



## EFFECT OF THE SIDE OF HEMISPHERIC LESION ON SEVERITY OF FATIGUE IN PATIENTS WITH STROKE

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### ABSTRACT

**Objective:** To evaluate the extent of severity of fatigue during sub-acute stage of stroke in outpatients having right or left side hemispheric lesion using Fatigue Severity Scale (FSS).

**Design:** Qualitative study.

**Setting:** Hakeem Abdul Hamid Centenary hospital, HIMSR, New Delhi, India.

**Subjects:** A total of 50 out-patients post stroke in sub-acute stage, comprising both male and female were included in the study. The MMSE  $\geq$  24 with no prior history of stroke or any other neurological disorder.

**Intervention:** Fatigue severity scale (FSS) scored the extent of fatigue experienced by the patients post stroke during the sub acute stage.

**Results:** The scores of the FSS in Left side hemispheric patients is (6.0+/- 1.20) and the patients with Right side hemispheric lesion is found to be(3.83+/- 1.83) with p value = 0.000. Left side hemispheric lesion may cause more fatigue in patient during the sub-acute stage than the patients with Right side hemispheric stroke.

**Conclusion:** The fatigue severity scale scored different value in both groups of hemispheric lesion with provides us with the fact that specific physiotherapy rehabilitation program to be constructed for better and efficient rehabilitation of the patients. Family and the care givers should be priorly explained the severity of fatigue the patients would be experiencing.

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### INTRODUCTION

Fatigue is a complex, subjective experience, which reflects subject interaction with the environment<sup>1</sup>. Fatigue as a subjective phenomenon or feeling state is much more difficult to define and study, as it may be independent of objective or behavioral tasks. This broad concept has been approached with technical or common terms, which are sometimes used like synonyms, such as lack of energy or motivation, weakness, fatigability, sleepiness, weariness, lassitude, boredom, adynamia.<sup>2</sup>

Fatigue is often one of the first signs of early brain disease and is usually a pronounced problem immediately following the acute stages of sudden onset brain conditions such as trauma or cerebrovascular accident.<sup>3</sup>

An early study suggested that PSF may be more prevalent following right sided infarcts, although another report suggested that left sided infarcts increase the risk of PSF.

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It has been hypothesized that sub cortical strokes may be associated with the development of PSF perhaps due to the disruption of ascending fibers through the reticular activating system a structure implicated in cognitive vigilance.<sup>(4)</sup> However there have been a number of other studies that have failed to demonstrate the relationship of fatigue to anatomical structures consistently.<sup>(5,6,7)</sup>

Ingles *et al* found fatigue was not related to stroke severity or lesion location. There is currently no evidence that fatigue is associated with time since stroke, severity of stroke or side of lesion. There is preliminary evidence that location of stroke may increase likelihood of fatigue.<sup>(4,5,8)</sup>

Benjamin *et al*<sup>(9)</sup> concluded from their study that they were unable to analyze the difference of fatigue between individuals with different stroke subtypes and lesion locations. In general the relationship between the presence of fatigue and stroke subtypes and lesion location has been controversial. Some studies also suggested that stroke subtype and lesion side or location did not seem to be related to post-stroke fatigue. Because of the contradicting finding from

previous investigation the relationship between presence of fatigue and stroke lesion side and location is unclear.

In a long-term follow-up population study by Glader *et al.*,<sup>(10)</sup> fatigue independently predicted decreased functional independence, institutionalization, and mortality, even after adjusting for age. Glader suggested however that the relationship between fatigue and these outcome measures is likely not unidirectional i.e impairments after stroke likely contribute to fatigue which in turn, contributes to impairment. There is currently no constructive evidence that fatigue is associated with time since stroke, severity of lesion, side of lesion. Whereas, Snaphaan *et al* in 2010 concluded that severity of fatigue was found to be more in patients with left side hemispheric lesion(p=0.54).<sup>(11)</sup> Also there is preliminary evidence that location of stroke may increase likelihood of fatigue.<sup>(4)</sup>

Thus the objective of our study was to focus on the effect of side of hemispheric lesion and severity of fatigue in post-stroke patients that may aid to formulate a physiotherapy plan during rehabilitation.

## METHOD

Subjects (both males and females) with stroke during sub-acute stage (1 month-6 months) with confirmed cerebral infarct & hemodynamically stable. Mini Mental Scale score  $\geq$  24/30<sup>(12)</sup>. Subjects were excluded if they were on antidepressants or antipsychotic medications or had any other neurological disease or systemic illness. Sub-arachnoid hemorrhage were not included because of its different etiology and course.

### Subjects

50 post-stroke subjects were recruited of which 25 had right side MCA infarct and 25 had left side MCA infarct. The mean age of Group A (left MCA infarct) was (53.12 $\pm$ 10.038) with time post-stroke was (6.0 $\pm$ 1.20) and in Group B (right MCA infarct) mean age was found to be (52.12 $\pm$ 14.52) and time post-stroke was (3.83 $\pm$ 1.83). On the basis of inclusion and exclusion criteria patients were selected by random sampling method and were made to sign the informed consent form.

### Protocol for Data collection

This study was approved by the ethical committee of Jamia Hamdard University.

Participants-data was collected by a post graduate student working under my supervision in HAHCH hospital & Rehabilitation Center Jamia Hamdard, Delhi. An informed consent form was signed by all subjects who participated in this study.

Instructions to the patients: The patients were informed about the study through a patient information sheet and also explained about the questionnaire when needed.

Time consumed: 1 year

### Procedure

Once informed consent form was obtained data were collected in a single session at the hospital in out-patient department or patients admitted in hospital. In this study Fatigue Severity Scale (FSS) has been used which is a 9-item self-report questionnaire scale developed in 1989. It's the simple and time saving application of the FSS which is the main reason

for its high acceptance. Patients were asked to score their self-perceived (subjective) fatigue on a score of 1-7 where 1 stands for strong disagreement of fatigue while 7 depicts strong agreement of presence of fatigue. The lesser score suggests less severity and vice-versa. FSS has an excellent internal consistency and reliability (Cronbach  $\alpha$  = 0.93)<sup>(13)</sup>

### Data analysis

Paired T-test has been used to examine the effect of side of hemispheric lesion on severity of Fatigue on Fatigue Severity Scale. A significant value of 0.05 has been used for all statistical comparisons.

## RESULTS

50 subjects were recruited. Of these two groups were formed Group A has 25 subjects with left hemispheric lesion and Group B has 25 subjects with right hemispheric lesion. The mean Age for Group A is 53.12 (S.D= 10.038) and Group B is 52.12 (S.D= 14.52) with p value = 0.81 and, mean for Time post-stroke for Group A is 111.76 (S.D=35.50) and Group B is 119.52 (S.D=28.74) with p value = 0.37. (Table :1)

**Table 1** Depicting Mean, S.D, p value of Demographic variable: Age and Time post-stroke of Group A and Group B

Factor	Group		p Value
	Group A	Group B	
Age	Mean +/- SD	Mean +/- SD	0.81
	53.12 +/- 10.038	52.12 +/- 14.52	
Time post Stroke	Mean +/- SD	Mean +/- SD	0.37
	111.76 +/- 35.50	119.52 +/- 28.74	

The mean for FSS Score for Group A was 6.0 (S.D=1.20) and for Group B was 3.83 (S.D=1.83) with p value of 0.000 and  $p < 0.05$  which is statistically significant. (Table: 2) This provides a strong evidence to reject null hypothesis which states that there is no effect of side of hemispheric lesion on fatigue in patient with sub-acute stroke.

**Table 2** Depicting Mean, S.D, p value of Fatigue Severity Scale (FSS) Score of Group A and Group B.

	Group A	Group B	p value
FSS	mean +/- S.D 6.0 +/- 1.20	mean +/- S.D 3.84 +/- 1.83	0.000

## DISCUSSION

Fatigue is more common problem post-stroke.<sup>(1,2,3)</sup> Many studies have confirmed the presence of fatigue post-stroke<sup>(4,5)</sup>. It is a common problem post-stroke and it is also barrier to post-stroke rehabilitation<sup>(5)</sup>.

In our study data analysis was done using Sigma plot 10.0 which shows, that our hypothesis stating that "the side of hemispheric lesion effects fatigue in patients post stroke during the sub-acute stage", holds true. The fatigue severity was perceived more in patients with left hemispheric lesions as compared to patients with right hemispheric lesion  $p=0.000$ .

Similar, results were found in a study done by Snaphaan *et al* in 2010, in which they evaluated that fatigue was perceived more post-stroke by patients with Left hemispheric lesion (p=0.54).<sup>(11)</sup> Eleven studies evaluated associations between side of stroke and fatigue, of which nine found no association which were concluded by Staub F *et al* in 2001.<sup>(4)</sup> Schepers *et al* in 2006 found no difference between right

verses left hemispheric stroke patients with (p value= 0.73)<sup>(14)</sup>.

**Clinical relevance:** Education regarding fatigue after stroke should be made available for patients, caregivers, and family. This information could include how to recognize abnormal fatigue and possible reasons for experiencing it, the likelihood of a problem, its potential impact on daily living, and suggestions regarding different fatigue management strategies that may prove beneficial. Education about fatigue has been tried with, and continues to be recommended for, patients exhibiting cancer- and AIDS-related fatigue, however, educational efforts should be tailored to the stroke patient population. It is important that the patient is made aware that it is a real and not imagined symptom. Recognition by the patient, caregivers, and family members that it is a genuine symptom of disease can be crucial to the psychological well-being of the patient. It also ensures that the patient does not feel, as if fatigue is simply to be endured, but that strategies may, in fact, reduce or alleviate it.<sup>(3)</sup>

**Limitation:** It was a one-time study, with no specific age criteria, which was carried out on a small number of subjects. Also chronic post-stroke cases and sub-arachnoid hemorrhage (SAH). Fatigue Severity Scale (FSS) is an ordinal subjective scale, which measures an individual's self-perceived rating of fatigue, and hence its results cannot be generalized.

#### Future studies

Should also attempt to elucidate whether PSF is the same across the period of post-stroke recovery, or whether the associations with PSF change over time. There is a need to transform the growing knowledge about the phenomenological, natural history and pathophysiology of PSF into rehabilitation strategies, to effectively treat this common post-stroke syndrome.

#### CONCLUSION

The findings of the current study concluded that PSF is one of the most enduring and disabling of the post-stroke neuropsychiatric sequelae. This study further suggests, the effect of side of hemispheric lesion on fatigue in patients with sub-acute stroke is more pronounced in patients having left side hemispheric lesion when compared to right side hemispheric lesion.

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#### Conflict of interest

No conflict of interest was declared by any of the authors.

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