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EFFECT OF STROKE SEVERITY INDEX WITH FUNCTIONAL INDEPENDENCE ON CAREGIVERS BURDEN IN ACUTE STROKE PATIENTS.

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ABSTRACT Greater number of stroke survivors suffer from disability and extended years of care is required to be undertaken by family members which adds burden to caregivers daily life.

Thus burden on caregivers needs attention to study the impact of stroke .Till now, scarce literature is found to study the correlation of severity of stroke and burden on caregivers.

This study was done to find the correlation of severity of stroke with functional independence and also intends to find the correlation of Functional dependency with the caregivers burden& severity of stroke with caregivers burden in acute stroke patients

Patients admitted in the tertiary care hospital of metropolitan city in Maharashtra with the Acute stroke within 48 hours of onset were included in study , on 3rd day after stroke/admission to hospital. National Institutes Of Health Stroke Scale (NIHSS), Barthel Index (BI), Burden Scale For Family Caregivers (BSFC), were used to gather information from 100 stroke patients admitted in hospital wards.

Study showed strong negative correlation of -0.705 between NIHSS and BI, Barthel index correlation with caregiver burden score shows moderate negative correlation of – 0.482, NIH scale score correlation with caregiver burden score shows moderate positive correlation of 0.59.

Thus stroke severity affects negatively on functional independence. caregivers have reported moderate burden due to dependance of patient. stroke severity has positive impact on caregivers burden. Further research in various stages of Stroke recovery on caregivers burden and functional independence level is recommended

KEYWORDS : Stroke severity ,Caregivers Burden, Motor arm ,Motor leg, Limb ataxia , Functional Independence

INTRODUCTION

Stroke is defined by World Health Organization as an 'acute neurologic dysfunction of vascular origin with symptoms and signs corresponding to involvement of focal areas of brain.[1] It is the leading cause of death secondary to coronary artery disease. In developing countries like India, Stroke is one of the important cause of disability and death. Reports suggest, one in every six men and one in every five women are at risk of developing stroke after 55 years of age. In India prevalence of stroke is 1.27 to 2.20 per 1000 persons & incidence rate of stroke is 148 per 100000 persons.[2]

The cause of stroke comprises two primary categories, namely Ischemic and Hemorrhagic stroke. Modern diagnostic technologies help to localize lesion in brain and understand cause of stroke. These techniques include Computerized Tomography (CT scans), Magnetic Resonance Imaging (MRI), Positron Emission Tomography (PET scan), Trans cranial and carotid Doppler, Cerebral angiography. Information collected through these techniques helps occupational therapist identify neurologic deficits that result into functional impairment, understand prognosis, formulate goals and plan treatment.[1]

Greater number of stroke survivors suffer from disability and extended years of care is required to be undertaken by family members which add burden to caregivers' daily life.[3] Stroke patients suffer from impairments that lead to participation limitations in activities of daily living and leads to dependency on caregivers in daily life activities.

These impairments can be classified into the following:
1.Primary impairments- performance components are involved
2.Secondary impairments- performance areas such as mobility etc are
3.Composite impairment- difficulty in functional activities& participation in functional activities.[4]

Functional status is affected, depending upon the extent of neurologic deficit after stroke. The National Institute of Stroke Scale (NIHSS) gives the extent of involvement and can be used for estimating the impairments in acute phase of stroke. Most adversely affected are the upper extremities and functional walking along with limitations in sensory, speech, swallowing, perception etc.[5]

The functional dependency can be estimated using Barthel Index (BI), a standardized outcome measure. The functional dependency in stroke patients results in stress & burden on their caregivers.

Caring for person suffering from functional dependency after stroke places additional burden on caregivers. Caregivers not only suffer from physical and mental stress but also in due course of time suffer from psychological and financial stress. Caregivers have to maintain balance between their responsibility towards the stroke patient as well as his/her own life.[6]

As Occupational Therapist, while using family centered approach, it is necessary to consider the wellbeing of family members/caregivers. Consideration of caregivers' stress and burden is important while planning intervention.

Till now though literature available in India which studies severity of stroke and its relation with functional independence or the study of functional independence in acute stroke and burden on caregivers in acute phase, scarce literature to study the correlation of severity of stroke & burden on care givers.

This study was done to find the correlation of severity of stroke with functional independence and also intends to find the correlation of Functional dependency with the caregivers burden& severity of stroke with caregivers burden in acute stroke patients.

METHODOLOGY :

Patients admitted in the tertiary care hospital of metropolitan city in Maharashtra with the Acute stroke within 48 hours of onset, aged- 40-85 years accompanied with family caregivers were included on 3rd day after stroke/admission to hospital. Patients not attended by caregivers, Comatose patients &, with previous compromised independence were excluded from the study. The consent was taken using Helsinki guidelines.

NIHSS stroke severity scale, Barthel Index were administered on the patient by the therapist, other objective data information was collected. Burden scales for family caregivers was used and translated into regional languages –Hindi, Marathi. It was validated before administering the scale.

The appropriate version was used with caregiver and if caregiver has difficulty in interpreting questions(may be due to inability to read) to

fill up the questionnaire, guidelines were given by investigator and then asked to mark the appropriate response.

The data was analyzed to find the correlation between NIHSS & Barthel Index, NIHSS & Care givers burden Scale scores and then Barthel Index score & caregivers burden scale.

The data obtained was entered in Microsoft Excel Sheet, descriptive data was analyzed in excel by Spearman rank order co-relation coefficient test.

Data Analysis

The data was analyzed, excel sheet. Spearman's correlation was used to find correlation. The initial Demographics are given in table 1 showing the demographics of the stroke patients.

Table 1: Shows Demographic Data Of Stroke Patients

	Total	Males	Females
Sex RATIO	100	72	28
AVERAGE AGE	54.87	54.09	54.92
Comorbidity	76	51	25
Diabetes	14	6	8
Hypertension	23	17	6
Both diabetes and hypertension	39	28	11

Out of 100 stroke patients evaluated 72 were males and 28 were female patients.

Average age of all patients was 52.87.

Number of patients having comorbidities like hypertension, diabetes , and both together was 76. Out of which 51 were male patients and 25 were female patients.

Out of which 14 patients had diabetes, 6 were male patients and 8 female patients.

Total 23 patients had hypertension, 17 were male patients and 6 were female patients, 39 patients suffered from both diabetes and hypertension, from which 28 were male patients and 11 were female patients.

Table 2: Shows Descriptive Statistics & Correlations On Scales Considering Different Components

Components	Subgroups	Mean	Standard error	Standard deviation	Spearman's correlation NIH (components) &Barthel index	P value
NIH stroke scale score		15.05	0.813	8.130	-0.705	0.000
	Motor arm	2.4	0.172	1.723	-0.5203	0.000
	Motor leg	2.31	0.177	1.779	-0.541	0.000
	Limb ataxia	0.6	0.084	0.840	-0.418	0.000
	Motor leg+ ataxia	2.91	0.182	1.820	-0.561	0.000
	Sensory Score	1.17	0.66	0.667	-0.418	
	Motor arm + leg	4.71	0.344	3.447	---	
Barthel index score		7.52	0.481	4.818	-0.705	0.000
					Correlation of Barthel index & Caregivers burden score	
Caregiver burden score		46.59	1.106	11.602	-0.482	0.000
					Correlation of NIH stroke score & Caregivers burden score	
					0.599	0.000

NIH stroke scale mean score is 15.05 with standard error of 0.813 and standard deviation of 8.130.NIHS scale motor arm mean score is 2.4 with standard error 0.172 and standard deviation 1.723. NIHSS scale motor leg score mean is 2.31 with standard error 0.177 and standard deviation 1.779. NIHS scale limb ataxia mean score is 0.6 with standard error 0.084 and standard deviation 0.840. NIHS scale motor leg +ataxia mean score is 2.91 with standard error of 0.182 and standard deviation 1.820. NIHS scale sensory mean score is 1.17 with standard error 0.66 and standard deviation 0.667. NIHS scale motor arm +leg mean score is 4.71 with standard error 0.344 with standard deviation of 3.447.

Barthel index mean value score is 7.52 with standard error 0.481 and standard deviation 4.818.

Caregiver burden scale mean value score is 46.59 with standard error 1.106 and standard deviation 11.602.

Further Data was analyzed to find out correlation with NIH Stroke Severity index total score ,components of NIHS stroke severity index with Barthel index & with Care givers burden and to find correlation of Barthel index & care Givers Burden scale, correlation of NIH stroke scale & caregiver burden score.

NIHS scale correlation with Barthel index shows strong negative correlation of -0.705 with (p value 0.000). Motor arm score correlation with Barthel index shows moderate negative correlation of -0.520 with (p value 0.000). Motor leg+ limb ataxia correlation with Barthel index shows moderate negative correlation of -0.561 (p value 0.000). Sensory score correlation with Barthel index shows mild negative correlation of -0.418 with (p value 0.000). Barthel index correlation with caregiver burden score shows moderate negative correlation of –0.482 with (p value 0.000). NIH scale score correlation with caregiver burden score shows moderate positive correlation of 0.599 with (p value 0.000).

DISCUSSION

This study was conducted to find out the effect of stroke severity on ADL independence & care givers burden in acute stroke patients ,using NIHS scale ,Modified Barthel index & Caregivers burden scale.

We have taken 6 components from NIHS scale which can affect the patients functional independence .These components are motor arm score, motor leg score, limb ataxia score, motor leg+limb ataxia score , sensory score, motor arm + motor leg score.

Most of the patients had higher NIHS score since patients were taken in the acute stage immediately after incidence of stroke. All the patients were dependent on their caregiver except few. The present study shows moderate negative correlation with total score of NIHS severity index & Barthel index.

In a review article by Janne M. Veerbeek et al ,2011: on early prediction of outcome of daily living in stroke, it was stated that neurological assessments showed strong evidence for baseline neurological status, upper limb paresis, effect of age has also been proved as predictors for outcome of ADL independence.[7]

The scores obtained on the latest modified Barthel index(20 point scale) analyzed, the mean Barthel score was 7.52 and standard deviation was 4.81. This indicated there was a wide range of difference in Barthel index score. This was also dependant on extent of upper

extremity or lower extremity involvement,& limb ataxia. Limb ataxia has lead to more dependency on care givers .The functional out come in acute phase may be dependent on the attitude of patients towards their illness. Some of the patients had only restricted mobility and had adapted themselves for other ADL activities, whereas few were totally dependent on caregivers this was observed in elderly adults. In a qualitative study by N. Mavaddat et al,2018: on Perceptions of self-rated health among stroke survivors: a qualitative study in the United Kingdom, study was done to assess the Stroke survivors' attitude & functional independence it was observed that The stroke survivors' perceptions of self-rated health are multifactorial, comprising physical, psychological and social components. They also stated that the recovery after stroke depends on health experiences & psychosocial support available to stroke patients . The independence also is influenced by past experiences of ill-health, dispositional outlook such as degree of optimism, a sense of control and views on ageing. The authors have emphasized the acceptance of functional limitations to adjust with the impairments & they work better towards functional independence.[8]

When the correlation in various components of NIHS score was observed all the components showed moderate negative correlation with p value 0.000. In present study the moderate correlation was observed between NIHS motor arm score and Barthel and between motor leg and Barthel index. This means higher the score of NIHS scale score less is the independence of the patients. The leg ataxia had more effect on the functional independence of patients.

In a study by Shigetaka Nakao et al, 2010 on: Relationship between Barthel Index scores during the acute phase of rehabilitation and subsequent ADL in stroke patients it was stated that skill level of basic activities related to standing was significant indicator of BI involvement for mobility & may be later used for prediction of improvement.[9]

In another study by Sooyeon Kwon et al,2004 on: Disability Measures in Stroke,it was stated that M-FIM ,Barthel Index are highly correlated with categorical disability measures (Modified Rankin Scale [MRS]),the another measure used to assess stroke severity score. Further research was recommended to develop better prediction models explaining the relationship between Functional independence measure & Disease severity index.[10]

When we use two assessment scales (NIHS scale and BARTHEL INDEX) in clinical practice they provide common objective insight in progress and outcome of stroke.

The sensory score of NIHS scale showed mild correlation with Barthel index as very few patients had sensory involvement from the patients population.

In India , culturally immediate family members are available for care giving in hospital after stroke. In one study by Madhumita Bhattacharjee et al, on : factors affecting burden on caregivers of stroke patients & their attitude in population based in INDIA , it was observed that financial worries, long caregiving hours and emotional stress are predominant factors increasing caregivers' stress. The caregivers were more worried of financial matters than the added physical efforts .It was recommended in the article that Stroke rehabilitation services should also address caregivers' issues and include practical training in nursing skills and counseling sessions, which will help in reducing the caregivers'burden and improve patient recovery.[11]

The effect of functional dependency on caregivers burden was evaluated by using Barthel index and caregiver burden scale showed moderate correlation with p value 0.000 showing negative correlation, that is more functional independence less burden perceived by caregiver. In a study by Ayşegül Çelik et al, : on 'The relationship between the stroke survivors' functional status and their informal caregivers' burden and quality of life. It was observed that the functional independence decreases the physical burden, but if the patient was primary earning member in the family, the emotional & social burden still continue to exist. They have used two functional independence assessments FIM & Barthel Index and correlated it with caregivers burden scale. .In the prospective study they observed that ,the caregivers' quality of life decreased and their care burden increased as the functional status of the patients deteriorated.[5] In present study we did not assess the correlation on subcomponents of caregivers burden scale.

In present study the care givers reported to be committed in giving services. In Indian culture family members consider themselves to be committed when patient is hospitalized. This may be the reason that some of the caregivers did not perceive increased burden on caregivers. Association of severity of the stroke with caregiver perceived burden was evaluated it showed moderate correlation with p value 0.000.

The relevant components of NIHS scale for functional dependency were taken into consideration to find out its effect on caregiver. This has shown a moderate correlation between components of NIH severity scale of the stroke and expectation from caregiver as caregivers role. In a review article by Beth Han et al,1999, on: Family Caregiving for Patients With Stroke Review and Analysis. A total of 20 published stroke caregiving research articles were included in this review. Across studies, the effects of stroke caregiving on caregivers' well-being and the significant predictors of caregivers' depression were analyzed. It suggested that stroke caregivers have raised levels of depression at both the acute stroke phase and the chronic stroke phase.[12]

The care givers in our study were close relations & found to be more committed ,since it was acute phase ,the impact of burden was not much appreciated. The family members noticed more impact of COVID 19 pandemic ,which had made them difficult to give consistent care ,as they were apprehensive that the other patients in ward may be suspected COVID 19 cases.

CONCLUSION

The present study was conducted to assess the correlation of Stroke severity & functional independence & care givers burden. There is negative correlation between the stroke severity & functional independence. The patients in acute stage of Stroke were dependent on care givers when upper extremities are more involved. The lower limb ataxia indicated ADL dependency on Barthel index . NIHSS showed the neurological signs leading to disability, so may lead to dependency on care giver . Thus the severe symptoms of stroke may lead to care givers' burden. The present study indicates that the stoke patients showing more upper extremity involvement & limb ataxia had more dependency & resulted in care givers burden. There was mild to moderate negative correlation with care givers burden & functional independence. The study was done in acute phase of stroke ,the care givers in Indian culture are committed to give care in acute phase of illness .due to this commitment they may not have reported higher level burden . The caregivers in the present study could not perceive extent of burden as they may had assistance from hospital care giving staff. The further study on larger sample size & in various stages of recovery may give more reliable data .

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