Original Research Article

Intra rater reliability and validity of simplified stroke rehabilitation assessment of movement (s-stream) scale on voluntary movement of the limbs and basic mobility in patients with stroke – An observational study

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A R T I C L E   I N F O

A B S T R A C T

Introduction: A stroke is a clinical syndrome characterised by rapidly developing clinical symptoms and / or signs of focal, and at times global, loss of cerebral function, with symptoms lasting more than 24 hours or leading to death, with no apparent cause other than that of vascular origin. Globally, cerebrovascular disease (stroke) is a second leading cause of death. For providing a better management we must evaluate the patient with a good valid and reliable tool. In physiotherapy for evaluating the stroke subjects mobility and functional activity there are many assessment tools are available for assessing Balance, Functional activity, mobility and gait through Berg Balance Scale, Functional Independence Measure, Barthal Index and observational Gait Analysis. Other than these scales, Stroke Rehabilitation Assessment of Movement Scale (STREAM) is one of the good reliable and valuable scale for the assessing of mobility and functional activity in stroke patients .

Aim of the Study: The aim of this study was to evaluate the Intra rater reliability and validity of Simplified-STREAM (S-STREAM) Scale on mobility and functional activity in patients with Stroke.

Materials and Methods: This study was carried out for the period of one year. 100 stroke patients were selected from Neurology ward of Sri Ramakrishna Hospital, Coimbatore who fulfilled the inclusion criteria. Intra rater reliability of S-STREAM was assessed for 1st and 2nd day of consequent 3 weeks. Validity of S-STREAM scale was evaluated by comparing the components of S-STREAM scale's upper and lower limb voluntary movement with Fugl-meyer motor assessment scale components; Mobility component of S-STREAM was compared with Rivermead mobility index scale on first day of assessment.

Data analysis of Intra-rater reliability and validity done with an help of Pearson's correlation coefficient test.

Conclusion: The results of this study shows that the S-STREAM has high Intra rater reliability and validity when compare with the Fugl-meyer and Rivermead mobility index on functional activity and mobility in patients with stroke. Further the S- STREAM scale was efficient to administer, as it consists of only half the number of items in the original STREAM. Therefore the study recommends S-STREAM is a reliable and valid tool for measuring mobility and functional activity in stroke patients.

Results: The result of this analyses shows that S-STREAM scale has high intra-rater reliability and validity when comparing with Fugl-meyer motor assessment and Rivermead mobility index on voluntary movement of the limbs and basic mobility in patients with stroke.

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1. Introduction

A stroke is a clinical syndrome characterised by rapidly developing clinical symptoms and / or signs of focal, and at times global, loss of cerebral function, with symptoms

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lasting more than 24 hours or leading to death, with no apparent cause other than that of vascular origin.

There are different ways of evaluating clinical conditions and interventions. Interviews and clinical observations are two important methods.[1] Testing / measuring function is another method. Ideally, the assessment process involves all three; an interview, where the patient's perceptions of the main problems are at focus, observations of performance, and tests of performance followed by a process of interpreting the information into goals, a treatment plan and continuously evaluate outcome throughout the intervention process.[2]

In physiotherapy for evaluating the stroke subjects voluntary movement of the limbs and basic mobility there are many assessment tools are available for assessing Balance, Functional activity, mobility and gait through Berg Balance Scale, Functional Independence Measure, Barthal Index and observational Gait Analysis.[3,4] Other than these scales, Stroke Rehabilitation Assessment of Movement Scale (STREAM) is one of the good reliable and valuable scale for the assessing of voluntary movement of the limbs and basic mobility in stroke patients.[5–7]

1.1. Objectivesof the study

1. To evaluate the Intra rater reliability of S-STREAM scale on Voluntary movement of the Limbs and basic mobility in patients with stroke.
2. To evaluate the validity of S-STREAM scale's Voluntary movement of the Limbs compared with Fugl-meyer motor assessment scale and the basic mobility of S -STREAM scale compared with Rivermead mobility index in patients with stroke.

2. Materials and Methods

2.1. Study Design

Observational Study

2.2. Study setting

This study was carried out in the Department of Physiotherapy and Neurology ward, Sri Ramakrishna Hospital Coimbatore-44.

2.3. Study duration

This study was carried out for the period of one year.

2.4. Sample size

100 stroke patients

2.5. Criteria for sampling

2.6. Inclusion criteria

1. Age between 55 to 75
2. Both males and females
3. All type of stroke patients

2.7. Exclusion criteria

1. History of previous stroke; uncontrolled hypertension, dementia, other significant movement disorders
2. Development of hemodynamic instability following the stroke
3. Abnormal clinical laboratory values on routine clinical laboratory testing
4. History of drug or alcohol abuse
5. Not understanding the commands

2.8. Procedure

100 patients were selected based upon the inclusion criteria. For intra rater Reliability testing test re-test procedure was carried out. In which 3 session for proceeding weeks were taken.[8–10] The Therapist made a initial assessment on the first day the procedure. The same were carried out on the second day. This was proceeded for 2 more sessions for next two weeks by the same therapist.

The validity of S-STREAM was determined by comparing the S -STREAM scales upper and lower extremity voluntary movement with Fugl meyer motor assessment scales upper and lower extremity voluntary movement and the mobility component of S-STREAM scale was compared with Rivermead mobility index scale. The validity and reliability study assessed at the same day and on the same environment by the same physiotherapist.

2.9. Ethical consideration

The study was conducted after approval from the concerned institution. Assurance was given to the participants regarding the confidentiality.

2.10. Dataanalysis and interpretation

2.11. Dataanalysisforreliability and validity

The reliability and validity of S-STREAM SCALE for 100 Stroke patients were measured using Pearsons correlation coefficient

Pearsons correlation coefficient test:

From the above table the comparison of test (1st) and re-test (2nd) day S-STREAM scale assessment in the 1st week in stroke patients shows similar mean value.

From the above table the comparison of test ($1^{st)}$) and re-test ($2^{nd)}$) day S-STREAM scale assessment in the 2nd week in stroke patients shows similar mean value.

Table 1: Correlations for S-STREAM 1st week assessment descriptive Statistics

	Mean	Std. Deviation	N
W1Test	2.9600	1.51704	100
W1Retest	3.1800	1.67802	100

Correlations

		W1 Test	W1 Retest
	Pearson Correlation	1	.971**
W1 Test	Sig. (2-tailed)		.000
	N	100	100
	Pearson Correlation	.971**	1
W1 Retest	Sig. (2-tailed)	.000	
	N	100	100

**. Correlation is significant at the 0.01 level (2-tailed).

Table 2: Correlations for S-STREAM 2nd week assessment: Descriptive Statistics

	Mean	Std. Deviation	N
W2 Test	5.0200	2.17878	100
W2 Retest	5.7200	2.22057	100

Correlations

		W2Test	W2 Re-test
	Pearson Correlation	1	.978**
W2 Test	Sig. (2-tailed)		.000
	N	100	100
	Pearson Correlation	.978**	1
W2 Retest	Sig. (2-tailed)	.000	
	N	100	100

**. Correlation is significant at the 0.01 level (2-tailed).

Table 3: Correlations of S-stream 3rd week in stroke patients Descriptive Statistics

	Mean	Std. Deviation	N
W3 Test	15.7200	2.94076	100
W3 Retest	16.6200	2.93285	100

Correlations

		W3 Test	W3 Retest
	Pearson Correlation	1	.953**
W3 Test	Sig. (2-tailed)		.000
	N	100	100
	Pearson Correlation	.953**	1
W3 Retest	Sig. (2-tailed)	.000	
	N	100	100

**. Correlation is significant at the 0.01 level (2-tailed).

From the above table the comparison of test (1$^{st)}$ and re-test (2$^{nd)}$ day S-STREAM scale assessment in the 3rd week in stroke patients shows similar mean value.

From the data analysis using Pearson correlation coefficient test, the reliability of S-STREAM scale was evaluated in 100 stroke patients at 1st, 2nd and 3rd week obtained a significant value of 0.9847, 0.98, and 0.97 respectively. Therefore, S-STREAM scale was more reliable to assess stroke patients voluntary movement of the limbs and basic mobility.

Data analysis for S-S tream scale in 100 stroke patients to find the validity

**. Correlation is significant at the 0.01 level (2-tailed).

From the above table the comparison of S-STREAM and RMI scale was assessed in the 1st day of 1st week in stroke patients.

**. Correlation is significant at the 0.01 level (2-tailed).

From the above table the comparison of FM and RMI scale was assessed in the 1st day of 1st week in stroke patients.

Validity assessed for 100 stroke patients using S-STREAM scale, Fugl-meyer motor assessment scale, Rivermaed mobility index on 1st week. From pearson correlation coefficient the standard deviation for s-stream, fugl-meyer motor assessment scale, rivermead mobility

Table 4: 't' -Test Value for comparing 1ST, 2ND, 3rd week S- Stream scale assessment to find the reliability Paired Samples Test

		Paired Differences			95% Confidence Interval of the Difference		t	Df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
1	W1 Test- W1 Retest	-.22000	.41633	.04163	-.30261	-.13739	-5.284	99	.000
2	W2 Test - W2 Retest	-.70000	.46057	.04606	-.79139	-.60861	-15.199	99	.000
3	W3 Test - W3 Retest	-.90000	.90453	.09045	-1.07948	-.72052	-9.950	99	.000

Table 5:

Paired Sampzes Correlations		N	Correlation	Sig.
Pair 1	W1Test & W1Retest	100	.971	.000
Pair 2	W2Test & W2Retest	100	.978	.000
Pair 3	W3Test & W3Retest	100	.953	.000

Table 6:

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	W1Test	2.9600	100	1.51704	.15170
	W1Retest	3.1800	100	1.67802	.16780
Pair 2	W2Test	5.0200	100	2.17878	.21788
	W2Retest	5.7200	100	2.22057	.22206
Pair 3	W3Test	15.7200	100	2.94076	.29408
	W3Retest	16.6200	100	2.93285	.29329

Table 7: Correlations for S- Stream and Fugl-Meyer1 st week assessment: Descriptive Statistics

	Mean	Std. Deviation	N
S-Stream	3.0000	1.53083	100
Fugl-Meyer	12.0200	3.19400	100

Table 8: Correlations

		S-Stream	Fugl-Meyer
S-Stream	Pearson Correlation	1	.942**
	Sig. (2-tailed)		.000
	N	100	100
Fugl-Meyer	Pearson Correlation	.942**	1
	Sig. (2-tailed)	.000	
	N	100	100

Table 9: Correlationsfor S-Stream and RMI 1ST week assessment descriptive statistics

	Mean	Std. Deviation	N
S-STREAM	3.0000	1.53083	100
Rivermead Mobility index	1.5000	1.08711	100

Table 10: Correlations

		S-STREAM	RMI
S-STREAM	Pearson correlation	1	.534**
	Sig. (2-tailed)		.000
	N	100	100
RMI	Pearson Correlation	.534**	1
	Sig. (2-tailed)	.000	
	N	100	100

Table 11: Correlation for RMI and FM for 1 st week assessment Descriptive statistics

	Mean	**Std. Deviation**	**N**
RMI	1.5000	1.08711	100
FM	12.0200	3.19400	100

Table 12: Correlations

		RMI	**FM**
RMI	Pearson Correlation	1	.538**
	Sig. (2-tailed)		.000
	N	100	100
FM	Pearson Correlation	.538**	1
	Sig. (2-tailed)	.000	
	N	100	100

index was 1.5308, 3.1940, 1.087.

3. Conclusion

Many assessment tools available for evaluating voluntary movement of the limbs and basic mobility in patients with stroke, among that one of the gold standard scale is Stroke Rehabilitation Assessment of movement (STREAM).[11]

The results of this study shows that the S-STREAM has high Intra rater reliability and validity when compare with the Fugl-meyer and Rivermead mobility index on voluntary movement of the limbs and basic mobility in patients with stroke.

Further the S-STREAM scale has efficient to administer, as it consists of only half the number of items in the original STREAM.

Therefore this study recommends that S-STREAM is a highly reliable and valid tool for measuring voluntary movement of the limbs and basic mobility in patients with stroke.

4. Source of Funding

5. Interest of Conflict

None.

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