

Stroke Rehabilitation and Fall Incidences in Rural Areas: A Survey

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ABSTRACT

Stroke is the leading cause of disability morbidity and mortality in the world. Stroke patients suffer from spasticity, balance issues and other higher mental issues. Stroke patients are prone to falls and fall related injuries during their recovery period. Rehabilitation for such patients may be a challenge in country like India due to their unawareness about importance of physiotherapy, economical status and unavailability of proper rehabilitation centers. Survey was done for the same.

Method: 352 patients were asked about their rehabilitation and fall incidents during their first 6 months after stroke via telephone interview.

Result: 42.61% (150) participants agreed that proper stroke rehabilitation is necessary after the incident of stroke, and only 17.05% (60) participants received the proper rehabilitation. Among Participants who did not receive rehabilitation (292), fell significantly higher than those who received the rehabilitation (60) during the first 6 months from the onset of stroke. Among all fallers 24.09 % reported serious injuries which required medical attention including fractures.

Conclusion: Stroke Rehabilitation is inadequate in rural areas due to variety of reasons, which may lead to increase in number of falls and fall related injuries

Key words: Stroke, Rehabilitation, fall incidences, balance, cognition

INTRODUCTION

According to WHO, Stroke is rapidly developing clinical signs of focal (or global) disturbance of cerebral function with symptoms lasting 24 hours or longer or leading to death, with no apparent cause other than of vascular origin.

The annual stroke incidence rate was slightly higher in the rural population than in the urban hyperlipidemia population (crude incidence rate, 116/100,000 person-years for the urban population versus 119/100,000 person-years for the rural population; age-standardized incidence rate, 135/100,000 person-years for the urban population versus 138/100,000 person-years for the rural population). It also showed that the number of smokers (men) and presence of multiple risk factors (more than 3) were

significantly more in the rural population than in the urban population. Also the distribution of conventional stroke risk factors was remarkably similar among the urban and rural communities. However, the number of stroke patients who had imaging was significantly low in the rural population. Studies from India on cardiovascular risk factors have shown a 2 to 3 time's high prevalence of hypertension, obesity, diabetes mellitus, and smoking (in men) in urban areas compared to rural communities.¹

Falls are found common among post stroke patients, stroke survivors having an estimated 14% risk of falling in the first month.² Apart from injuries, those who all experience activity limitation, increase dependence, and fear of falling.³ These

barriers will limit social and community participation and quality of life may be compromised.⁴Overcoming these are challenging, as patients require significant cognitive and emotional adjustment to successfully adopt coping strategies. It is thus important to develop effective interventions to reduce risks of a post-stroke fall.⁵

It has been observed that stroke survivors in rural areas in India are not taking adequate stroke rehabilitation. This survey may give insight about probable reasons, fall incidents after stroke among non rehabilitating stroke survivors.

MATERIALS AND METHODS

352 Stroke patients who are subacute and chronic (more than 6 months of stroke and less than 1.5 years of stroke) were selected for the telephonic interview from the rural areas surrounding of Rajkot. Telephonic interview have been done for them retrospective (participants were asked to answer the questions about their 1st month post stroke to 6 months post stroke)

Participants were selected on the basis of inclusion and exclusion criteria as mentioned below.

Inclusion criteria

- Age above 40 years
- With ability to walk at least 8 meter (with assistive device if required)

Exclusion criteria

- Major musculoskeletal problems
- Neurological disorder in addition to stroke.
- More than 1 attack of stroke

Design of survey

Survey was designed to gain the information about the following things

among stroke patients who are living in rural areas.

- Awareness about rehabilitation following stroke
- Availability of Rehabilitation center in nearby area
- Fall incidents after stroke.
- Type of activity during the incident of fall/s

Following questions have been asked to participants:

- Do you feel stroke rehabilitation is necessary for 6-8 months after the onset of stroke, even if you are walking by your own or with an assistive device?
- Is there a proper rehabilitation set up in your nearby area (upto 20 kms)?
- Did you receive regular rehabilitation (min 3 days a week upto 4 months from onset of stroke) at home or at a rehabilitation center by a physiotherapist?
- If yes, Did you receive Balance training in your rehabilitation program?
- Did you receive Cognitive training in your rehabilitation program?
- Were you using any assistive device for walking during the first 6 months?
- Have you experienced any fall incidents during the first 6 months?
- If yes, how many?
- If yes, did you had any complications which required medical attention?
- Describe the activity you were doing during your fall incidences (for each fall)

Statistical analysis

Participant's data were converted in percentage. Chi square test was used to compare the number of falls in between the group.

RESULTS

Table: 1. Result summary

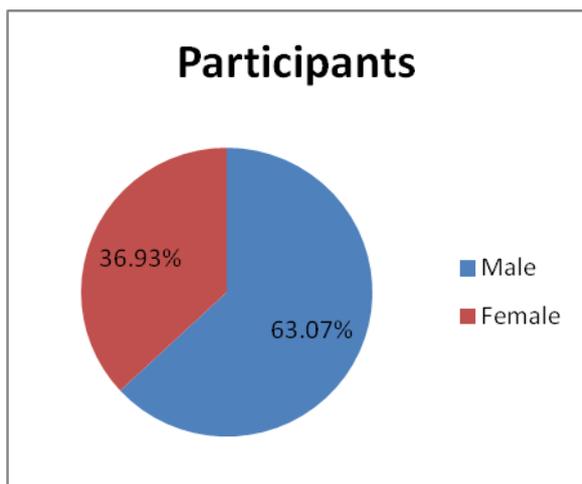
Number of participants (352)	Male 222 (63.07%)	Female 130 (36.93%)
Participants view on receiving proper stroke rehabilitation after stroke	Yes it is necessary 150 (42.61%)	Not necessary/ not sure 202 (57.39%)
Participants who received/ not received Rehabilitation during first 6 months	Received 60 (17.05%)	Not Received 292 (82.95%)

Table 1 Continued...

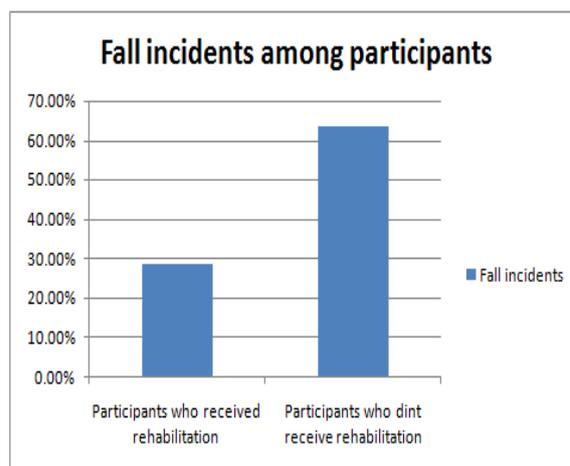
Reasons for not taking Rehabilitation (292)	Lack of awareness 34.59% (101), Financial problems 41.09% (120), Unavailability of rehabilitation center in nearby area 24.32% (71).	
Participants and Balance Training during first 6 months (Among rehabilitation received participants)	Received 20 (33.33%)	Not Received 40 (66.66%)
Participants and Cognitive Training during first 6 months (Among rehabilitation received participants)	Received 05 (8.33%)	Not Received 55 (91.67%)
Participants and assistive device for ambulation	Used 198 (56.25%)	Did not use 154 (43.75%)
Fall incidents among non rehabilitation people during first 6 months (292)	Did not fall 149 (51%) 1 Fall 105 (36%) More than 1 Fall 38 (13%)	
Fall incidents among rehabilitation people during first 6 months (60)	Did not fall 37 (61.67%) 1 fall 18 (30%) More than 1 fall 5 (8.33%)	
Serious injuries (like fractures) reported among fallers (166)	Yes reported 40 (24.09%)	Not reported 126 (75.91%)
Activities participants were attempting while falling (166)	Transfer activities 60 (36.14%) Crossing over obstacles 37(22.29%) Slippery surfaces like bathroom 43 (25.90%) Others 26 (15.66%)	

Table 2. Chi Square test analysis

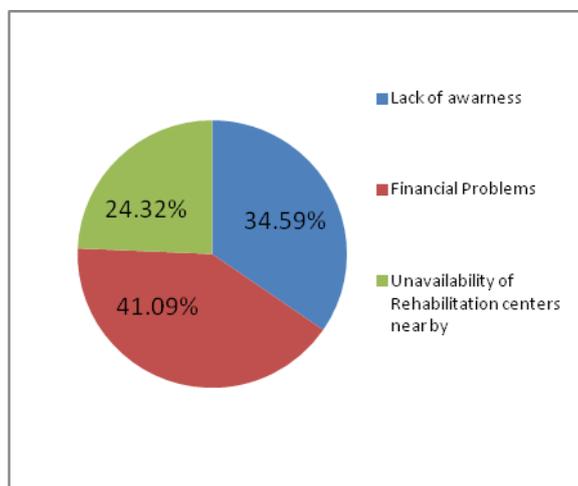
	Non Rehab Group N=(292)	Rehab Group N=(60)	Chi Square value with df 1	Level of significance
Did not fall	149/292 (51%)	37/60 (61.67%)	2.254	P=0.1332 (P<0.5)
1 fall	105/292 (36%)	18/60 (30%)	0.775	P=0.3786 (P<0.5)
More than 1 Fall	38/292 (13%)	5/60 (8.33%)	1.104	P=0.3140 (P<0.5)



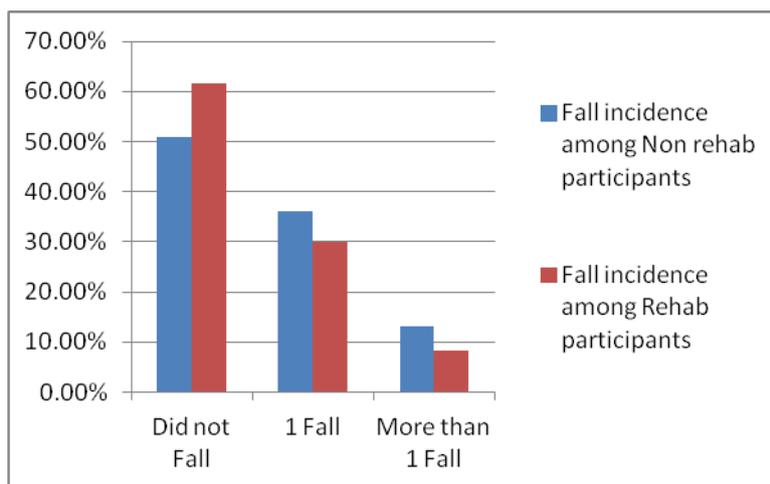
Graph 1: Gender distribution of Participants



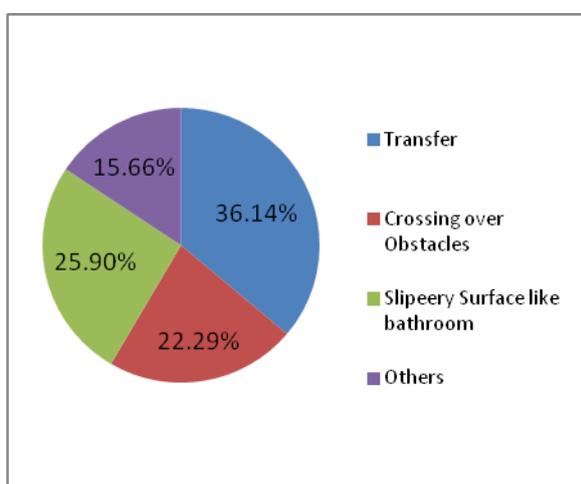
Graph 2: Fall incidents among participants who received Rehabilitation and who did not receive rehabilitation



Graph 3: Reasons for not taking Rehabilitation in rural areas



Graph 4: Fall incidents among participants who took rehabilitation and who did not take rehabilitation



Graph 5: Activities during which participants experienced fall incidents

Total 352 participants took part in the survey via telephonic interview. 63.07% (222) were male participants, while 36.93% (130) were female participants.

42.61% (150) participants agreed that proper stroke rehabilitation is necessary after the incident of stroke, while 57.39% (202) participants were not sure or did not agree about the importance of rehabilitation after stroke.

Out of all participants only 17.05% (60) participants received the proper rehabilitation (Minimum 3 days/ week upto minimum of 4 months/ 48 days in first 6 months), while 82.95% (292) did not receive the rehabilitation program.

Reasons for not taking rehabilitation were lack of awareness 34.59% (101), financial problems 41.09% (120), no nearby rehabilitation center 24.32% (71). Among patients who received Rehabilitation

(60), 66.66% (37) did not receive balance training and 91.67% (55) did not receive cognitive training. Among Participants who did not receive rehabilitation (292), 51% (149) patients did not fall at all, 36% (105) patients fell once and 13% (38) patients fell more than once during the first 6 months from the onset of stroke. Among Participants who received rehabilitation (60), 61.67% (37) patients did not fall at all, 30% (23) patients fell once and 8.33% (5) patients fell more than once during the first 6 months from the onset of stroke.

Chi square test was used to compare the number of falls between the groups. There was a statistical significant difference in number of falls between those who took rehabilitation and those who did not take rehabilitation.

Among all fallers 24.09% reported serious injuries which required medical attention including fractures. Among all fallers 36.14% fell during transfer activity, 22.29% fell during crossing an obstacle, 25.90% fell due to slippery surfaces while 15.66% reported other reasons.

DISCUSSION

The aim of this survey was to check that about how many % of stroke survivors received adequate rehabilitation. What was the primary reason for not taking the rehabilitation? Effect of rehabilitation on number fall incidents in first 6 months.

It has been observed that in rural areas, stroke survivors do not take adequate

rehabilitation due to multiple personal and availability of related infrastructure related reasons. Post stroke patients are prone to falls and fall related injuries. Results show that most of the stroke survivors are skipping the adequate rehabilitation. And such patients have tendency to fall more and get more fall related injuries compare to patients who received stroke rehabilitation. Transfer activities, crossing over obstacles and slippery surfaces are three primary reasons for falls. Among all fall incidents about one quarter reported serious injuries which requires due medical attention including fracture

The poor people are increasingly affected by stroke, because of both the changing population exposures to risk factors and, most tragically, not being able to afford the high cost for stroke care. Majority of stroke survivors continue to live with disabilities, and the costs of on-going rehabilitation and long term-care are largely undertaken by family members, which impoverish their families.^{6,7} our study also supports their statement that financial problems remain number one for taking the adequate rehabilitations.

Major risk factors for falls among community stroke survivors have been identified and in descending order of risk are: impaired mobility, reduced balance, use of psychotropic medications, disability in self-care, depression, cognitive impairment and a history of falls.⁸ if such risk factors are modified through proper rehabilitation fall incidents can be prevented at large. Possibly this is the reason we see significant difference in fall incidences in our study between those who received rehabilitation and those who dint receive rehabilitation. However, among those who received rehabilitation among patients, 66.66% (40) did not receive balance training and 91.67% (55) did not receive cognitive training. Perhaps being important risk factors were not modified even in rehabilitation groups may leads to more number of falls.

Limitations of study

Types of stroke and comorbid factors were not asked as there were chances of false information from the participants. Survey type was subjective hence information regarding past history about any other neurological disorder, number of falls may not be accurate.

We were not able to exclude Stroke participants with cerebellar lesions and perceptual disorders during telephonic interviews which can affect the study outcome.

Factors like age hemiosteoporosis related to falls were not included in the study.

Further recommendations

Appropriate solution may be found by applying routing home exercise program with regular routing monthly or weekly follow up. Such protocol may be made and checked.

Further large cross sectional studies are recommended in rural areas of India to get more accurate data.

CONCLUSION

Most of the post stroke patients do not think that post stroke rehabilitation is necessary. Only about 17.05% patients (post stroke) are receiving proper rehabilitation in rural areas. Financial reasons are the primary reason for not taking proper rehabilitation followed by the lack of awareness and unavailability of rehabilitation centers in nearby areas. Though balance and cognitive training is an integral part of rehabilitation it is usually ignored during the first 4-6 months in the rehabilitation center.

Fall incidents are more common in patients who don't take rehabilitation compared to who take rehabilitation. About one quarter of patients may report serious injuries after fall incidents post stroke in the first 6 months. Transfer activity is more vulnerable for stroke patients in terms of fall and fall related injuries followed by crossing

an obstacle and walking over slippery surfaces.

People should be made aware about the importance of stroke rehabilitation. They should be further aware that they are more likely to fall and get fall related fatal injuries compared to healthy individuals of same age and gender. More rehabilitation centers can be generated in rural areas. Balance and cognitive training can be added in a routine rehabilitation program. To prevent fall incidents proper home modification can be done like removing obstacles, facilitation transfer activity and modification in surface area of washroom/ bathrooms.

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