Zhu *et al. BMC Public Health* (2025) 25:1716
https://doi.org/10.1186/s12889-025-22655-x

BMC Public Health

RESEARCH **Open Access**

Abstract

Background The impact of recovery self-efficacy on health-related quality of life in haemorrhagic stroke survivors remains unclear. This longitudinal study examined this association through a one-year follow-up after discharge.

Methods A prospective, longitudinal design was conducted. A total of 184 haemorrhagic stroke survivors in a tertiary hospital in western China from January 2020 to December 2021 were recruited by the convenience sampling

†Cong Wang and Chaofeng Fan contributed equally to this work.

*Correspondence:
Chaofeng Fan
sjwkfanfan@163.com
[1]Department of Neurosurgery, West China Hospital/West China School of Nursing, Sichuan University, Chengdu, China
[2]Evidence-based Nursing Center, West China Hospital, Sichuan University, Chengdu, China

Background

e Stoke Self-e cacy Questionnaire (SSEQ), which

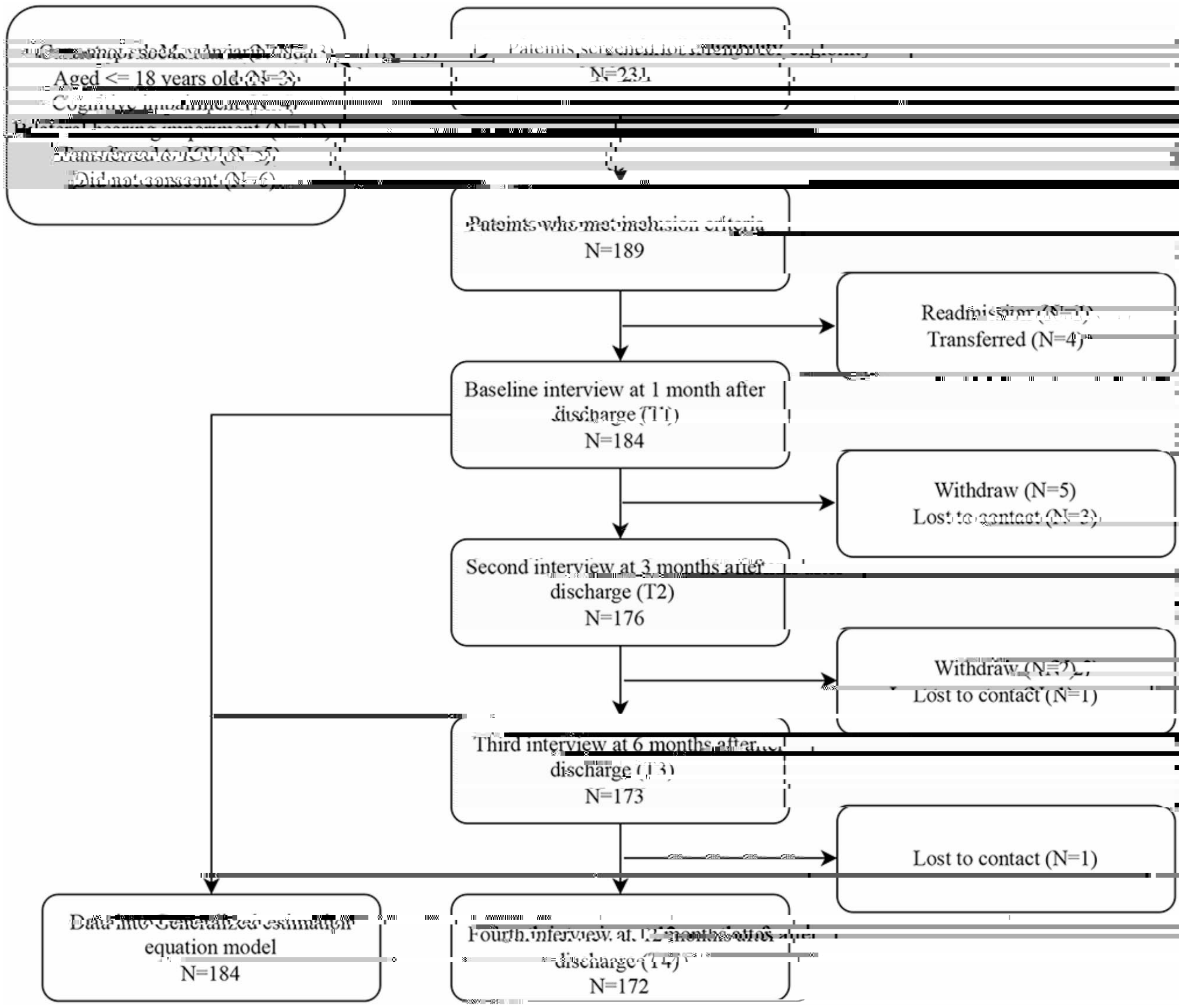

Fig. 1 Flow diagram of this study

time, with the largest gains between T1 (median = 0.87, IQR: 0.65-1) and T4 (median = 1, IQR: 1–1) ($p < 0.001$). SSEQ scores increased significantly from T1 (98, IQR: 84.25–107) to T4 (110, IQR: 108–110) ($p < 0.001$), while BI scores remained stable at 90 (IQR: 85–90 at T1; 90–90 at T2-T4). Neurological function, as measured by the Scandinavian Stroke Scale, improved significantly, with median scores increasing from 50 (IQR: 42–58) at T1 to 58 (IQR: 58–58) at T2-T4 ($p < 0.001$). For psychological status, HADS(A) scores increased from T1 (median = 1, IQR: 0–2) to T3 (median = 3, IQR: 2–5) ($p = 0.001$), then decreased by T4 (median = 2, IQR: 0–4), while HADS(D) scores followed a similar trend, peaking at T3 before improving to their lowest levels by T4. Figure 2 illustrates the temporal changes in these outcomes.

Simple effects of time on the HRQoL

The GEE analysis revealed significant interactions between time and SSEQ on EQ-5D-3 L ($p < 0.001$). Given these interactions, we further evaluated the simple effects of time and SSEQ on EQ-5D-3 L. The results indicated significant simple effects for both time and SSEQ ($p < 0.001$). In the low SSEQ group, patients exhibited significant increases in EQ-5D-3 L scores at T3 (β = 0.113, 95%CI: 0.068–0.158, $p < 0.001$) and T4 (β = 0.203, 95%CI: 0.159–0.248, $p < 0.001$) compared with T1. In the high SSEQ group, significant increases of EQ-5D-3 L were observed at T2 (β = 0.046, 95%CI: 0.012–0.081, $p = 0.009$), T3(β = 0.054, 95%CI: 0.020–0.088, $p = 0.002$), and T4 (β = 0.038, 95% CI: 0.006–0.070, $p = 0.021$) compared with T1 (Table 3). The estimated marginal means of EQ-5D-3 L across different time points for both SSEQ groups are presented in Table S2, showing a significant increase of EQ-5D-3 L from T1 to T4 in the low SSEQ group and from T1 to T3 in the high SSEQ group ($p < 0.05$).

Simple e□ects of SSEQ on the HRQoL

Table 4 shows the simple e ects of SSEQ on EQ-5D-3 L. Compared with patients with lower SSEQ scores, those with higher SSEQ scores exhibited significant increases in EQ-5D-3 L scores at T1 (β = 0.187, 95%CI: 0.132–0.242, $p < 0.001$), T2 (β = 0.154, 95%CI: 0.111–0.196, $p < 0.001$), and T3 (β = 0.084, 95%CI: 0.054–0.113, $p < 0.001$). No significant di erences in EQ-5D-3 L scores were observed between the low and high SSEQ groups at T4 ($p = 0.803$).

e estimated marginal means of EQ-5D-3 L across different SSEQ groups at each time point are presented in Table S3, indicating significant increases in EQ-5D-3 L scores in the high SSEQ group at T1, T2, and T3 ($p < 0.05$).

Discussion

is study found that haemorrhagic stroke survivors showed consistent improvements in daily living, neurological function, recovery self-e cacy, and HRQoL in the first year after discharge, with mental health status fluc

stages, external environmental supports, such as institutional and home-based care [43, 44], may compensate for initial psychological disparities, thereby diminishing the predictive power of recovery self-e cacy. In clinical practice, interventions should be adapted to the recovery phase, focusing on building internal resources like recovery self-e cacy in early stages and enhancing external supports in later stages to optimize recovery outcomes. Additionally, maintaining comprehensive support throughout the recovery process, recognizing the potential for late-phase improvements and avoiding premature pessimism about long-term outcomes are also important.

ere were several limitations in this study. First, we only included haemorrhagic stroke survivors with GCS scores of nine or above to ensure the feasibility of telephone follow-up. However, this may have excluded stroke survivors with more severe neurological, physical, and mental impairments, potentially introducing biases into the results. Second, the sample was from western China, where the level of medical resources and techniques are poor compared to eastern parts of the country, thus limiting the generalization of the results. ird, other psychosocial factors, such as social support, may also contribute to HRQoL trajectories. Future studies could propose integrative models that incorporate multiple psychosocial factors to examine their impacts on HRQoL in stroke survivors. Despite these limitations, our study highlighted that recovery self-e cacy serves not as a static predictor but as a dynamic agent across stroke rehabilitation phases, potentially mediated through cognitive, emotional, and environmental pathways. Future research should explore how targeted e cacy-enhancing interventions might amplify both early and late-phase recovery trajectories.

Conclusion

is study found that recovery self-e cacy significantly influenced the temporal trajectory HRQoL recovery in haemorrhagic stroke survivors. Higher baseline recovery self-e cacy was associated with earlier improvements in HRQoL, while lower recovery self-e cacy was related to delayed but comparable recovery. is suggests di erential yet converging recovery pathways among stroke survivors. e diminishing e ects of recovery self-e cacy one year after stroke indicated that its influence was most pronounced during the acute and subacute recovery phases. Considering baseline recovery self-e cacy levels when designing pest