



ORIGINAL RESEARCH PAPER

Neurology

INFLUENCE OF PREMORBID PHYSICAL ACTIVITY IN THE RECOVERY OF STROKE

KEY WORDS: Ischaemic stroke, Premorbid physical activity, Risk factors , Good recovery.

Dr.S.Saravanan	MD, DM.,Neurology, Professor & HOD, Department of Neurology, Tirunelveli Medical College Hospital, Tirunelveli.
Dr. P.K Murugan	MD,DM.,Neurology, Professor, Department of Neurology, Tirunelveli Medical College Hospital, Tirunelveli. Corresponding Author
Dr.Praveen Singh Peter	Senior Resident, Neurology.

ABSTRACT

BACKGROUND

Stroke is the third commonest cause of death worldwide and is one of the leading causes of mortality and morbidity in India. In Tirunelveli medical college hospital, Tirunelveli, stroke patients constitute a major proportion of admissions in neurology and medical wards .The objective of this study is to analyse the influence of premorbid physical activity in the recovery of ischaemic stroke.

MATERIALS AND METHODS

This study is a retrospective study of ischaemic stroke patients attending the department of neurology, Tirunelveli medical college hospital from January 2015. Patients were treated on the same line using the same protocol. Thrombolysis was not done in any of the patients. Recovery was judged as good and poor depending upon the extent of independency on day to day activities. The good and poor recovery is correlated with premorbid physical activity.

RESULTS

The study analysed 115 patients, of whom 50 had good premorbid physical activity and 65 were sedentary workers. Irrespective of the number of risk factors and the type of risk factors, good recovery was seen in patients who had good premorbid physical activity.

CONCLUSION

Premorbid Physical activity influences the recovery in patients suffering from ischaemic stroke in a positive way.

INTRODUCTION

Stroke is a global health problem. It is one of the leading causes of disability and the second leading cause of mortality worldwide. Stroke is responsible for three million deaths in developing countries. It is the major cause of mortality and morbidity in Asian countries(1). It is a leading cause of functional impairment, with 20 % of survivors requiring institutional care after 3 months and 15%-30% being permanently disabled(2).

Epidemiological studies help to determine the prevalence, distribution and risk factors and are necessary to streamline health services for prevention and treatment of the disease. Current treatment for patients with established stroke are limited and risk factor interventions are the real hope of reducing stroke morbidity and mortality in general populations(3). Certain risk factors have consistently been identified with stroke as significant predictors: age, hypertension, excessive alcohol intake, previous stroke, atrial fibrillation, diabetes mellitus, smoking and family history of stroke. Other risk factors much less consistently associated with stroke include previous CHD, left ventricular hypertrophy, drug abuse, and obesity.

AIM:

The aim of this study is to study the influence of premorbid physical activity of the patient with final recovery in ischaemic stroke.

MATERIALS AND METHODS

This study is a retrospective study of stroke patients attending the department of neurology, Tirunelveli medical college hospital, Tirunelveli. All patients of either sex above 15 years of age with ischaemic stroke were included in the study. Patients with TIA, ICH and subarachnoid hemorrhage were excluded. All patients underwent complete neurological evaluation, routine examination of blood, haematocrit, biochemistry, urine examination, coagulation profile, lipid profile, electrolytes, ECG, echocardiography and computer tomography. Risk factors for stroke in every patient were analysed. These include diabetes mellitus, smoking, hypertension, valvular heart disease, alcoholism, dyslipidemia and occupation details regarding physical activity before the onset of stroke(6). The type of work whether it was hard work or sedentary work, was typified. Those included in the hard

work and good physical activity include farmers working in the fields throughout the day, building workers lifting heavy weight etc. On the contrary, shop keepers watchmen etc are taken as sedentary workers.

Stroke was diagnosed clinically and confirmed by imaging studies like CT brain or / and MRI brain in every patient. The patients were treated in the same protocol which is followed in the Tirunelveli medical college hospital which includes antioedema drugs, antiplatelet drugs, IV fluids and other supportive treatment. Thrombolysis was not done in any of the selected patient due to lack of facilities. The nature of recovery in the patients was assessed based on improvement in motor power and sensory, speech and visual defects. Recovery in these patients was categorized into good recovery and poor recovery depending upon the patient ability to lead an independent life.

RESULTS:

A total of 115 patients were taken for study of which 75 were males and 40 were females. Among them, the commonest risk factors found were hypertension (68pts), diabetes (38pts), smoking (36pts), alcohol (32pts), dyslipidemia, (13pts) and heart disease (5pts). No risk factors were found in 20 patients. Out of 115 patients 50 patients were hard working labourers with good physical activity and 65 patients were sedentary workers; good recovery was seen in 62 patients and poor recovery was seen in 53 patients. The number of risk factors in these patients varied from nil to many. Irrespective of the presence or absence of risk factors and irrespective of the number of risk factors, there is good recovery from ischaemic stroke in patients who had good physical activity before the development of stroke. 33 out of 50 patients who were hard working labourers, had good recovery from their stroke constituting 66% of the total hard workers. Of the 65% of sedentary workers, only 35 patients showed good recovery constituting 53.8% of the sedentary workers. Extrapolating, to larger population, these values become statistically significant.

The effect of hard physical activity in good recovery in ischaemic stroke is more consistent in patients who had multiple risk factors i.e., more than two risk factors for stroke. Out of 115 patients, 34 had more than two risk factors, of these 15 patients were hard

working labourers and 19 were sedentary workers. Of the 15 patients who had good physical activity 11 showed good recovery constituting 73.3% of the total 15. Of the 19 sedentary workers only 8 patients showed good recovery constituting only 42.1% which is much lesser when compared to the recovery seen in patients who had good physical activity.

Out of the total 115 patients 20 patients had two risk factors of which 7 were hard workers and the remaining 13 were sedentary workers. 5 out of the 7 hard workers recovered well constituting 71.43% where as only 6 out 13 sedentary workers recovered well constituting 46.15% only. When extrapolated to larger population this become statistically significant.

Out of 115 patients 41 patients had single risk factor only, 17 of them were hard workers and 24 of them sedentary workers. 9 out of 17 hard workers recovered well, making a percentage of 52.94 where as 10 out of 24 patients who were sedentary workers having single risk factors showed good recovery making a percentage of 41.67. The difference in the two groups is statistically significant. Thus even in patients with single risk factor previous physical activity favorably influences the recovery from ischaemic stroke.

The more the number of risk factors the more the influence of physical activity in the recovery. 73.3% recovery with multiple risk factors, 71.43% with two risk factors and 52.94% with single risk factor were seen. The good recovery seen in patients who had good physical activity is seen almost equally in men and women. 25 out of 37 men and 8 out of 13 women who were hard physical workers showed good recovery constituting 67.57% in men and 61.54% in women.

Table:1

Risk Factors	
Diabetes	38
Heart Disease	5
Dyslipidemia	13
Smoking	36
Alcohol	32

Table:2

Sex	
Male	75
Female	40

Table:3

Age	
< 40	9
41 to 60	50
> 61	56

Table:4

Recovery	
Good	62
Partial	53

Table:5

Physical Activity	
Hard working Labourers	50
Sedentary Workers	65

Table:6

	Hard Workers with Risk Factors	Sedentary Workers with Risk factors
Good Recovery	25	24
Poor Recovery	14	32

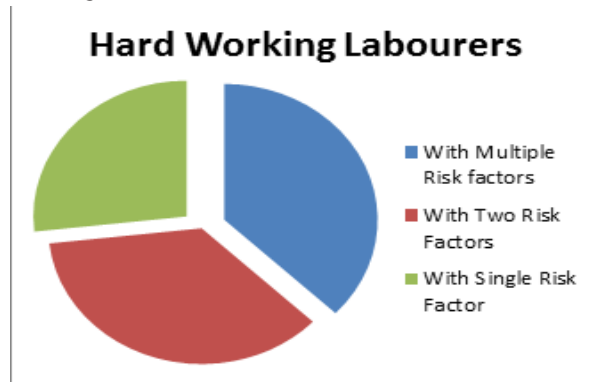
Table :7

	Hard Workers with No Risk Factors	Sedentary Workers with No Risk factors
Good Recovery	7	6
Poor Recovery	4	3

Table:8

Patients	Good Recovery
----------	---------------

With Multiple Risk Factors	73.30%
With Two Risk Factors	71.43%
With Single Risk Factor	52.94%

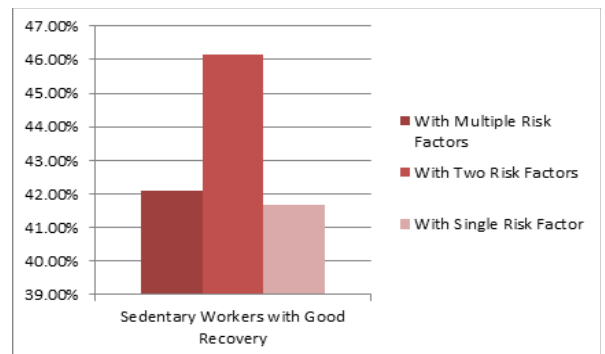


Sedentary Workers

With Multiple Risk Factors	42.10%
With Two Risk Factors	46.15%
With Single Risk Factor	41.67%

Good Recovery

With Multiple Risk Factors	42.10%
With Two Risk Factors	46.15%
With Single Risk Factor	41.67%



DISCUSSION:

The positive influence of physical activity on the recovery of patients, who suffered from ischaemic stroke is well documented in this study.

Sedentary activity is considered to be one of the minor risk factors for stroke. On the contrary good physical activity can be taken to prevent the occurrence of stroke. But the influence of the premorbid physical activity in the final outcome of patients with stroke is not studied well earlier. This study attempts to show the influence of this premorbid physical activity in the recovery of ischaemic stroke, irrespective of the number and the type of risk factors associated in a particular patient(4).

Recovery from ischaemic stroke may be related to various physiological factors. Lysis of the thrombus occluding the vessel, development of good collateral circulation and neuronal plasticity are some of the factors which influence the recovery(7). The size of the infarct, small vs large and the site of infarct, cerebral hemisphere vs. brainstem also influence the recovery. Larger infarcts, and brainstem infarcts show poor recovery when compared to the other two.

The positive effect of premorbid physical activity in the recovery of ischaemic stroke patients could be due to maintenance of good health of blood vessels in the cerebral circulation. Physical activity also gives beneficial effects in the control of hypertension and optimization of blood sugar levels. It also increases the oxygen content of the blood and gives positive cardiovascular effects by improving the circulation (8,9). So even though other risk factors like hypertension, diabetes, smoking and dyslipidemia damaged the blood vessels, the effect of good physical activity neutralises some of the vascular damaging effects of these risk factors by improving the circulation and health of the blood vessels(10). Because of the maintenance of good health of blood vessels and circulation, the neuronal cells as a whole are maintaining a healthy state which are able to plasticize themselves and remodel well in

the recovery of affected tissue(11,12). Moreover these patients who had good pre-morbid physical activity also maintain a good physical activity continuously during recovery phase also and thus get only less functional impairment due to stroke.

Conclusion:

Various risk factors are known to cause stroke, poor physical activity being one of the minor risk factors. Pre-morbid good physical activity influences the recovery from ischaemic stroke and this is well established in this study. Hence patients with risk factors prone to stroke need to do regular good physical activity in any form which may help in early recovery from stroke if at all they develop stroke in life time.

References

1. Scottish Intercollegiate Guidelines Network (SIGN) Management of Patients with Stroke or TIA: assessment, Investigation, Immediate Management and Secondary Prevention. SIGN 108. Edinburgh, UK: A National Clinical Guideline; 2008.
2. O'Donnell MJ, Denis X, Liu L, et al. Risk factors for ischaemic and intracerebral haemorrhagic stroke in 22 countries (the INTERSTROKE study): a case-control study. *The Lancet*. 2010;376(9735):112–123. [PubMed]
3. Gordon NF, Gulanick M, Costa F, et al. Physical activity and exercise recommendations for stroke survivors: an American Heart Association scientific statement from the Council on Clinical Cardiology, Subcommittee on Exercise, Cardiac Rehabilitation, and Prevention; the Council on Cardiovascular Nursing; the Council on Nutrition, Physical Activity, and Metabolism; and the Stroke Council. *Stroke*. 2004;35(5):1230–1240. [PubMed]
4. WHO. Global recommendations on physical activity for health: World Health Organization; 2010 [cited 2014 July 18]. Available from: http://www.who.int/dietphysicalactivity/factsheet_recommendations/en/.
5. WHO. The World Health Organization MONICA Project (monitoring trends and determinants in cardiovascular disease): a major international collaboration. WHO MONICA Project principal investigators. *J Clin Epidemiol* 1988; 41: 105–114.
6. Adams HP, Jr, Bendixen BH, Kappelle LJ, Biller J, Love BB, Gordon DL, et al. Classification of subtype of acute ischemic stroke. Definitions for use in a multicenter clinical trial. TOAST. Trial of Org 10172 in Acute Stroke Treatment. *Stroke* 1993; 24: 35–41.
7. Powell KE, Paluch AE, Blair SN. Physical activity for health: what kind? How much? How intense? On top of what? *Ann Rev Public Health* 2011; 32: 349–365.
8. Nelson ME, Rejeski WJ, Blair SN, Duncan PW, Judge JO, King AC, et al. Physical activity and public health in older adults: recommendation from the American College of Sports Medicine and the American Heart Association. *Circulation* 2007; 116: 1094–1105.
9. Kraemer HC, Wilson GT, Fairburn CG, Agras WS. Mediators and moderators of treatment effects in randomized clinical trials. *Arch Gen Psychiatr* 2002; 59: 877–883.
10. Koenig W, Sund M, Doring A, Ernst E. Leisure-time physical activity but not work-related physical activity is associated with decreased plasma viscosity. Results from a large population sample. *Circulation* 1997; 95: 335–341.
11. Adams HP Jr, Adams RJ, Brott T, del Zoppo GJ, Furlan A, Goldstein LB, et al. Guidelines for the early management of patients with ischemic stroke. A scientific statement of the Stroke Council of the American Stroke Association. *Stroke* 2003; 34: 1056–1083.
12. Laufs U, Wassmann S, Czech T, et al. Physical inactivity increases oxidative stress, endothelial dysfunction, and atherosclerosis. *Arterioscler Thromb Vasc Biol* 2005;25:809–14.