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Research article

Measurement of self-report scale (SRS) for assessing activity participation to home-based exercise regime among stroke survivors

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ABSTRACT

Stroke survivors are often deconditioned and prone to a sedentary lifestyle, which limits everyday activities. In discharge patients' home-rehabilitation is crucial for reaching full functional abilities, and its cost-effective services can also alleviate anxiety among patients and caregivers. Therefore, self-report scale (SRS) is designed to assess the activity participation to prescribed home-based exercise regime among Stroke Survivors. After satisfying the inclusion criteria and informed consent, a total of 30 patients who are going to discharge from the hospital were randomly divided into Group A (control) and Group B (experimental). Group A (n=15) receives explicit verbal instruction and demonstration of the prescribed home exercises, while group B receives an exercise brochure containing descriptions and pictorial illustrations of the above exercises. Both groups were asked to fill a self-report scale under the direct supervision of the caregiver. The baseline demographic characteristics passed the normality test (W). The mean of the patient self-report scale of Group A is 188.75±21.89, and that of Group B is 222±24.73 with a "t" value (-2.07) and p-value 0.046, the test is significant at $p<0.05$. The participation rate of Group B (78.93%) indicates a significant increase in activity participation as compared to Group A. It is concluded from the above study that self-report scale (SRS) assesses the participation levels to the prescribed home-based exercise regime among stroke survivors.

Keywords: Stroke survivors, home-based exercises, self-report scale, activity participation.

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INTRODUCTION

WHO defines stroke as a rapidly acquired clinical symptom of focal (or global) disturbance of cerebral function, lasting longer than 24 hours or resulting in death, with no apparent cause other than a vascular origin? Stroke is the third most common cause of mortality and one of the primary causes of long-term disability [1]. It is detected that approximately 20 million people each year suffer from stroke, and about 5 million will not survive. The Indian council of medical research (2004) report reveals that stroke contributes to about 41% of deaths and 72% of disability amongst the non-communicable diseases in India [2].

Increasing life expectancy and risk exposure is associated with an increase in the prevalence of stroke and disability among survivors, with significant socioeconomic consequences for patients, caregivers, and healthcare systems [3]. Stroke survivors are often deconditioned and prone to a sedentary lifestyle, limiting their everyday activities and increasing the risk of cardiovascular disease. Due to advances in science and medical technology, patient hospitalizations have been decreased from weeks to days, but the raised expenses induce anxiety among the patients and caregivers [4].

Inpatient rehabilitation can help patients restore their functional abilities, mobility, and strength; though this recovery is rarely complete by the time they leave the hospital rehabilitation program. Even though the Patient has been discharged from the hospital, a home-based rehabilitation program is crucial for reaching their functional abilities. Its cost-effective services can also alleviate anxiety in patients and caregivers [5].

Patients who participate to the prescribed home-based exercises are less likely to progress to recurrent, persistent, or disabling problems. Activity participation is defined as the extent to which the patients followed home-based components of their physical therapy interventions [6]. The participation to prescribed exercise must be precisely measured. There are many ways to assess participation levels among patients to prescribed exercises at home [7]. It is an essential factor in the effectiveness of exercise-based rehabilitation. Therefore, the aim is to optimize stroke survivor's activity level after stroke through well-designed therapeutic exercises. Non-participation

to home exercise programs raises the likelihood of recurrent injury with long-term outcomes and may lead the physiotherapist to believe that their current treatment is inadequate [8,9]. To find out the maximum participation, a prescribed home-based exercise is needed. However, it appears that there is a shortage of reliable, validated tools for assessing self-reported activity participation to prescribed home-based regime [4]. Finding a way to know what patients are doing and how much they are doing is essential and self-reporting is one technique that can be used. Therefore a 5-point Likert self-report scale (SRS) is designed to measure the activity participation levels to home-based exercise regime among stroke survivors.

MATERIAL AND METHOD

Subject recruitment

The study was conducted at the Department of Neurology and Rehabilitation at Uttar Pradesh University of Medical Sciences, Saifai; Etawah, India. Patient with 30-60 years of age with confirmed diagnosis of Stroke until 6-month time period, who can read, understand, reply to commands, can do exercise independently, and those who have a caregiver present for a physiotherapy session are included whereas flaccid patients, or patients with Bedsores of Grade 3 and above, with Psychosocial impairments, or with other physical impairments before the stroke like fractures/ subluxation, stable vital parameters, or who previously suffered from stroke, and visually impaired patients were excluded from the study.

Procedure

After satisfying the inclusion criteria and informed consent, a total of 30 patients who are going to discharge from the hospital were randomly divided into Group A control (n=15) and Group B experimental (n=15). Group A (n=15) patients and caregivers were motivated and counseled about the importance of exercise and its consequences, in order to motivate them to participate in the study regime. They were instructed verbally in front of caregiver to carefully perform the 15 sets of exercises at home (Table 1) for 1 hour/ 4 repetitions/ exercise for 30 days. If any exercise demonstrations were not understood, they were repeated. Patients and caregivers in group B (n=15) were demonstrated the above same, in addition they were also given an exercise brochure containing the same 15 sets of exercises, each with a clear description of the exercises with a number of repetitions. The brochure is written in a simple, easily understandable English and Hindi language and includes high-definition pictures of all exercises for clarity, to motivate patients to engage in an exercise session. These exercises are performed at home for one hour per day with four repetitions per exercise for a period of 30 days. Both groups receive a self-report scale to measure the level of activity participation and the reason of non-participation under the direct supervision of caretaker. Additionally, the caretaker is tasked with ensuring that the patient is performing the exercises correctly. (Table-1) Patients were followed up after 30 days by sending text and by reminding telephonically. Once the patient visited for follow-up, the self-report scale is checked for activity participation levels.

Table 1: Description to Home-based Exercise Regime

Standard 15 Set of Exercises	Description of Exercise	Effects/Benefits
Group	Both groups receive the same set of exercises with different methodology. Group A (Verbal instructions) and Group B (Exercise brochure)	
No of Repetitions with duration	4 times per exercise for 1 hour for 30 days.	
Home-based Exercise Regime (15 sets of exercises)		
Towel slide.	Keep a bedside table or sit comfortably in a chair. (As a matter of convenience) Place the affected hand on the folded towel kept on the table. Now apply pressure to the affected hand from the unaffected hand. Now slide the towel up and down in a downward and upward motion and repeat.	It helps stretch the non-functioning hand, strengthen the shoulder muscles, and improve the range of motion.
Shoulder shrug.	Stand in front of a mirror with the caretaker standing beside you. Roll both the shoulder up and back such that both the shoulder blade meets together and repeat.	It strengthens the shoulder girdle muscles and improves the range of motion.
External rotation with cane.	Stand in front of a mirror with the caretaker standing beside. With the help of lightweight bar/umbrella or rod (according to availability). Hold it from both hands. Lift the shoulder to 90 degrees. Now move the shoulder left and right. Repeat this technique	It will improve your ability to perform external rotations with the shoulders, which are required for a significant number of everyday tasks.
Reach out.	Sit on a chair /or bed with legs hanging (according to convenience) facing the wall. Mark 4 circles/or stars with a distance of 5cm (target points) on the wall with the help of a marker or pen. Clasp both the hand and touch all the target points placed on the walls and repeat.	It will strengthen the spinal muscles, stretching, and coordination of the upper extremity.
Weight bearing exercises U/L.	Sit on the bed with legs hanging. The caretaker must have one hand on the Patient's legs and the other on the elbow for stabilization. Put the affected hand and arm extended on the table and move shoulder to 40 degrees. Now put the entire weight of the body onto the shoulder. A feeling of mild stretch during the maneuver is correct. Hold this position for 10-seconds* and repeat.	These are mutually reinforcing movements that minimizes in frequency as the mobility improves. It can aid in the treatment and prevention of painful conditions. It also assists patients in regaining their ability to perform the upper extremity activities such as grasping power while taking into account their shoulder subluxation and shoulder joint positions.
Hip Abduction in Standing	Stand while holding a chair or any hard-heightened surface. Keep the back straight. Lift the affected leg away and out from the body as far as you can. Hold this position for 10 seconds*and repeat.	It helps in strengthening the weak adductors, coordination, and balancing
Weight bearing exercises in LL (Hip flexion).	Stand on a stable surface. Keep the back straight. Transfer the body weight on the affected leg. Now Lift the unaffected leg forward and upward towards the	It helps in strengthening the weak hip extensors, coordination, and balancing

	body. Hold this position for 10 seconds*and repeat.	
Weight bearing exercises in LL (knee flexion).	Stand on a stable surface while holding a chair or any hard-heightened surface. Keep the back straight. Transfer the body weight to the affected leg. Bent the leg and knees and moved backward and upward till the last limit. Hold it for 10 Seconds* and repeat.	It helps in strengthening the weak knee extensors, coordination, and balancing
Lying terminal extension.	Lie on the back. Place a rolled/or twisted towel under the knees. Now Lift the affected foot off the mat and straighten the knees. Hold it for 10 seconds*. Next Lower the foot back down to the starting position and repeat.	It maintains the spinal curvature, strengthening the knees, thigh muscles, and lower back for coordination and balance
Supine bridging B/L.	Lie on the back. Bend both knees. Caretakers will hold both the knees in position and then command to lift the waist as much as possible. Hold this position for 10seconds*. Next, lower the waist down and repeat.	It helps in strengthening the core back muscles and help in coordination, balance and postural control.
Heel lifts.	Sit comfortably on a chair or a short-heightened bed. (According to the convenience). Ensure that the feet should touch the ground. Press both the toes on the ground and raise the heel upward and downward, and repeat	It helps build up strong neural connections to restore balance.
Toe lifts.	Sit comfortably on a chair or a short-heightened bed. (According to the convenience). Ensure that the feet should touch the ground. Press both the heels on the ground and raise the toes upward and downward and repeat.	It helps build up strong neural connections to restore balance.
Sitting knee extension.	Sit comfortably on a chair. The caregiver or the Patient must stabilize both knees. Slowly move the affected leg forward and upward. Ensure that both the knees are pressed by the Patient's hand or by the caregiver to avoid the unnecessary movement of the thigh while moving the leg. Hold this position for 10 seconds*and repeat.	It can help to improve the gait, pattern of walking, and balance. It can also help to reduce the risk of falling, which is a priority for stroke patients.
Hip extension.	Stand while taking the help of a chair or any heightened stable surface. Move the affected leg backward and upward till the last limit. Ensure that the knee must be straight while performing the exercise and repeat.	It helps in strengthening the flexors muscles. It will help in moving up and down the stairs.
Toe standing	Stand while holding any stable surface. Raise both the heels upward while standing on the toes. Hold this position for 10 seconds*. Then move it down and repeat.	It helps build up strong neural connections to restore balance and coordination.

*10-seconds = 10 seconds means count one breath as one second, 2nd breath as the second, similarly count it till 10 seconds.

OUTCOME MEASUREMENT

Self-Report Scale (SRS)

A self-report scale is a 5-point Likert scale designed to evaluate the patient's activity participation level to a prescribed home-based exercise regimen under the direct supervision of the Caretaker/or patient attendant. The measurement area encompasses motivation and levels of activity participation. The scale is administered using a pen/pencil and the time required to record is one hour from the beginning of the session to the end. It contains specific dates and days for daily recording of the prescribed exercises. Moreover, there were specific columns for the time the exercises were started and ended to record the time it took to complete the home exercise program by the patient and the reasons for non-participation. The exercises must be completed and carefully filled out at home, under the direct supervision of the caretaker.

Measurement of Activity Participation

The self-report scale (SRS) is a patient/or caregiver self-evaluated scale used to measure activity participation to a prescribed home-based exercise regime. It quantitatively measures the participation to the prescribed home-based exercises by rubrics per Number of exercises. The caregiver/or patient has to tick mark the Number of exercises performed each day carefully. If the patient did not perform any exercise on that day, the score will be zero and is considered none. Similarly, if a patient out of 15 exercises performed from 1 to 4, they will tick on score 2 and is considered fair. Correspondingly, if perform exercises between 5 to 9, then the score will be 3 and is considered good Likewise, if perform between 10 to 14, then the score will be 4 and is considered V-Good.

If they perform all 15 sets of exercises, the score will be 5 and is considered excellent. It has a total score of 5 for 15 exercises to be completed per day. The study assessed the patient for 30 days, thus making a total score of 150. To check the activity participation level to the prescribed exercises, the formula used as: Sum of Number of Exercises Performed / Sum of Number of Exercises Prescribed * 100 [10-13].

STATISTICAL SIGNIFICANCE

This study is intended to determine the accuracy of the self-report scale (SRS) on activity participation levels to prescribed home-based exercise regime among stroke survivors. The baseline demographic data were analyzed using the Non-parametric Man Whitney U test. It tests whether a random sample comes from the normal distribution or not. The test scores of the self-report scale were expressed as a mean. They were statistically analyzed using an unpaired t-test to accurately determine the statistical difference among the group at a 95% confidence level ($P<0.05$). The data was analyzed using SPSS 14.0 version.

RESULT

To analyze the accuracy of the self-report scale on participation level to home-based exercises regime among stroke survivors, the age groups were expressed as median with Group-A 55 (IQR= 10) and Group-B 55 (IQR=15). The study population comprises 16 (53.3%) males and 14(46.6%) females. (Figure 1) The baseline demographic characteristic follows the normal distribution at more than 5% level of significance (Table 2) In Group A, 9(60%) ischemic stroke patients and 6(40%) hemorrhagic stroke patients are seen, whereas, in Group B, 11 (73%) ischemic stroke patients and 4 (26%) hemorrhagic stroke patients are seen. (Figure 2) In group A, 10

stroke patients (66.6 %) were primarily impacted on the right side, whereas 5 (53.3 %) were affected on the left side. The mean of the patient self-report scale of Group A is 188.75±21.89, and that of Group B is 222±24.73 with a "t" value (-2.07) and p-value 0.046, the test is significant at p<0.05. (Figure 3) Activity participation was found to be 67.11% in Group A and 78.93% in Group B. (Figure 4)

Table 2: Baseline Demographic Characteristics of Sample Population

Characteristics	Group A (n=15)	Group B (n=15)	P Value
Age (Years)*	x̃=55 (IQR-10)	x̃=55 (IQR-15)	0.55
Gender (M: F) *	8(53):7(47) 0.46±0.51	8(53):7(47) 0.46±0.51	0.98
Type (I:H) *	9(60):6(40) 0.4±0.50	12(80):3(20) 0.06±0.25	0.12
Affection Side* (L: R)	5(33):10(66) 0.66±0.48	8(53):7(47) 0.46±0.51	0.28
Time of onset till discharge in days	234 18.8±10.28	231 24.9±26.6	0.96

**Median; M: F= Male: Female; I: H= Ischemic: Hemorrhagic; L: R= Left: Right*

Table 3: Comparison and Proportion of Activity Participation Levels among Groups

Groups	Comparison of Self Report Scale (SRS)	Proportion of Activity Participation Level	t value	P value	Significance
Group A	188.75±100	67.11%	-2.07	0.046	P<0.05
Group B	222±122	78.93%			

Figure 1: Male Female Ratio in Both Groups

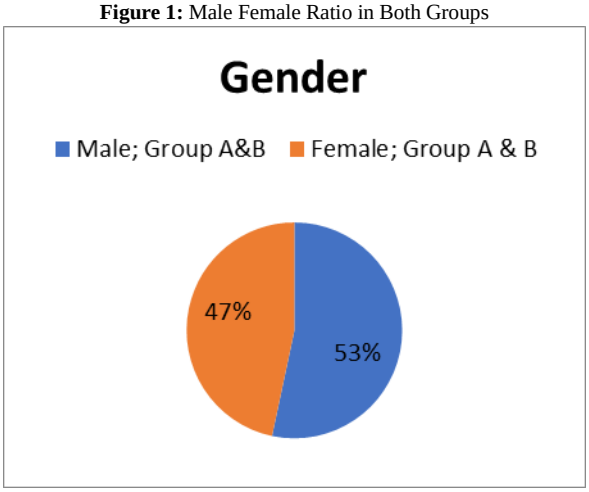


Figure 2: Figure Depicting Type of Stroke among Groups

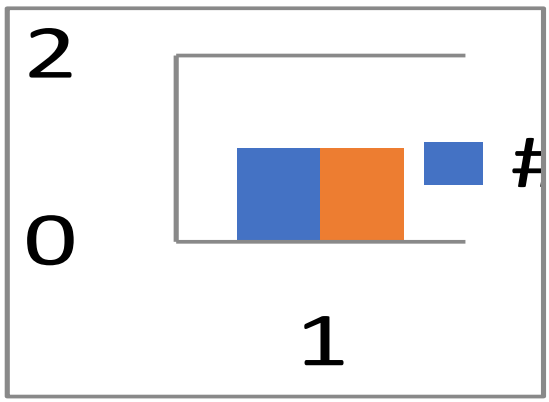


Figure 3: Figure Depicting Comparison of Activity Participation levels among Groups at 5% Level of Significance

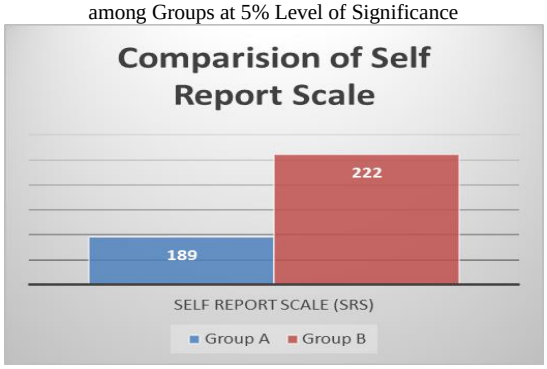
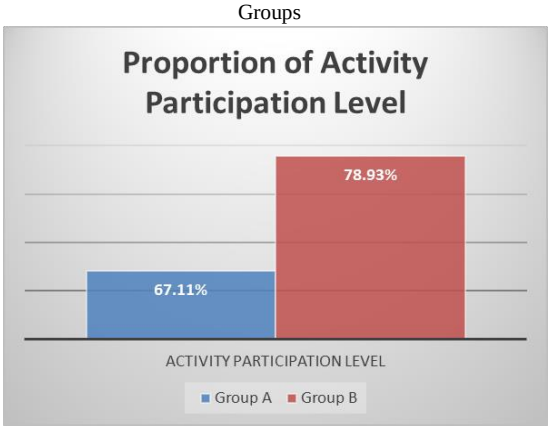


Figure 4: Figure Depicting Proportion of Activity Participation level among Groups



DISCUSSION

The purpose of this study is to identify whether the Self-report scale can measure activity participation to prescribed home-based exercise regime among stroke survivors. The self-report scale can assess participation to home prescribed exercises among stroke survivors. Activity participation refers to the participation of the patients in the exercises prescribed to them at home. It is found that Group A shows less participation in exercises as compared to Group B.

One author reviewed that stroke survivors, despite individual comorbidities and deficit functional status, could benefit from being directed to partake in regular physical activity [14]. The author reported distinctive aspects related to participation in activities, including high self-efficacy in exercises, family and social support, proper guidance and counselling, and motivation [6]. According to Bachmann C and colleagues physiotherapists should guide the patients thoroughly and recommend their family members to provide proper family and social support while exercising [10]. Similarly, Sevilla MEG and colleagues in 1995 found that social support appeared to be the main determinant of medication adherence. For proper rehabilitation, family and social support are important. The caregivers should also participate in rehabilitation processes to encourage and motivate the patients; however, support should not be so rigid that it will have the opposite impact [15]. In our study, Group B showed a greater participation to the prescribed (78.93%) home-based exercises which is similar to the study done by

many authors. [16-18] Kolt and colleague in the year 2003 recorded patient participation to prescribed exercises above 60% [19]. Non-participation can negatively affect treatment efficacy and efficiency, therapeutic relationships, long waits, and care costs [20]. There are many factors for non-participation like forgetfulness, high cost of treatment, low self-efficacy [10, 21]. In our study, we highlight the observation of the caretaker throughout the exercise program to motivate, counsel regarding the low cost of home-based exercises to the patient and remind him of their everyday activity. There are various methods of assessing participation to the prescribed home-based exercise-based regime.

The most common participation measures were the proportion of participants completing the prescribed exercise programs (65-86%), the proportion of available sessions attended (58-77%), and the average number of home exercises completed per week (range 1.5 to 3 times per week) [22]. In our study, it is found that the documented exercises with pictorial illustrations make the person more enthusiastic about participating in the study as compared to group A, which is also explained in the study done by Medina and Brewer [23-24] that only prescribed exercises could influence the patient's participation to home-based exercises. The self-report Scale is the most advanced scale in the field. There are many alternative methods of assessing participation to the activities, including attendance at appointments [25]. Similarly stroke survivor's participation to prescribed home exercise can also be analyzed with the self-reported Bassett SF 5-point Likert scale in which the average score for each week is the total number of all participants divided by the total number of participants [6].

Another measure for evaluating participation levels is through the Sports Injury Rehabilitation Adherence Scale (SIRAS) with three items on an incremental 5-point scale throughout the class sessions in which the caretaker evaluated the exercise intensity of the participants, their ability to follow the instructions and their sensitivity to programme changes during the meeting [26]. In addition, participation to the clinic and home-based exercise programme were measured using diary in which patients voluntarily participate to the prescribed exercises due to interactive written communication. The proportion of activity participation levels to the prescribed exercise is recorded using a self-report scale. The patient is asked to fill and tick all the details in the diary and self-report scale and come for follow up with both the tools [8]. Another study conducted to measure participation levels to exercise for chronic musculoskeletal pain in adults for three months and found three experiments evaluating different types of exercise showed positive results, demonstrating that type of exercise does not affect participation. Six trials examined supervised exercise sessions, repetition sessions, and audio or videotapes of the exercises to be done at home. The treatments were performed in five of the trials. Four trials looked at specific exercise participation strategies, three of which were successful. Six of eight studies on self-management programmes boosted participation levels. In one trial, graded activity outperformed conventional care in increasing exercise participation levels. Cognitive Behavioural therapy helped individuals with whiplash-associated disorders but not those with other CMP. In trials showing a favorable effect on activity participation, the link between clinical outcomes and exercise participation was ambiguous [27].

CONCLUSIONS

Our study concluded that the self-report scale (SRS) could measure the activity participation levels to the prescribed home-based exercises among stroke survivors. It is considered a safe and viable option for the home-based patient's optimal recovery program. This scale will be beneficial if used under the direct supervision of the caregiver. It is recommended that before Discharge from the hospital, the patient and their caretaker must be counseled and guide thoroughly regarding the importance of home-based exercises, their low-cost services, and if undone, can lead to serious long-term complications. Patients should therefore advise to take their home-based therapy carefully and consequently generate sufficient time for it. This can be done by providing adequate health education on how participation to home exercise could lead to the most optimal functional recovery. The possibility of inaccurate reminders, patient unavailability during follow-up are its limitations. Still, this drawback is yet balanced by convenience and ease of use of scale as compared to the other records like a diary and attendance records.

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DECLARATIONS

Conflict of Interest: Nil

Ethical approval

University ethical committee of Uttar Pradesh University of Medial Sciences Saifai, Etawah has approved the study with ethical number 95/2018.

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