Effect of health empowerment intervention for stroke self-management on behaviour and health in stroke rehabilitation patients

JWH Sit*, SY Chair, CWH Chan Yip, KC Choi, DTF Lee, KP Leung, SW Tang, PS Chan

KEY MESSAGES

1. Implementation of patient empowerment intervention has potential influence on self-efficacy in illness management, favouring self-management behavioural outcomes and enhancement of functional recovery in post-stroke patients.
2. The health empowerment intervention for stroke self-management can be conducted in parallel with the existing ambulatory stroke rehabilitation services and gave added value in sustaining stroke self-management and functional improvement in the longer term.

Hong Kong Med J 2018;24(Suppl 2):S12-5
HHSRF project number: 09100551

[1] **JWH Sit**, [1] **SY Chair**, [1] **CWH Chan Yip**, [1] **KC Choi**, [1] **DTF Lee**, [2] **KP Leung**, [2] **SW Tang**, [2] **PS Chan**

[1] *The Nethersole School of Nursing, The Chinese University of Hong Kong*
[2] *Department of Medicine and Rehabilitation, Tung Wah Eastern Hospital*

* Principal applicant and corresponding author: janet.sit@cuhk.edu.hk

Introduction

Empowerment-based self-management interventions for chronic illnesses such as diabetes, asthma, hypertension, and arthritis have been shown to be effective in targeting behavioural and health outcomes.[1-3] Nonetheless, self-management in stroke is a challenge; it is multifaceted and relies on a combination of medications, technical aids, and professional care. In addition, the sudden and complex disabling consequences of a stroke hinder patient participation. It is important to identify an effective empowerment approach to articulate and to provide support to stroke patients for their unique health needs and attainment of their personal goals. Based on the theory of health empowerment, the health empowerment intervention for stroke-self-management (HEISS) emphasises patients' inner resources (eg self-efficacy) and social-contextual resources (eg supportive relationships) to facilitate awareness and ability to participate knowingly in health and healthcare decisions.[4] This study aimed to evaluate the effects of HEISS together with the existing out-patient rehabilitation schedule immediately after the acute phase of stroke.

Methods

This study was conducted from May 2012 to November 2014. We hypothesised that participants in HEISS would have significantly improved self-efficacy, self-management behaviour and activities of daily living.

Subjects were randomised to receive usual care alone (control group) or usual care plus HEISS (intervention group). Usual care under the ambulatory stroke rehabilitation programme was implemented by the interdisciplinary team that included a physiotherapist, occupational therapist, and nurses. The HEISS aimed to empower patients with the 'know how' and skills to practise self-management during stroke rehabilitation. It consisted of three parts.

In part I, small-group sessions that comprised six weekly 30-minute sessions (4-6 participants per group) provided an opportunity to establish a partner relationship between individual participants and the research nurse. Activities included building self-efficacy (through mastery, verbal persuasion, vicarious experience, and physiological feedback), developing core self-management skills, and articulating his/her health needs for goal attainment. An individualised mutually agreed action plan and Stroke Self-management Work Book was prepared for individual home-based implementation.

Part II was a 4-week home-based implementation conducted immediately after part I. Participants worked according to their action plan at home using their own Stroke Self-management Work Book. Participants received critical input for empowering and supporting self-management.

In part III, a face-to-face reinforcement session was conducted after the 4-week home-based implementation. Nurse-patient interaction was organised to determine what progress participants had made in their self-management and stroke recovery process. Critical inputs were reinforced to facilitate personal reflection and celebrate successes, and recognise limitations that would require modification of long-term goals and action plans.

Primary outcome measures included self-

efficacy, self-management, and instrumental activities of daily living (IADL). Data were collected at pre-test (T0), and 1 week (T1), 3 months (T2) and 6 months (T3) post-test.

Outcomes were compared between the control and intervention groups based on the intention-to-treat principle. The generalised estimating equation model was used to evaluate differential changes to each outcome across the time points between the two groups. This model accounts for baseline outcome values and the intra-correlation of the repeated measures outcome across time. The differential changes to each outcome were assessed by the regression coefficient (*B*) of the group x time point interaction-terms in the model. For continuous outcomes, the *B* of the interaction term at each follow-up time point represented the net average difference (intervention group – control group) in the change to the outcome at the underlying follow-up time point with respect to the baseline. A positive *B* meant the intervention group had better improvement than the control group. For binary outcomes, the *B* of the interaction-terms represented the net average difference (intervention group – control group) in the change of the log odds of the outcome at the underlying follow-up time point with respect to the baseline. Instead of the raw *B*, the odds ratios of the interaction-terms were presented for binary outcomes. An odds ratio of >1 means the intervention group had better improvement than the control group. All statistical tests were two-sided and a P value of <0.05 was considered statistically significant.

Results

A total of 375 stroke patients were screened for eligibility and 291 fulfilled the inclusion criteria. Of them, 210 were randomised to the control (n=105) or intervention (n=105) group (Fig). The overall dropout rate at T3 was 16.7% (21.9% and 11.4% respectively for control and intervention groups). No significant difference was found in sociodemographic or clinical characteristics between the dropouts and the completers, or between the two groups.

Participants were predominately older adults, with 31.9% aged <65 years. The mean age was 69.25 (standard deviation, 14.1; range, 30-89) years. All participants required assistance by caregivers; 73.7% of the participants had suffered an ischaemic stroke that had resulted in hemiparesis (86.7%) and/or sensory impairment (67.1%), and 70% were hypertensive before the stroke (Table 1).

Overall, the intervention group showed more favourable improvement in all outcomes at all time points, except for medication adherence (Table 2). The intervention group showed significantly better improvement than the control group in self-efficacy in illness management at both 3 months (*B*=5.44, 95% confidence interval [CI]=1.24-9.64, P=0.011) and 6 months (*B*=5.59, 95% CI=1.22-9.95), P=0.012).

Regarding self-management behaviour, the intervention group showed better improvement than the control group in cognitive symptom management at T1 (*B*=4.49, 95% CI=2.60-6.37, P=0.001), T2 (*B*=5.18, 95% CI=3.27-7.09, P<0.001), and T3 (*B*=3.61, 95% CI=1.62-5.61, P<0.001), and in communication with physician at T1 (*B*=3.53, 95% CI=2.13-4.94, P<0.001), T2 (*B*=2.44, 95% CI=0.93-3.95, P=0.002), and T3 (*B*=1.36, 95% CI= -0.23-2.95, P=0.094). In self-health monitoring, the intervention group showed significantly better improvement than the control group at T1 (odds ratios [OR]=2.49, 95% CI=1.32-4.68, P=0.005), T2 (OR=2.56, 95% CI=1.32-4.96, P=0.005), and T3 (OR=2.31, 95% CI=1.11-4.81, P=0.025). Nonetheless, there was no significant difference between the two groups for improvement in medication adherence.

For functional ability, the intervention group

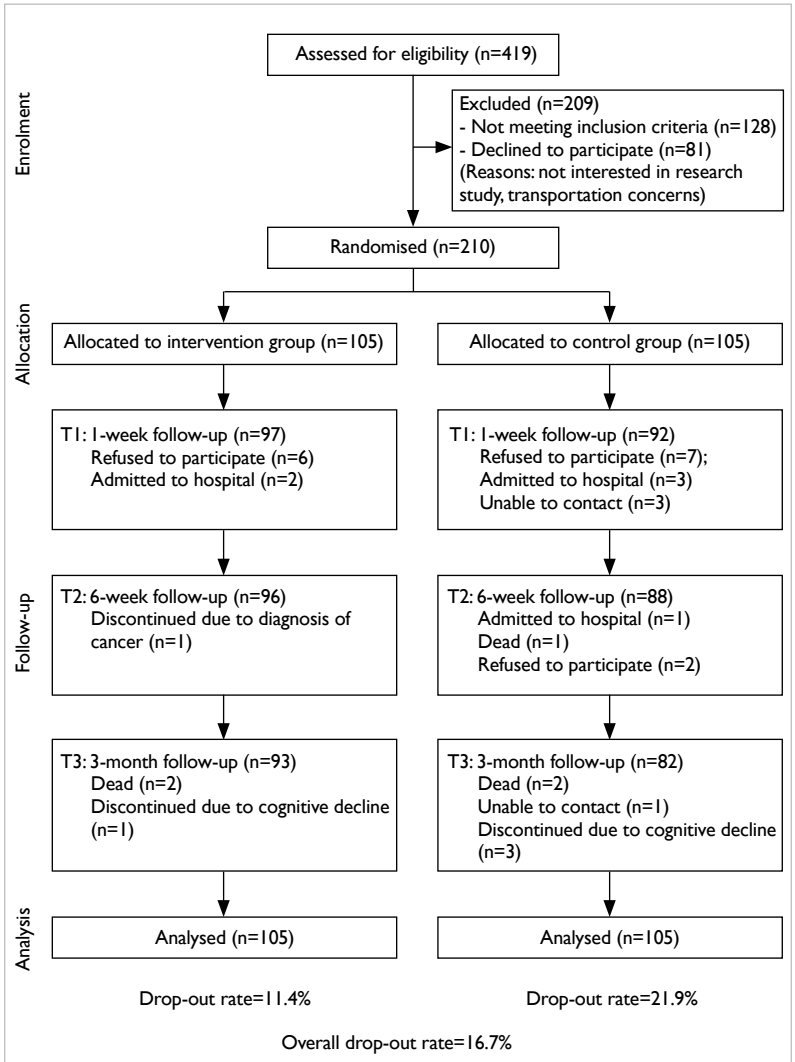

FIG. Flow diagram of recruitment of participants (adapted from reference 5, with permission from Dove Medical Press Ltd)

TABLE 1. Baseline characteristics and clinical profile of participants (n=210)* [adapted from reference 5, with permission from Dove Medical Press Ltd]

Characteristic	Control (n=105)	Intervention (n=105)	P value
Age (years)	70.7±13.9	67.8±14.2	0.124
Sex			0.999
Male	55 (52.4)	55 (52.4)	
Female	50 (47.6)	50 (47.6)	
Marital status			0.193
Single	10 (9.6)	10 (9.5)	
Married	80 (76.2)	71 (67.6)	
Divorced/separated/widowed	15 (14.2)	24 (22.9)	
Educational level			0.606
No formal education	22 (20.9)	21 (20.0)	
Primary school	27 (25.7)	24 (22.9)	
Secondary school	47 (44.7)	46 (43.8)	
Tertiary education or above	9 (8.7)	14 (13.3)	
Employment status			0.827
Full/part time work	34 (32.4)	33 (31.4)	
Housewife	15 (14.3)	20 (19.0)	
Retired	48 (45.7)	45 (42.9)	
Unemployed	8 (7.6)	7 (6.7)	
Carer			0.090
Relatives	17 (16.2)	24 (22.9)	
Paid full-time domestic helper	10 (9.5)	16 (15.2)	
Paid part-time domestic helper	60 (57.1)	57 (54.3)	
Aged care staff	18 (17.1)	8 (7.6)	
Religion			0.935
No	61 (58.7)	61 (58.1)	
Yes	43 (41.3)	44 (41.9)	
Smoking habits			0.999
Never smoke	68 (64.8)	68 (64.8)	
Ex-smoker	34 (32.4)	35 (33.3)	
Smoker	3 (2.9)	2 (1.9)	
Stroke type			0.754
Haemorrhagic	27 (25.7)	29 (27.6)	
Ischaemic	78 (74.3)	76 (72.4)	
Affected brain region			0.579
Left brain	49 (46.7)	41 (40.2)	
Right brain	52 (49.5)	57 (55.9)	
Both	4 (3.8)	4 (3.9)	
Mobility			0.854
Hemiplegia	6 (5.7)	4 (3.8)	
Hemiparesis	90 (85.7)	92 (88.5)	
Both	8 (7.6)	7 (6.7)	
Not obvious	0 (0.0)	1 (1.0)	
Affected body part			0.961
Left side	49 (46.6)	50 (47.6)	
Right side	41 (39.1)	41 (39.0)	
Both	9 (8.6)	9 (8.6)	
Others (visual/speech)	6 (5.7)	5 (4.8)	
Sensory influence			0.996
Intact	35 (33.3)	35 (33.3)	
Impaired	65 (61.9)	66 (62.9)	
Absent	5 (4.8)	4 (3.8)	
Chronic illnesses	96 (91.4)	93 (90.3)	0.490
Hypertension	74 (70.5)	73 (70.9)	0.880
Diabetes mellitus	38 (36.2)	36 (35.0)	0.773
Hyperlipidaemia	47 (44.8)	50 (48.5)	0.678
Heart disease	11 (10.5)	24 (23.3)	0.016
Complications	7 (7.0)	13 (12.7)	0.158

* Data are presented as mean±SD or frequency (%)

had significantly better improvement than the control group in the Barthel index at T1 (*B*=5.20, 95% CI=0.75-9.64, P=0.022), T2 (*B*=8.04, 95% CI=2.40-13.68, P=0.005), and T3 (*B*=7.97, 95% CI=1.51-14.43, P=0.016) and the Lawton IADL at T1 (*B*=2.46, 95% CI=1.29-3.63, P<0.001), T2 (*B*=3.54, 95% CI=2.27-4.80, P<0.001), and T3 (*B*=2.86, 95% CI=1.39-4.32, P<0.001).

Discussion

Participants who received HEISS have demonstrated a progressive improvement in self-efficacy in illness management at 3-month and 6-month follow-ups.[5] During the rehabilitation period, stroke patients of similar disabilities work alongside each other and thus can influence and motivate each other that an activity or task is possible. Verbal persuasion from health care personnel is also an important factor that can encourage individuals in a progressive manner. It is possible that during the course of recovery, HEISS participants experienced success in day-to-day symptom or illness management, their self-efficacy improved over time, consequently showing a more favourable effect over and above that of participants in the control group. Our findings suggest that improvement in self-efficacy may produce more long-term value in sustaining a stroke patient's belief about their capability for self-management.

To empower stroke patients to participate knowingly and actively in self-management, the HEISS adopted a more person-centred approach than the usual care offered to the control group. Participants who received HEISS had significant improvement in cognitive symptom management, communication with physician, and self-health monitoring. Compared with baseline, improvement was distinctively notable at T1 (1 week) and T2 (3 months), but waned slightly at T3 (6 months) suggesting beneficial intervention implementation at the two earlier time points. The waning benefit could be a consequence of a gradual recovery of mobility and increasing confidence with patients feeling better adapted to their post-stroke changes in daily living or a result of less contact with health professionals and lack of reinforcement. No difference was observed between the two groups in stroke-specific self-efficacy and medication adherence, possibly because all individuals were aware of the importance of stringent compliance after a major health event such as a stroke.

The difference in functional outcomes was resonated in the intervention group where major improvements in self-management behaviours were evident.[5] The Barthel Index and Lawton IADL are measures of functional mobility. The Barthel Index in the control and intervention groups significantly improved over the three time points. A similar observation was also seen with the Lawton IADL

TABLE 2. Generalised estimating equation (GEE) models for comparison of outcomes across time between groups (adapted from reference 5, with permission from Dove Medical Press Ltd)

Outcome	Regression coefficients of the GEE models						
	Group	T1	T2	T3	Group*T1	Group*T2	Group*T3
	B (95% CI)	*B* (95% CI)	*B* (95% CI)	*B* (95% CI)	*B* (95% CI)	*B* (95% CI)	*B* (95% CI)
Self efficacy							
Stroke-specific self-efficacy	2.71 (-4.34 to 9.76)	3.12 (-1.03 to 7.25)	2.89 (-1.88 to 7.65)	6.84 (1.84 to 11.84)*	3.64 (-2.21 to 9.48)	6.28 (-0.26 to 12.82)	5.09 (-1.97 to 12.16)
Self-efficacy in illness management	2.24 (-1.52 to 6.01)	1.10 (-1.66 to 3.85)	-0.47 (-3.57 to 2.63)	0.42 (-2.96 to 3.80)	2.11 (-1.77 to 6.00)	5.44 (1.24 to 9.64)*	5.59 (1.22 to 9.95)*
Self-management behaviour							
Cognitive symptom management	-0.57 (-2.01 to 0.87)	0.56 (-0.70 to 1.82)	0.40 (-0.84 to 1.65)	-0.21 (-1.65 to 1.23)	4.49 (2.60 to 6.37)‡	5.18 (3.27 to 7.09)‡	3.61 (1.62 to 5.61)‡
Communication with physician	-0.03 (-0.84 to 0.78)	1.44 (0.60 to 2.28)‡	1.78 (0.78 to 2.77)‡	2.23 (1.17 to 3.29)‡	3.53 (2.13 to 4.94)‡	2.44 (0.93 to 3.95)†	1.36 (-0.23 to 2.95)
Medication adherence	1.01 (0.55 to 1.86)	1.15 (0.69 to 1.90)	1.04 (0.59 to 1.82)	1.61 (0.87 to 2.99)	1.10 (0.50 to 2.42)	1.29 (0.57 to 2.92)	0.57 (0.25 to 1.32)
Self–blood pressure monitoring	1.00 (0.58 to 1.73)	1.55 (1.04 to 2.30)*	1.54 (0.98 to 2.40)	1.83 (1.12 to 2.98)*	2.49 (1.32 to 4.68)†	2.56 (1.32 to 4.96)†	2.31 (1.11 to 4.81)*
Functional ability							
Barthel index	-3.24 (-9.28 to 2.80)	8.46 (5.15 to 11.77)‡	6.98 (2.44 to 11.53)†	5.48 (0.80 to 10.16)*	5.20 (0.75 to 9.64)*	8.04 (2.40 to 13.68)†	7.97 (1.51 to 14.43)*
Lawton instrumental activities of daily living scale	-0.65 (-1.98 to 0.69)	1.56 (0.67 to 2.44)†	0.92 (-0.05 to 1.89)	1.80 (0.66 to 2.93)†	2.46 (1.29 to 3.63)‡	3.54 (2.27 to 4.80)‡	2.86 (1.39 to 4.32)‡

* P<0.05
† P<0.01
‡ P<0.001

measure apart from slight fluctuations between the three time points, whereas a more stable improvement was seen in the intervention group. In the intervention group, both Barthel Index and Lawton IADL measures indicated steady and more stable functional recovery. The fluctuations in the control group could have been related to the day-to-day illness management abilities and resilience when faced with difficulties or physical symptoms.

Conclusion

Patient empowerment is a process whereby a patient becomes willing and able to play an active role in the management of their health and to exert influence over events that affect their lives during their stroke rehabilitation journey. Implementation of interventions aimed at patient empowerment may influence self-efficacy in illness management and self-management participation and thereby improve functional recovery in the longer term.

Acknowledgements

This study was supported by the Health and Health Services Research Fund, Food and Health Bureau, Hong Kong SAR Government (#09100551). We thank all the participants who took part in the study.

Results of this paper have been published in:

(1) Sit JW, Chair SY, Choi KC, et al. Do empowered stroke patients perform better at self-management and functional recovery after a stroke? A randomized controlled trial. Clin Interv Aging 2016;11:1441-50.

(2) Sit JW, Chair SY, Choi KC, et al. The effects of a theory-based health empowerment intervention on self-management and functional recovery post-stroke. Stroke 2016;47(Suppl 1):ANS7.

Figure and tables are reprinted with permission from Dove Medical Press Ltd.

References

1. Chodosh J, Morton SC, Mojica W, et al. Meta-analysis: chronic disease self-management programs for older adults. Ann Intern Med 2005;143:427-38.
2. Scott IA. Chronic disease management: a primer for physicians. Intern Med J 2008;38:477-37.
3. Chan WL, Hui E, Chan C, et al. Evaluation of chronic disease self-management programme (CDSMP) for older adults in Hong Kong. J Nutr Health Aging 2011;15:209-14.
4. Shearer NB. Health empowerment theory as a guide for practice. Geriatr Nurs 2009;30(2 Suppl):4-10.
5. Sit JW, Chair SY, Choi KC, et al. Do empowered stroke patients perform better at self-management and functional recovery after a stroke? A randomized controlled trial. Clin Interv Aging 2016;11:1441-50.