |
| Median (IQR)                                 | 56.0 (22.0, 80.0)                      |
| Communication (SIS), mean±SD; min-max         | 89.3 (12.8); 45-100                    |
| Median (IQR)                                 | 94.3 (80.0, 100.0)                     |
| Cognition (SIS), mean±SD; min-max             | 81.4 (15.6); 31-100                    |
| Median (IQR)                                 | 85.7 (72.9, 94.3)                      |
| **Environmental factors**                    |                                        |
| Environmental support (WHOQOL-BREF), mean±SD; min-max | 72.2 (18.1); 25-100               |
| Median (IQR)                                 | 75.0 (59.5, 88.0)                      |
| **Participation**                            |                                        |
| RNLI (participation performance), mean±SD     | 83.5 (21.6)                            |
| Total score                                  | 100                                    |
| PROMIS satisfaction (participation satisfaction), mean±SD | 47.8 (15.7)                          |
| Total score                                  | 100                                    |

Abbreviations: CES-D, Center for Epidemiologic Studies Depression Scale; IQR, interquartile range.
The finding that perceived recovery showed moderate correlations with participation performance is consistent with previous literature that identified perceived recovery as a predictor of participation in leisure and outdoor activities. This highlights the importance of considering nonneurologic clinical assessments that include patients’ self-evaluations. Given that perceived recovery is a modifiable psychological construct, future research may consider whether interventions directed at increasing self-efficacy, resilience, and perceived recovery may improve participation outcomes. Interventions focusing on the social model of disabilities highlighting that the environment and system, rather than the bodily impairment, enable or restrict poststroke participation over time, which environmental factors in particular have stronger effects on participation, and what interventions can mediate the environmental influence on participation. More research is needed to understand how environmental factors enable or restrict poststroke participation over time, which environmental factors in particular have stronger effects on participation, and what interventions can mediate the environmental influence on participation.

We did not find differences in the results between performance and satisfaction except for perceived recovery. This may be because the chosen outcomes were the participants’ perceptions of participation performance and satisfaction. Future evaluation using objective participation performance data such as use of Global Positioning Systems, ecological momentary assessments, and accelerometers for measuring community integration will allow us to explore whether and how participation performance and satisfaction differ from each other and how different factors relate to these 2 aspects of participation.

### Limitations

The study has several limitations. The study used a small sample of individuals with mild to moderate stroke recruited from 2 Midwest urban areas, which limits the generalizability of the findings. Patient-reported measures were used that have limitations inherent to self-report data. The cross-sectional data only allowed for an analysis of associations without an investigation of the direction of associations. Finally, the study utilized data collected over 10 years ago. Future studies should collect long-term data, particularly data related to environmental factors, with a larger sample size to better understand predictors of participation outcomes.

#### Table 2 Spearman correlations

| Variable Name          | Participation Performance (RNLI) Spearman Correlation Coefficient (r) | P Value | Participation Satisfaction (PROMIS) Spearman Correlation Coefficient (r) | P Value |
|------------------------|------------------------------------------------------------------------|---------|---------------------------------------------------------------------------|---------|
| Age                    | 0.22                                                                   | .02     | 0.24                                                                      | .001    |
| Monthly income         | 0.01                                                                   | .89     | 0.03                                                                      | .73     |
| Perceived recovery     | 0.41                                                                   | <.001   | 0.37                                                                      | <.001   |
| Health conditions      |                                                                        |         |                                                                           |         |
| Months since stroke    | 0.17                                                                   | .07     | 0.28                                                                      | .003    |
| No. of medical conditions | -0.24                                                                | .01     | -0.28                                                                     | .003    |
| Depression (CES-D)     | -0.40                                                                  | <.001   | -0.50                                                                     | <.001   |
| Fatigue severity       | -0.46                                                                  | <.001   | -0.42                                                                     | <.001   |
| Mobility (SIS)         | 0.43                                                                   | <.001   | 0.45                                                                      | <.001   |
| Strength (SIS)         | 0.38                                                                   | <.001   | 0.31                                                                      | <.001   |
| Hand function (SIS)    | 0.27                                                                   | .004    | 0.20                                                                      | .034    |
| Communication (SIS)    | 0.29                                                                   | .002    | 0.28                                                                      | .003    |
| Cognition (SIS)        | 0.32                                                                   | <.001   | 0.23                                                                      | .013    |
| Environmental factors  |                                                                        |         |                                                                           |         |
| Environmental support (WHOQOL BREF) | 0.61                                                              | <.001   | 0.69                                                                      | <.001   |

**NOTE.** Higher scores are better for all variables, except for number of medical conditions, depression, and fatigue severity. Abbreviation: CES-D, Center for Epidemiological Studies Depression Scale.
Conclusions

This study shows that participation, which is known to be a complex construct, is associated with a variety of personal, body function–related, and environmental factors, as the ICF suggests. It particularly establishes evidence supporting the strong association of environmental factors and participation and supports the importance of paying attention to the nonneurologic effects of stroke (eg, support system, depression, fatigue). The finding stresses the need for more research in stroke rehabilitation to develop interventions that use thorough evaluations and address the various biopsychosocial effects of stroke from both micro- and macrolevels.

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References

1. Norving B, Kessela B. The global burden of stroke and need for a continuum of care. Neurology 2013;80:55–12. Available at: https://nn.neurology.org/content/80/3_Supplement_2/55. Accessed February 15, 2022.
2. Harwood RH, Gompertz P, Ebrahim S. Handicap one year after a stroke: validity of a new scale. J Neurol Neurosurg Psychiatry 1994;57:825–9.
3. Harwood RH, Gompertz P, Pound P, Ebrahim S. Determinants of handicap 1 and 3 years after a stroke. Disabil Rehabil 1997;19:205–11.
4. Desrosiers J, Bourbonnais D, Noreau L, Rochette A, Bravo G, Bourget A. Participation after stroke compared to normal aging. J Rehabil Med 2005;37:353–7.
5. Rochette A, Desrosiers J, Bravo G, St-Cyr-Tribble D, Bourget A. Changes in participation after a mild stroke: quantitative and qualitative perspectives. Top Stroke Rehabil 2007;14:59–68.
6. Clarke PJ, Black SE, Badley EM, Lawrence JM, Williams JH. Handicap in stroke survivors. Disabil Rehabil 1999;21:116–23.
7. Ezekiel L, Collett J, Mayo NE, Pang L, Field L, Daws H. Factors associated with participation in life situations for adults with stroke: a systematic review. Arch Phys Med Rehabil 2019;100:945–55.
8. Ezekiel L, Collett J, Mayo NE, Pang L, Field L, Daws H. Factors associated with participation in life situations for adults with stroke: a systematic review. Arch Phys Med Rehabil 2019;100:945–55.
9. Noonan VK, Kopec JA, Noreau L, Singer J, Dvorak MF. A review of participation instruments based on the International Classification of Functioning, Disability and Health. Available at: https://www.tandfonline.com/doi/abs/10.1080/09638280902846947. Accessed May 1, 2022.
10. Magasi S, Hammel J, Heinemann A, Whiteneck G, Bogner J. Participation: a comparative analysis of multiple rehabilitation stakeholders’ perspectives. J Rehabil Med 2009;41:936–44. Available at https://pubmed.ncbi.nlm.nih.gov/19841847/. Accessed May 1, 2022.
11. Dijkers MP. Issues in the conceptualization and measurement of participation: an overview. Arch Phys Med Rehabil 2010;91:55–16.
12. Whiteneck G, Dijkers MP. Difficult to measure constructs: conceptual and methodological issues concerning participation and environmental factors. Arch Phys Med Rehabil 2009;90:522–35.
13. Mallinson T, Hammel J. Measurement of participation: Intersecting person, task, and environment. Arch Phys Med Rehabil 2010;91:529–33.
14. Wolf TJ, Baum CM, Lee D, Hammel J. The development of the improving Participation After Stroke Self-Management Program (IPASS): an exploratory randomized clinical study. Top Stroke Rehabil 2016;23:284–92.
15. Wood-Dauphinee SL, Opzoomer MA, Williams JI, Marchand B, Spitzer WD. Assessment of global function: the Reintegration to Normal Living Index. Arch Phys Med Rehabil 1988;69:583–90.
16. Tooth LR, McKenna KT, Smith M, O’Rourke PK. Reliability of scores between stroke patients and significant others on the Reintegration to Normal Living (RNL) Index. Disabil Rehabil 2003;25:433–40.
17. Bourget N, Deblock-Bellamy A, Blanchette AK, Batcho CS. Use and psychometric properties of the Reintegration to Normal Living Index in rehabilitation: a systematic review. Ann Phys Rehabil Med 2018;61:262–9.
18. Hahn EA, Beaumont JL, Plkonis PA, et al. The PROMIS satisfaction with social participation measures demonstrated responsiveness in diverse clinical populations. J Clin Epidemiol 2016;73:135–41.
19. Hahn EA, DeVellis RF, Bode RK, et al. Measuring social health in the Patient-Reported Outcomes Measurement Information System (PROMIS): item bank development and testing. Qual Life Res 2010;19:1035–44.
20. Duncan PW, Wallace D, Lai SM, Johnson D, Embretson S, Laster LJ. The Stroke Impact Scale Version 2.0. Stroke 1999;30:2131–40.
21. Wolf T, Koster J. Perceived recovery as a predictor of physical activity participation after mild stroke. Disabil Rehabil 2013;35:1143–8. Available at: https://pubmed.ncbi.nlm.nih.gov/23013280/. Accessed April 28, 2022.
22. Parikh RM, Eden DT, Price TR, Robinson RG. The sensitivity and specificity of the Center for Epidemiologic Studies Depression Scale in screening for post-stroke depression. Int J Psychiatry Med 1988;18:169–81.
23. Shinar D, Gross CR, Price TR, Banko M, Bolduc PL, Robinson RG. Screening for depression in stroke patients: the reliability and validity of the Center for Epidemiologic Studies Depression Scale. Stroke 1986;17:241–5.
24. Skewington SM, McCrate FM. Expecting a good quality of life in health: assessing people with diverse diseases and conditions using the WHOQOL-BREF. Health Expect 2012;15:49–62.
25. The WHOQOL Group. Development of the World Health Organization WHOQOL-BREF quality of life assessment. Psychol Med 1998;28:551–8.
26. Dancey CP, Reidy J. Statistics without maths for psychology. United Kingdom: Pearson Education; 2007.
27. Tolgia J, Askin G, Gerber LM, Jaywant A, O’dell MW. Participation in younger and older adults post-stroke: frequency, importance, and desirability of engagement in activities. Front Neurol 2019;10:1–10.
28. Palstam A, Sjödin A, Sunnerhagen KS. Participation and autonomy five years after stroke: a longitudinal observational study. PLoS One 2019;14:e0219513.
29. Törnbom K, Lundälv J, Sunnerhagen KS. Long-term participation 7–8 years after stroke: experiences of people in working-age. PLoS One 2019;14:e0213447.
30. Parke HL, Epiphaniou E, Pearce G, et al. Self-management support interventions for stroke survivors: a systematic meta-review. PLoS One 2015;10:e0131448.
31. Jones F. Strategies to enhance chronic disease self-management: how can we apply this to stroke? Available at: https://www.tandfonline.com/doi/abs/10.1080/0963828050034952. Accessed May 3, 2022.
32. Wolf T, Koster J. Perceived recovery as a predictor of physical activity participation after mild stroke. Disabil Rehabil 2013;35:1143–8.
33. Singam A, Ytterberg C, Tham K, Von Koch L. Participation in complex and social everyday activities six years after stroke: predictors for return to pre-stroke level. PLoS One 2015;10:e0144344.
34. French MA, Moore MF, Pohlig R, Reisman D. Self-efficacy mediates the relationship between balance/walking performance, activity, and participation after stroke. Top Stroke Rehabil 2016;23:77-83.
35. Siminski P. Patterns of disability and norms of participation through the life course: empirical support for a social model of disability. Disabil Soc 2003;18:707-18.
36. Zhang L, Yan T, You L, Gao Y, Li K, Zhang C. Functional activities and social participation after stroke in rural China: a qualitative study of barriers and facilitators. Clin Rehabil 2018;32:273-83.
37. Zhang L, Yan T, You L, Li K. Barriers to activity and participation for stroke survivors in rural China. Arch Phys Med Rehabil 2015;96:1222-8.
38. Zhang L, Sui M, Yan T, You L, Li K, Gao Y. A study in persons later after stroke of the relationships between social participation, environmental factors and depression. Clin Rehabil 2017;31:394-402.
39. Robison J, Wiles R, Ellis-Hill C, McPherson K, Hyndman D, Ashburn A. Resuming previously valued activities post-stroke: who or what helps. Disabil Rehabil 2009;31:1555-66.
40. Miller A, Pohlig RT, Wright T, Kim HE, Reisman DS. Beyond physical capacity: factors associated with real-world walking activity after stroke. Arch Phys Med Rehabil 2021;102:1880-7. e1.
41. della Vecchia C, Viprey M, Haesebaert J, et al. Contextual determinants of participation after stroke: a systematic review of quantitative and qualitative studies. Disabil Rehabil 2021;43:1786-98.
42. Hammel J, Jones R, Gossett A, Morgan E. Examining barriers and supports to community living and participation after a stroke from a participatory action research approach. Top Stroke Rehabil 2015;13:43-58.
43. Foley EL, Nicholas ML, Baum CM, Connor LT. Influence of environmental factors on social participation post-stroke. Behav Neurol 2019;2019:2606039.
44. Woodman P, Riazi A, Pereira C, Jones F. Social participation post stroke: a meta-ethnographic review of the experiences and views of community-dwelling stroke survivors. Disabil Rehabil 2014;36:2031-43.
45. Elloker T, Rhoda AJ. The relationship between social support and participation in stroke: a systematic review. Afr J Disabil 2018;7:1-9.
46. Erler KS, Sullivan V, Mckinnon S, Inzana R. Social support as a predictor of community participation after stroke. Front Neurol 2019;10:1-7.