Original Article

Reliability and Validity of a Thai Version of a Modified Frenchay Activities Index for use with Stroke Patients

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ABSTRACT

Objectives: To evaluate the reliability and validity of the Thai version of the modified Frenchay Activities Index (mFAI) questionnaire for use with stroke patients

Study design: Descriptive study

Setting: Department of Rehabilitation Medicine and Neurology Division, Department of Medicine, Faculty of Medicine, Siriraj Hospital, Mahidol University, Bangkok, Thailand

Subjects: Stroke patients visiting the Outpatient Department of the Rehabilitation Medicine and Neurology Division, Department of Medicine, from March 2020 to August 2020

Methods: Data were collected using a Thai version of the modified Frenchay Activities Index (Thai-mFAI). Of 75 patients, 70 met the inclusion criteria. After the initial assessment, all 70 participants were reassessed 3-7 days later to determine test-retest reliability. Validity was assessed from 59 participants by evaluating the correlation between the Stroke Impact Scale (SIS) and the Timed Up-and-Go test (TUG).

Results: The Thai-mFAI showed good content validity (CVI = 0.95), fair construct validity (convergent validity; r=0.287-0.310, discriminant validity; r=-0.259), excellent test-retest reliability (ICC3,1=0.929) and excellent internal consistency (Cronbach's alpha = 0.936).

Conclusions: The Thai-mFAI was found to have good content validity, fair construct validity, excellent test-retest reliability, and excellent internal consistency. These suggested that Thai-mFAI is suitable for evaluating how well active stroke patients can perform activities of daily living.

Keywords: Frenchay Activities Index (FAI), instrumental activities of daily living (IADL), reliability, validity, stroke

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Introduction

Cerebrovascular disease is a heterogeneous disorder. It comprises several distinct pathologies, including transient ischemic attack, different pathological types of stroke (ischemic stroke, intracerebral hemorrhage, subarachnoid hemorrhage) as well as etiological subtypes and other intracranial vascular diseases, each of which has different epidemiological and management features. Stroke is the most important and devastating clinical manifestation of all cerebrovascular disorders.[1] Cerebrovascular disease is a major global public health problem. Statistics from the World Health Organization showed that in 2016 cerebrovascular disease was the second leading cause of death in the world, and studies in Thailand have found cerebrovascular disease in 1.88% of patients aged 45-80 years.[2] Stroke was the third-leading cause of death and disability combined (as expressed by disability-adjusted life-years lost - DALYs) in the world in 2022.[3] The major impact of stroke is disability or impairment. According to the World Stroke Organization (WSO), there are more than 50 million patients with disabilities from stroke.[4]

Rehabilitation care aims to help patients regain an average or near-normal level of competence or at least the ability to carry out daily activities independently. Measuring the ability to carry out daily activities helps to know the patient's skill level. The most commonly used assessment is the Barthel Index (BI), an essential routine assessment.[5] However, rehabilitation focuses on a person's ability to return to a near-normal level. This means that a stroke patient should have regained a higher level of proficiency in real-life situations, e.g., a stroke patient should be able to perform a more advanced routine (instrumental activities of daily living or IADL) including contributing to society. Patients' ability to conduct more advanced routine activities should be assessed.[6] To that end, a patient activity assessment was developed for assessing IADL competency levels. Scales for evaluating IADL include the Nottingham extended ADL (NEADL) and the Frenchay Activity Index (FAI). FAI is a frequently used IADL scale for measuring stroke outcomes.[7] In 1983, the Frenchay Activity Index (FAI) was invented for use in assessing the daily life of stroke patients and to provide a more substantial and broad-spectrum measurement of the patient's daily routine.[8] The FAI consists of 15 activities divided into three main areas: domain 1: home activities, domain 2: work/leisure activities, and domain 3:

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outdoor activities. In 2013, the FAI was adjusted to include daily activities. In the 21st century, FAI has been modified and included increasing the activity index to 16 items, adding the ability to use a telephone and adjusting details of outdoor walking activities and travel patterns to align with today's lifestyle. We chose this questionnaire for the present study because it comprises a range of activities in real daily routine life, i.e., not only the basic activities of daily living (BADL) but also the IADL, social functions, and avocations. The mFAI also measures changes in frequency of activities compared to pre-stroke levels, self-reported causes of changes, and satisfaction with activity performance. Thus, mFAI results show the active performance level, while NEADL only evaluates activities done in specific activities. A study of the modified FAI (mFAI) in Sweden has shown that the tool provides more comprehensive information.[9]

Evaluation and monitoring of stroke patients' ability to perform independently are important in the follow-up of rehabilitation treatment. The study focused on the mFAI questionnaire which is related to the daily life routines of stroke patients. Although studies have been conducted on the FAI to determine its validity and reliability,[10] it has not yet been translated into Thai. Therefore, the researcher translated the mFAI questionnaire into Thai and calculated its reliability and validity to obtain an accurate Thai mFAI for future use in rehabilitation and research work.

Methods

The study protocol was approved by the Siriraj Institutional Review Board (SIRB) of the Faculty of Medicine, Siriraj Hospital, Mahidol University, Bangkok, Thailand (COA no. 545/2562 [EC1]). This study complied with all of the principles set forth in the Declaration of Helsinki and all of its subsequent amendments, and all participants provided written informed consent to participate in the study.

Participants

Outpatient stroke patients from the Department of Rehabilitation Medicine and Neurology Division, Department of Medicine, Faculty of Medicine, Siriraj Hospital, Mahidol University who met the inclusion criteria and were willing to participate were eligible for recruitment.

Inclusion criteria

- Age more than 18 years
- Onset of stroke ≥ 3 months
- Normal consciousness
- TMSE questionnaire score ≥ 24
- Able to walk independently, at least inside the house, without assistance

Exclusion criteria

- Non-Thai nationality
- Inability to read and understand the Thai language

After obtaining written informed consent, demographic and clinical data were collected and recorded.

Sample size calculation

The sample size was calculated based on a study by Imam et al.[10], who developed the Chinese version of mFAI. That study reported the test-retest reliability of the Chinese version assessed using an intraclass correlation coefficient was 0.86. Concerning about reliability, the sample size was calculated at 95% confidence interval with prehypothesized ICC 0.8 precision of 0.2. For validity assessment, based on the same study, correlations between the Chinese version and Timed Up & Go test was -0.68 (r= -0.68). Using type 1 error (0.05), 95% power Fisher's z test of the null hypothesis that the Pearson correlation coefficient r = 0.0, detect the alternative hypothesis r of 0.5. And an add-on of 10% was used to compensate for dropouts for any cause. The estimated numbers of participants for the reliability and validity tests were 65 and 55, respectively.

Translation

The modified FAI, which assesses three domains: home activities, leisure/work activities, and outdoor activities, was used. The questionnaire was translated into Thai after receiving permission from Professor Susanne Iwarsson. The translation of the questionnaires followed the recommended guidelines for the process of cross-cultural adaptation.[11] The mFAI questionnaire was translated by two English language professionals: the first was involved in the medical field, and the second was a linguistic expert from the Research Institute for Languages and Cultures of Asia, Mahidol University, who was not involved in the medical profession.

Our research team synthesized the results of those two translation questionnaires into one translation. After that synthesizing step, the Thai language questions were back-translated into English by different linguistic experts to prevent/minimize bias. That back-translated English version was then sent to another expert whose mother tongue is English for comparison with the original English language version of the mFAI.

Validity

In this study, we evaluated both content and construct validity. For construct validity, we assessed both convergent and discriminant validity.

Content validity

The Thai-mFAI was given to 5 experts to determine its content validity, including a neuro-rehab physiatrist, a general physiatrist, a physiotherapist, an occupational therapist, and a nurse experienced in caring for stroke patients. They were asked to rate each of the 16 questions regarding their comparability or relevance to the original version. Each question was then individually rated using a 4-point scale (1 = not relevant to 4 = highly relevant). Any item judged irrelevant by receiving a rating of 1 or 2 by more than 20% of the experts was amended. We then calculated the item content validity index (I-CVI), the percentage of the total items rated as 3 or 4, for all questions.

An I-CVI score of 0.8 or higher indicates good item content validity. Additionally, we determined the content validity for the entire questionnaire using the content validity for scale (S-CVI). Using that score, > 0.8 indicates a good S-CVI, the same as the I-CVI cut-point score.[12]

Construct validity

We evaluated the correlation between Thai-mFAI and the Stroke Impact Scale (SIS) using Spearman's correlation coefficient to assess convergent validity. Since the mFAI indicates how active the respondent was, we assumed that the Thai-mFAI would positively correlate with the SIS. The SIS, one of the stroke-specific quality of life measurements, evaluates the effects of stroke better than other tools.[13] It consists of 59 questions divided into eight parts (strength, communication, memory, emotion, social participation, the activities of daily living (ADL), mobility, hand function, and composite physical). A higher score indicates a better quality of life. The SIS was translated into Thai and showed good test-retest reliability and acceptable validity for use with stroke survivors.[13]

The Timed Up and Go (TUG) test is an objective clinical measure for assessing functional mobility balance and the risk of falling. It measures an individual's time to rise from a chair, walk 3 meters, turn, walk back, and sit down.[14] The cut-off score in stroke patients is > 14 seconds.[15] The TUG test has been revealed to be a high validity, reliable, and easy-to-administer clinical tool for assessing advanced functional mobility in people with chronic stroke.[14] Another study reported that the TUG test can reflect mobility, walking ability and ADL.[16] The lower the TUG time, the more active a person is. To determine discriminant validity, we analyzed by Spearman's correlation coefficient between the Thai-mFAI and the TUG test. We hypothesized that the Thai-mFAI would be negatively correlated with the TUG test.

Reliability

Reliability was performed using test-retest evaluation. We re-administered the Thai mFAI to 65 patients who took the Thai mFAI at least three days but not more than seven days apart. The content of both the test and retest were the same, but the questions were alternated to prevent a memory carry-over effect. Reliability was evaluated by the coefficient of stability using intraclass correlation (ICC3,1 = Two-way mixed effects model).

Statistical analysis

CVI was calculated to evaluate content validity, while Spearman's correlation coefficient was used to assess convergent and discriminant construct validity. Cronbach's alpha was used to evaluate internal consistency. The intraclass correlation coefficient was used to measure test-retest reliability.

The interpretation results of CVI, construct validity, ICC3,1, and internal consistency are shown below.

Range of construct validity[17]

Size of correlation	Interpretation
0.750 to 1.000 (-0.750 to -1.000)	Very good to excellent relationship
0.501 to 0.750 (-0.501 to -0.750)	Moderate to good relationship
0.251 to 0.500 (-0.251 to -0.500)	Fair degree of relationship
0.000 to 0.250 (0.000 to -0.250)	Little or no relationship

Range of internal consistency[18] Cronbach's alpha	Internal consistency
$0.9 \leq \alpha$	Excellent
$0.8 \leq \alpha < 0.9$	Good
$0.7 \leq \alpha < 0.8$	Acceptable
$0.6 \leq \alpha < 0.7$	Questionable
$0.5 \leq \alpha < 0.6$	Poor
$\alpha < 0.5$	Unacceptable

Range of intraclass correlation coefficient[19]	Interpretation
≥ 0.90	Excellent
0.75 ≤ ICC < 0.90	Good
0.50 ≤ ICC < 0.75	Moderate
< 0.50	Poor

Results

Seventy stroke patients (42 men, 28 women; mean age 58 years (SD8.9) were enrolled between March and August 2020. Table 1 shows the participants' characteristics. After a stroke, there was a markedly increase in retirement/unemployment among the patients.

Five experts were asked to judge the content validity of the Thai m-FAI. All of them gave the highest possible score with the exception of questions number 10A, 10C, 11, 13, and 15 which one expert scored 2 out of 4. When all scores were calculated for the item content validity index (I-CVI), however, the result showed that the overall I-CVI was 0.95, a good I-CVI. Likewise, the content validity for the scale result (S-CVI) was 0.95, which also means a good S-CVI (Table 2).

Spearman's correlation coefficient between the Thai-mFAI and the SIS was used to evaluate convergent validity. This study found a statistically significant fair degree relationship between the Thai-mFAI frequency summary score and part 1 (strength), 5 (ADL/IADL), and 8 (participation and role function) of the SIS, with correlation coefficient scores of 0.287, 0.289, and 0.310, respectively ($p < 0.05$). When analyzing of each Thai-mFAI subgroup found that domain 1 had a significant fair degree relationship with the SIS in parts 1 (strength), 5 (ADL/IADL), and 8 (participation and role function), with correlation coefficient scores of 0.316, 0.266 and 0.284, respectively (p-values all < 0.05). The Thai-mFAI domain 2 had a fair positive correlation with only two parts of the SIS, parts 5 (ADL/IADL) and 8 (participation and role function). (Table 3) There was, however, no relationship between Thai-mFAI domain three and the SIS. For discriminant validity, the correlation score between the Thai-mFAI domain 1 and the TUG test was -0.259 ($p < 0.05$). This finding indicates a significant

Table 1. Characteristics of participants

Variables	Number (%)
Sex	
Male	42 (60)
Female	28 (40)
Average age (years)*	58 (8.9)
Education level	
Below high school	10 (14)
High school	15 (21)
Diploma	8 (11)
Bachelor's degree	25 (35)
Post-graduate degree	12 (17)
Marital status	
Single	10 (14)
Married	57 (81)
Divorced	3 (4)
Living at home	70 (100)
Career before stroke	
Government official and/or state enterprise employee	25 (35)
Private company employee	9 (12)
Trading and private business	20 (28)
Worker	7 (10)
Student	2 (2)
Retired, housewife or unemployed	7 (10)
Career after stroke	
Government official and/or state enterprise employee	11 (15)
Private company employee	2 (2)
Trading and private business	16 (22)
Worker	4 (5)
Student	2 (2)
Retired, housewife or unemployed	35 (50)
Co-morbidities**	
Diabetes	20 (28)
Hypertension	54 (77)
Dyslipidemia	56 (80)
Coronary artery disease	4 (5)
Previous stroke	6 (8)
Others diagnosis***	10 (14)
Type of stroke	
Ischemic stroke	61 (87)
Hemorrhagic stroke	9 (12)
Onset of stroke	
3-6 months	6 (8)
6-12 months	14 (20)
≥ 1 year	50 (71)
Hemiparesis side	
Left	36 (51)
Right	31 (44)
Bilateral	3 (4)
Underwent rehabilitation program	
Yes	39 (55)
No	31 (44)
TMSE score*	28 (1.39)
Timed up and go test (seconds)*	13.2 (9.74)

*Mean (SD), **some patients had more than one underlying disease, ***asthma, chronic kidney disease, gout, thyrotoxicosis, and breast cancer

fair negative correlation between Thai-mFAI and the TUG test. (Table 4)

Regarding the Thai-mFAI test-retest reliability, the ICC3,1 was 0.929 (95% CI, 0.881 to 0.957), which indicates excellent reliability. Cronbach's alpha of 0.936 showed excellent internal consistency.

Discussion

In this study, we translated the mFAI into Thai and assessed the validity and reliability of the Thai version. Regarding validity, the Thai mFAI showed overall good I-CVI and S-CVI, which indicates good content validity.

Regarding the convergent validity, there was a fair positive correlation (r= 0.25-0.50) (Table 3) with the SIS. The Spearman's correlation coefficient between the Thai-mFAI sum score and the SIS part 1 (strength) showed r=0.287, part 5 (ADL/IADL) showed r= 0.289, and part 8 (participation and role function) showed r=0.310. Other SIS parts (memory and thinking, emotions, communication, mobility, and hand function) compared with the Thai-mFAI had a low positive relationship. When we calculated each domain of the Thai-mFAI, domains 1 and 2 had a fair positive correlation with the SIS part 5 (ADL/IADL) (r=0.266, 0.276) and part 8 (participation and role function) (r=0.284, 0.308). In addition, domain 1 of the Thai-mFAI also had a fair relationship with the SIS part 1 (strength) (r=0.316). However, there was no correlation between Thai-mFAI domain 3 (outdoor activity) and all of the parts of the SIS. This finding may be due to a cultural tendency of Thai individuals with illnesses or medical conditions to prefer staying home.

Referring to the former study which translated the FAI into a Chinese version[10], the correlation coefficient was r= 0.610, which indicates moderate to good positive correlation compared with the Reintegration to Normal Living Index (RNLI). The same test could not be directly compared because of language-related limitations. Even though the study used a Chinese language questionnaire, the survey was conducted in Canada. We want to point out that different cultures can potentially have differences in routine lifestyle. For example, in general most people living in countries outside Asia either live independently or live in a health care unit or a nursing home. Conversely, most Asian cultures are based on extended families. In addition, most middle-class Thai families often include a housewife or a servant who does the housework. Moreover, these two tests, FAI and SIS, measure different dimensions. The FAI answers questions about the frequency/how often people do the activities, while the SIS answers questions about rating the difficulty level of the activities. Similarly, the RNLI in the Chinese version of the study evaluates the degree to which a patient has been able to return to normal life activities. These two tests, the SIS and RNLI, ask patients to estimate how capable they are in doing activities. Thus, due to the differences in the kind of answers, culture, and lifestyles could result in our validity study results being not as robust as earlier studies conducted in non-Asian countries. Another confounding factor is the COVID-19 pandemic which caused the majority of the population to stay away from usual

Table 2. Content validity of the Thai modified Frenchay Activity Index (Thai-mFAI)

Question No.	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	No. in agreement	CVI
1	√	√	√	√	√	5	1.00
2	√	√	√	√	√	5	1.00
3	√	√	√	√	√	5	1.00
4	√	√	√	√	√	5	1.00
5	√	√	√	√	√	5	1.00
6	√	√	√	√	√	5	1.00
7	√	√	√	√	√	5	1.00
8A	√	√	√	√	√	5	1.00
8B	√	√	√	√	√	5	1.00
9	√	√	√	√	√	5	1.00
10A	√	X	√	√	√	4	0.80
10B	√	√	√	√	√	5	1.00
10C	√	X	√	√	√	4	0.80
10D	√	√	√	√	√	5	1.00
10E	√	√	√	√	√	5	1.00
10F	√	√	√	√	√	5	1.00
11	√	X	√	√	√	4	0.80
12	√	√	√	√	√	5	1.00
13	√	X	√	√	√	4	0.80
14	√	√	√	√	√	5	1.00
15	√	X	√	√	√	4	0.80
16	√	√	√	√	√	5	1.00
Total	1.00	0.77	1.00	1.00	1.00		0.95

√ means scores 3-4 out of 4 points rating scale (acceptable); x means scores 1-2 out of 4 points rating scale (unacceptable)

Table 3. Convergent validity of the Thai modified Frenchay Activity Index (Thai-mFAI) compared with the Stroke Impact Scale (SIS)

Spearman's correlation coefficient (*p*-value)	Thai-mFAI sum score	Domain 1 home activities	Domain 2 work/leisure
Part 1 strength	0.287 (0.028)*	0.316 (0.015)*	0.212 (0.108)
Part 2 communication	-0.007 (0.960)	0.064 (0.631)	-0.025 (0.851)
Part 3 memory	0.049 (0.713)	0.174 (0.188)	0.021 (0.875)
Part 4 emotion	0.070 (0.597)	0.141 (0.286)	0.036 (0.789)
Part 5 ADL, IADL	0.289 (0.027)*	0.266 (0.042)*	0.276 (0.035)*
Part 6 mobility	0.135 (0.309)	0.202 (0.124)	0.124 (0.351)
Part 7 hand function	0.252 (0.054)	0.255 (0.051)	0.216 (0.100)
Part 8 social participation	0.310 (0.017)*	0.284 (0.029)*	0.308 (0.018)*

*$p < 0.05$ indicates statistical significance

ADL, activities of daily living; IADL, instrumental activities of daily living

Table 4. Discriminant validity of the Thai modified Frenchay Activity Index (Thai-mFAI) compared with Timed Up and Go (TUG)

Spearman's correlation coefficient (*p*-value)	Thai-mFAI sum score	Domain 1 home activities	Domain 2 work/leisure
TUG	-0.248 (0.058)	-0.259 (0.047)*	-0.179 (0.175)

*$p < 0.05$ indicates statistical significance

socializing and outside routine activities during the period of the study.

In discriminant validity, there was a fair negative correlation between the Thai-mFAI domain 1 and the TUG test (r= -0.259). In contrast, a previous study found a moderate to good negative correlation (r= -0.68).[10] Each Thai-mFAI activity domain consists of various activities. Some activities do not require ambulation or the ability to walk, e.g., pursuing hobbies and reading books in domains 2 and 3. In the Thai-mFAI domain 1, all activities require the ability to walk, so there was some correlation between the TUG and Thai-mFAI domain 1. Additionally, there is a possibility that the TUG test evaluation in our study group had some level of ceiling effect due to the relatively good walking ability of the majority of the study population.

The Thai-mFAI was used to study reliability and to assess IADL performance by patients recovering from a stroke. Analyis via Cronbach's alpha coefficient found that the Thai-mFAI questionnaire has excellent internal consistency (Cronbach's α = 0.936), the same as the Lin et al. study (Cronbach's α = 0.99)[20], while the Tse et al. study showed good internal consistency (Cronbach's α = 0.85).[21]

In determining the coefficient of stability using the test-retest method of analyzing the intraclass correlation coefficient (ICC3,1), we found that the Thai-mFAI has excellent test-retest reliability. The ICC3,1 in our study (0.929) was better than the ICC3,1 in the Chinese version-FAI (0.86).[10] Our better result may have been the result of differences in the retest period in the two studies, i.e., Imam et al.[10] conducted the retest 2 weeks after the first test to reduce memory bias, while our retest period was shorter. We defined the retest within 3-7 days after that. The memory carry-over effect may have influenced our findings.

The study has some limitations. First, it was conducted during the COVID-19 pandemic which might have affected outdoor activity and/or social participation. Second, this study focused mainly on the reliability and validity of the Thai-mFAI and did not collect data about depression, which might have affected the IADL of stroke patients. Future studies of IADL should include an evaluation of depression.

Conclusions

The Thai-mFAI was found to have good content validity, fair construct validity, excellent test–retest reliability, and excellent internal consistency. The Thai-mFAI can be used to evaluate how active stroke patients are in being able to do certain activities.

Disclosure

All the authors declare no personal or professional conflicts of interest related to any aspect of this study.

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References

1. Sharma VK. Cerebrovascular Disease. In: Quah SR, editor. International encyclopedia of public health. 2nd ed. Oxford: Academic Press; 2017. p. 455-70.
2. Suwanwela NC. Stroke epidemiology in Thailand. J Stroke. 2014; 16:1-7.
3. Feigin VL, Brainin M, Norrving B, Martins S, Sacco RL, Hacke W, et al. World Stroke Organization (WSO): Global stroke fact sheet 2022. Int J Stroke. 2022;17:18-29.
4. World Stroke Organization: (WSO). Up again after stroke [Internet]. [cited 2024 May 12]. Available from: http://www.worldstrokecampaign.org/
5. Sarker SJ, Rudd AG, Douiri A, Wolfe CD. Comparison of 2 extended activities of daily living scales with the Barthel Index and predictors of their outcomes: cohort study within the South London Stroke Register (SLSR). Stroke. 2012;43:1362-9.
6. Wade DT, Legh-Smith J, Langton Hewer R. Social activities after stroke: measurement and natural history using the Frenchay Activities Index. Int Rehabil Med. 1985;7:176-81.
7. Wu CY, Chuang LL, Lin KC, Horng YS. Responsiveness and validity of two outcome measures of instrumental activities of daily living in stroke survivors receiving rehabilitative therapies. Clin Rehabil. 2011;25:175-83.
8. Holbrook M, Skilbeck CE. An activities index for use with stroke patients. Age Ageing. 1983;12:166-70.
9. Wendel KA, Stahl A, Iwarsson S. Inter-rater agreement of a modified and extended Swedish version of the Frenchay Activities Index (FAI). Eur J Ageing. 2013;10:247-55.
10. Imam B, Miller WC. Reliability and validity of scores of a Chinese version of the Frenchay Activities Index. Arch Phys Med Rehabil. 2012;93:520-6.
11. Beaton DE, Bombardier C, Guillemin F, Ferraz MB. Guidelines for the process of cross-cultural adaptation of self-report measures. Spine (Phila Pa 1976). 2000;25(24):3186-91.
12. Rinthaisong I. Determination of content precision by the content validity index [Internet]. Songkla: Department of public administration, Faculty of management, Prince of Songkla University [Internet]. 2014 [cited 2020 Sep 5]. Available from: https://sites.google.com/site/stats2researchs/student-of-the-month/johndoe
13. Garnjanagoonchorn A, Dajpratham P. Reliability and validity of the Thai version of the stroke impact scale (SIS) 3.0. J Thai Rehabil Med. 2015;25:45-52.
14. Chan PP, Si Tou JI, Tse MM, Ng SS. Reliability and validity of the Timed Up and Go test with a motor task in people with chronic stroke. Arch Phys Med Rehabil. 2017;98:2213-20.
15. Whitney JC, Lord SR, Close JC. Streamlining assessment and intervention in a falls clinic using the Timed Up and Go test and physiological profile assessments. Age Ageing. 2005;34:567-71.
16. Brooks D, Davis AM, Naglie G. Validity of 3 physical performance measures in inpatient geriatric rehabilitation. Arch Phys Med Rehabil. 2006;87:105-10.
17. Colton T. Statistics in medicine. Boston: Little, Brown; 1974.
18. Taber KS. The use of Cronbach's Alpha when developing and reporting research instruments in science education. Research in science education. 2018;48(6):1273-96.
19. Koo TK, Li MY. A guideline of selecting and reporting intraclass correlation coefficients for reliability research. J Chiropr Med. 2016;5:155-63.
20. Lin KC, Chen HF, Wu CY, Yu TY, Ouyang P. Multidimensional Rasch validation of the Frenchay Activities Index in stroke patients receiving rehabilitation. J Rehabil Med. 2012;44:58-64.
21. Tse T, Douglas J, Lentin P, Carey L. Measuring participation after stroke: a review of frequently used tools. Arch Phys Med Rehabil. 2013;94:177-92.

FRENCHAY ACTIVITETS INDEX (FAI) ฉบับขยายความและเพิ่มเติมสเกล	ความถี่				การเปลี่ยนแปลง			สาเหตุ* ↓ / ↑	การช่วยเหลือ				ความพึงพอใจ				
	0	1	2	3	↓ *	→	↑ *	รหัส 1 -5	แบบแตะต้องตัว	แบบไม่แตะต้องตัว	เป็นทางการ	ไม่เป็นทางการ	1	2	3	4	5
1 ประกอบอาหารมื้อหลัก																	
2 ล้างจาน																	
3 ซักผ้า																	
4 งานบ้าน (เบา)																	
5 งานบ้าน (หนัก)																	
6 จับจ่ายซื้อของในละแวกบ้าน																	
7 การร่วมงานสังคม																	
8A เดินเล่นนอกบ้านมากกว่า 15 นาที																	
8B ใช้รถเข็นวีลแชร์นอกบ้านมากกว่า 15 นาที																	
9 ทำงานอดิเรก																	
10A ขับรถยนต์ รถจักรยานยนต์																	
10B เดินทางโดยรถโดยสาร รถไฟ																	
10C ใช้รถจักรยาน จักรยานไฟฟ้า																	
10D ใช้รถเข็นนั่งไฟฟ้า																	
10E โดยสารรถยนต์ส่วนตัว แท็กซี่																	
10F ใช้บริการขนส่งพิเศษ เช่นรถฉุกเฉินรพ.																	
11 เดินทางท่องเที่ยว /เดินทางโดยรถยนต์																	
12 ทำสวน																	
13 ดูแลรักษาเครื่องมือเครื่องใช้ในบ้าน/รถยนต์																	
14 อ่านหนังสือ																	
15 ทำงานที่มีรายได้																	
16 ใช้โทรศัพท์																	

ความพึงพอใจ *: 1 = ไม่พอใจมาก 2 = ไม่พอใจ 3 = เฉยๆ 4 = พอใจ 5 = พอใจมาก*

▽ สำหรับกิจกรรมที่มีความถี่เป็นศูนย์และความพึงพอใจที่ไม่เปลี่ยนแปลงจะไม่ถูกรายงาน

การเปลี่ยนแปลง: ↓ = ความถี่ต่ำลงเมื่อเปรียบเทียบกับช่วงก่อนเป็นโรคหลอดเลือดสมอง

→ = ความถี่ไม่เปลี่ยนแปลงเมื่อเปรียบเทียบกับช่วงก่อนเป็นโรคหลอดเลือดสมอง

↑ = ความถี่มากขึ้นเมื่อเปรียบเทียบกับช่วงก่อนเป็นโรคหลอดเลือดสมอง

ความถี่: ดูคู่มือแนวทางปฏิบัติ

การช่วยเหลือที่เป็นทางการ = เจ้าหน้าที่ ฯลฯ (บริการทางสังคม ฯลฯ)

การช่วยเหลือที่เป็นไม่ทางการ = คู่สมรส ญาติ เพื่อน เพื่อนบ้าน

สาเหตุของการเปลี่ยนแปลง: 1,2,3,4,5 ดู ลิสต์รหัส