

“EFFICACY OF PHYSIOTHERAPY IN BEHAVIOURAL PROBLEMS OF ADULT NEUROLOGY PATIENTS AND CAREGIVERS.”

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ABSTRACT

- **Background and Purpose:**

Behaviour change is a frequent and lasting complaint voiced by carers of stroke patients. Some aspects of this personality change particularly those with more established biological substrates such as emotionalism and an inability to control anger are well described. This study will be done on physiotherapy treatment to patients with neurological conditions related to behavioural problems. As physical therapy is involved to resolve behavioural issues.

- **Subjects:**

30 subjects with adult neurological conditions.

- **Method:**

Patients who are willing to participate in the study and fulfil the inclusion and Exclusion criteria are included in the study. During regularly scheduled clinic appointments, patients and caregivers were invited to participate in a study about behaviour changes in patients with adult neurological condition. The initial assessment consists of the Revised Janis-field feelings of inadequacy scale (now known as multidimensional self-Esteem scales), stroke-specific quality of life scale (SS-QOL) and Functional independence measures (FIM). The follow-up assessment was conducted after Physiotherapy treatment.

- **Result:**

The final sample was composed of 30 subjects, having mean age of 55.16 years old (± 15.16 SD). Physiotherapy interventions were effective in reducing some of the behavioural disturbances ($Z = -4.78$; $p < 0.00001$) in patient as well as their care givers.

- **Conclusion:**

Our results indicate physiotherapy treatment may be effective in reducing the frequency and severity of behavioural disorders and subjective burden among caregivers.

INTRODUCTION

The two major mechanisms causing brain damage in stroke are, ischemia and hemorrhage. In ischemic stroke, which represents about 80% of all strokes, decreased or absent circulating blood deprives neurons of necessary substrates. The effects of ischemia are rapid because the brain does not store glucose, the chief energy substrate and is incapable of anaerobic metabolism. Non-traumatic intracerebral hemorrhage represents approximately 10% to 15% of all strokes. Intracerebral hemorrhage originates from deep penetrating vessels and causes injury to brain tissue by disrupting connecting pathways and causing localized pressure injury.¹

Pathophysiology

Focal Ischemic Injury: A thrombus or an embolus can occlude a cerebral artery and cause ischemia in the affected vascular territory. It is often not possible to distinguish between a lesion caused by a thrombus and one caused by an embolus. Thrombosis of a vessel can result in artery-to-artery embolism. Mechanisms of neuronal injury at the cellular level are governed by hypoxia or anoxia from any because that is reviewed below. Rate of onset and duration: the brain better tolerates an ischemic event of short duration or one with slow onset.

Health of systemic circulation: Constant cerebral perfusion pressure depends on adequate systemic blood pressure. Systemic hypotension from any reason can result in global cerebral ischemia.

Temperature: elevated body temperature is associated with greater cerebral ischemic injury.

Glucose metabolism: hyper- hypoglycemia can adversely influence the size of an infarct.

Cerebral Blood Flow: Normal cerebral blood flow (CBF) is approximately 50-to 60 ml/100g/ Min and varies in different parts of the brain. In response to ischemia, the cerebral auto regulatory mechanisms compensate for a reduction in CBF by local vasodilatation, opening the collaterals, and increasing the extraction of oxygen and glucose from the blood. However, when the CBF is reduced to below 20 ml/100g/min, an electrical silence ensues and synaptic activity is greatly diminished in an attempt to preserve energy stores. CBF of less than 10ml/100g/min results in irreversible neuronal injury.²

Mechanisms of neuronal injury: Inflammatory response to tissue injury is initiated by the rapid production of many different inflammatory mediators, tumor necrosis factor being one of the key agents. Leukocyte recruitment to the ischemic areas occurs as early as thirty minutes after ischemia and reperfusion. In addition to contributing to mechanical obstruction of microcirculation, the leucocytes also activate vasoactive substances such as oxygen free radicals, arachidonic acid metabolites (cytokines), and nitric acid. The cellular effects of these mediators include vasodilatation, vasoconstriction, increased permeability, increased platelets aggregation, increased leukocyte adherence to the endothelial wall, and immunoregulation. Endothelial cells are one of the first cell types to respond to hypoxia. This response occurs at morphological, biochemical and immunological levels, causing a variety of physiological and pharmacological effects.

Ischemic Stroke: The three main mechanisms causing ischemic strokes are: (a) thrombosis, (2) embolism and (3) global ischemia (Hypotensive) stroke. All ischemic strokes do not neatly fall into these categories and the list of entities responsible for unusual stroke syndromes is very long.

Thrombosis: Atherosclerosis is the most common pathological feature of vascular obstruction resulting in thrombotic stroke. Atherosclerotic plaques can undergo pathological changes such as ulcerations, thrombosis, calcifications, and intra-plaque hemorrhage. The susceptibility of the plaque to disrupt, fracture or disrupt or ulcerate depends on the structure of the plaque, and its composition and consistency.

Embolism: Embolic stroke (ES) can result from embolization of an artery in the central circulation from a variety of sources. Besides clot, fibrin, and pieces of atheromatous plaque, materials known to embolize into the central circulation include fat, air, tumor or metastasis, bacterial clumps, and foreign bodies. Superficial branches of cerebral and cerebellar arteries are the most frequent targets of emboli. Most emboli lodge in the middle cerebral artery distribution because 80% of the blood carried by the large neck arteries flow through the middle cerebral arteries. The two most common sources of emboli are: the left sided cardiac chambers and large arteries.

Many embolic strokes become “hemorrhagic” causing hemorrhagic infarction (HI). Hemorrhagic infarct is an ischemic infarct in which bleeding develops within the necrotizing cerebral tissue. The two common explanations that are advanced to explain the pathogenesis of HI in embolic strokes are: (1) Hemorrhagic transformation occurs because ischemic tissue is often perfused when the embolus lyses spontaneously and blood flow is restored to a previously ischemic area. An initial vascular obstruction is likely to occur at a bifurcation of a major vessel. The occlusion may obstruct one or both of the branches, producing ischemia of the distal tissue. Blood vessels as well as brain tissue are rendered fragile and injured. (2) Hemorrhagic transformation is also known to occur with persistent occlusion of the parent artery proximally, indicating that hemorrhagic transformation is not always associated with migration of embolic material.³

Global – Ischemic or Hypotensive stroke

Profound reduction in systemic blood pressure due to any reason is responsible for “Hypotensive stroke.” Some neurons are more susceptible to ischemia than others.

RESEARCH METHODOLOGY

SOURCES OF DATA: Parul Sevashram hospital, Khemdas ayurvedic & homeopathy hospital

STUDY DESIGN: Conventional sampling

STUDY TYPE: Pre and post survey

SAMPLE SIZE: The study was done on Thirty (n=30) subjects and

STUDY POPULATION: Study was done on behavioural problems in patient with adult neurology conditions.

SAMPLING CRITERIA: Subjects for the study were selected based on the following criteria.

Inclusion Criteria:

- Age = 18 to 80 years
- Both Gender: male and female
- Less than 6 months after stroke.
- Patient must be with caregiver.

Exclusion Criteria:

- Impaired cognitive skill.
- Uncooperative patients.

METHOD

A pre and post survey, Participants (N=30) were patients diagnosed with neurological impairments. The majority of sample was male. Caregivers also participated and majority was female. Caregivers were spouses or had brother-sister or other relationships. Caregivers had known patient for many years and majority lived with the patients. To be eligible for inclusion, patient had to be aged 18 to 80 years, with mild to moderate neurological condition. All the patients and care givers were informed about the objectives of study and informed consent form taken from them before their participation. Revised Janis-Filed Feelings of Inadequacy Scale (Now Known as Multidimensional Self-Esteem Scales), Stroke Specific Quality Of Life (SS-QOL) and Functional Independence Measure (FIM) are used as a survey instrument.

OUTCOME MEASURES: Revised Janis-Filed Feelings of Inadequacy Scale (Now Known As Multidimensional Self-Esteem Scales), Stroke Specific Quality Of Life (SS-QOL), Functional Independence Measure (FIM)

DATA COLLECTION PROCEDURE: Each patients or caregiver has given the 4 forms which are:

- Informed consent form
- Revised Janis-Filed Feelings of Inadequacy Scale (Now Known As Multidimensional Self-Esteem Scales)
- Stroke Specific Quality of Life (SS-QOL)
- Functional Independence Measure (FIM)

MATERIAL USED:

- Informed consent form
- Questionnaire / Scale
- Google form
- Mobile
- Paper / Pencil / pen

PROCEDURE:

Participants were recruited from the Parul shevashram hospital Khemdas ayurvedic & homeopathy hospital with neurological conditions. During regularly scheduled clinic appointments, patients and caregivers were invited to participate in a study about behavior changes in patients with adult neurological condition. If interested, all patients and caregivers provided written informed consent form. The initial assessment consists of the Revised Janis-field feelings of inadequacy scale (now known as multidimensional self-Esteem scales), stroke-specific quality of life scale (SS-QOL) and Functional independence measures (FIM). The follow-up assessment was conducted after Physiotherapy treatment. On both occasions, patients and caregivers provided multidimensional self-Esteem scales ratings independent from one another.

RESULTS

Table: 1. Gender distribution of subjects. Gender	No. of subjects	Percentage
Female	08	27%
Male	22	73%
Total	30	100%

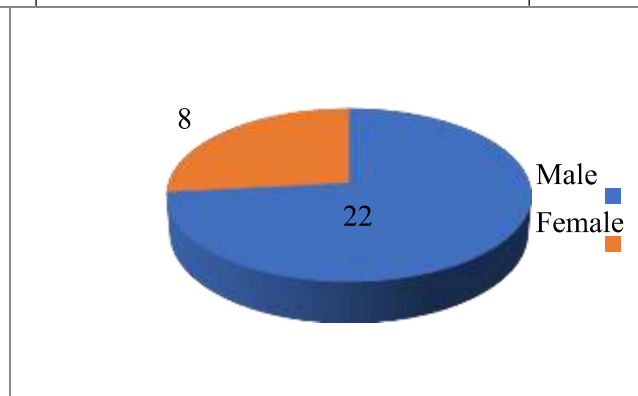


Figure 1. Gender distribution of subjects.

Inference: The above pie graph shows 73% of male and 27% of females are affected with neurological conditions.

Table: 2..Analysis of Multidimensional Self-Esteem Scale of wellbeing. (Frequency).

Pre	Post	
Mean	160.3	98.2666 7
SD	5.55319 1	9.80499 5
Z value	-4.7821	
p value	< .00001	

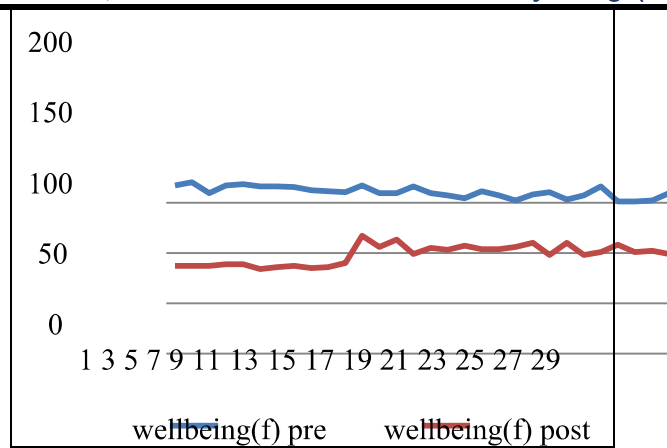


Figure 2. Analysis of Multidimensional Self-Esteem Scale of wellbeing. (Frequency).

Inference: The above line graph shows the difference in the mean score and individual score of the applied scale.

Table: 3. Analysis of Multidimensional Self-Esteem Scale of wellbeing. (confidence).

Pre	Post	
Mean	154.7	98.6
SD	5.45293	7.77085
	3	6
Z value	-4.7821	
p value	< .00001	

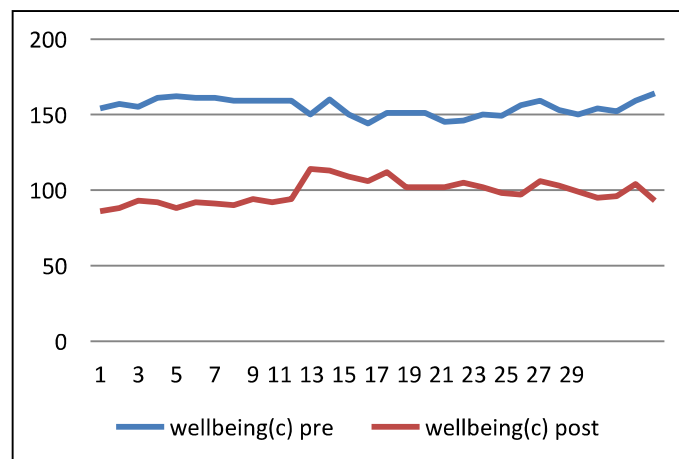


Figure 3. Analysis of Multidimensional Self-Esteem Scale of wellbeing. (confidence).

Inference: The above line graph shows the difference in the mean score and individual score of the applied scale.

Table: 4. Analysis of functional independent measures.

Pre	Post	
Mean	32.5666 7	87.7
SD	9.8495	5.87895 1
Z value	-4.7821	
p value	< .00001	

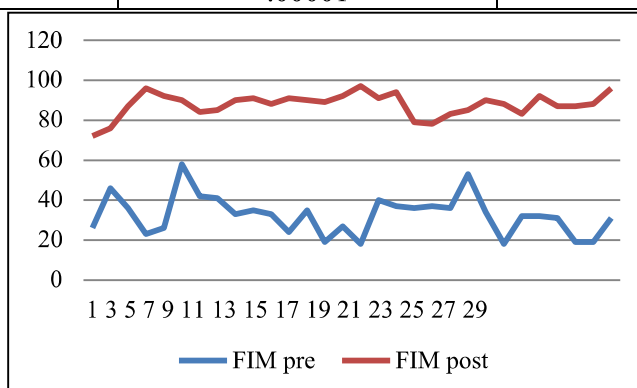


Figure 4. Analysis of functional independent measures.

Inference: the above line graph illustrates the difference in the change in the standard of living pre and post treatment.\

Table: 5. Analysis of Stroke Specific Quality of Life.

Pre	Post	
Mean	86.6666 7	158.966 7
SD	19.2054 5	18.0468 4
Z value	-4.7821	
p value	< .00001	

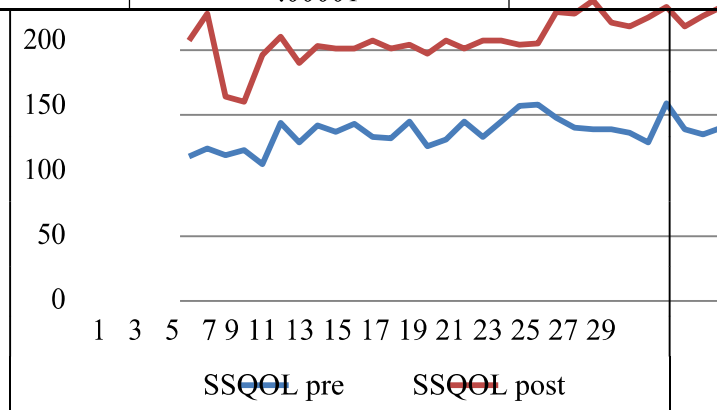


Figure 5. Analysis of Stroke Specific Quality of Life.

Inference: The graph indicates difference in the change of health improvement after physiotherapy treatment.

INTERPRETATION OF SCALES

- Revised Janis-Filed Feelings of Inadequacy Scale (Now Known As Multidimensional Self-Esteem Scales): This multidimensional scale measures self-regard, academic abilities, social confidence, and appearance.
- Stroke Specific Quality of Life (SS-QOL): SS-QOL is a reliable and valid instrument for measuring self-reported health-related quality of life on group level among people with mild to moderate stroke.
- Functional Independence Measure (FIM): Basic indicator of patient disability.

Table: 6.Results of Scales

sr. no	age	gender	wellbeing(f)		wellbeing(c)		FIM		SSQOL	
			pre	Post	pre	post	pre	post	pre	Post
1	57	M	167	87	154	86	26	72	68	157
2	70	M	170	87	157	88	46	76	74	178
3	23	F	159	87	155	93	36	87	69	114
4	65	F	167	89	161	92	23	96	73	110
5	70	M	168	89	162	88	26	92	62	146
6	60	M	166	84	161	92	58	90	94	160
7	68	F	166	86	161	91	42	84	79	140
8	59	M	165	87	159	90	41	85	92	153
9	62	M	162	85	159	94	33	90	87	151
10	19	M	161	86	159	92	35	91	93	151
11	70	M	160	90	159	94	33	88	83	157
12	58	M	167	117	150	114	24	91	82	151
13	32	M	159	106	160	113	35	90	95	154
14	50	M	159	113	150	109	19	89	76	147
15	66	M	166	99	144	106	27	92	81	157
16	28	M	159	105	151	112	18	97	95	151
17	65	F	157	103	151	102	40	91	83	157
18	35	M	154	107	151	102	37	94	95	157
19	74	M	161	104	145	102	36	79	107	154
20	65	M	157	104	146	105	37	78	108	155
21	65	F	152	106	150	102	36	83	98	179

22	32	M	158	110	149	98	53	85	90	178
23	50	M	160	98	156	97	34	90	89	188
24	60	F	153	110	159	106	18	88	89	171
25	70	M	157	98	153	103	32	83	86	168
26	45	M	166	101	150	99	32	92	79	175
27	72	M	151	108	154	95	31	87	109	183
28	50	M	151	101	152	96	19	87	89	168
29	55	F	152	102	159	104	19	88	85	176
30	60	F	159	99	164	93	31	96	90	183

DISCUSSION

EMOTIONAL distress, especially anxiety, frustration, and depression, are common problems after stroke and other chronic. In our study there were significant negatively perceived changes in the caregiver's perception of characteristics such as frustration, dissatisfaction, unhappiness, worrying, patience, and being in control, energetic, confident, and easy going before physiotherapy & mostly the reverse in the case with both. However, for some patients, caregiver's s occasionally reported personality changes in a positive direction—for example, reporting that their relative was less aggressive or less unreasonable. [4]

Left Brain CVA Those with left-brain injury and a paralyzed right side (called right hemiplegic) are more likely to have problems with speech and language. They also tend to be cautious, hesitant, and anxious and disorganized when faced with an unfamiliar problem. People with right hemiplegia need frequent assurance that they are doing okay, with lots of immediate positive feedback. Breaking down tasks into steps with lots of practice will often aid learning. **Right Brain Injury** Those with Right-Brain CVA and a paralyzed left side (called left hemiplegia) may have problems with spatial-perceptual tasks such as judging distance, size, position, rate of movement, form, and how parts relate to a whole. People with severe spatial-perceptual deficits may have more trouble with self-care. They may not be able to read a paper – not because they cannot read, but because they lose their place on the page. They tend to have a behavioral style that is too quick and impulsive and behave in a way that makes it easy to overestimate their abilities. They are often unaware of their deficits and may think themselves capable of tasks they are not (eg, driving) [5]

Behavior change is a frequent and lasting complaint but changeable by physiotherapy voiced by caregivers s of C.V.A patients. Some aspects of this personality change—particularly those with more established biological substrates such as emotionalism and an inability to control anger are well described. In its totality, however, “personality change” as described by the caregivers s appears to be a much broader phenomenon. It encompasses straightforward emotional disorder—changes in cognitive function, emotional expression, and behavior probably as a result of brain damage—and also caregivers' factors such as their own distress, personality, and change in life circumstances. It remains uncertain to what degree the observed major personality and behavioral change seen acutely after a C.V.A, such as emotionalism, correlates with later caregivers perceived personality change. [6]

Attempting to measure “Behavioral change” as described by the caregivers is difficult, partly because it may mean different things to different people, but also because it is an inherently heterogeneous problem. Although studies have been carried out in patients with conditions such as dementia, subarachnoid hemorrhage, and head injury, there has been a marked neglect of this area in ischemic C.V.A research.

Psychological problems are common complications following C.V.A and have an impact on all aspects of recovery.

The psychological symptoms were slightly less intense and less frequent in the follow up after a period of six weeks of physiotherapy treatment. The analysis of the data collected showed: During the study it was found that more of males were affected with neurological condition than females. (Table 1). The average score for sample subjects' posts physiotherapy treatment had increased which determined the improvement in the personal wellbeing of the patients as compared to pre-Physiotherapy treatment. (Table 2 & 3). The difference in the individual scores shows an improvement in the post Physiotherapy treated patients than the pre-Physiotherapy treated. (Table 2 & 3). Post Physiotherapy treatment shows increase in the health improvement in patients than in the patients before the Physiotherapy treatment. (Table 5). The rate of improvement in the satisfaction of life as a whole is more in the patients post the Physiotherapy treatment than the pre-Physiotherapy treatment. (Table 5). There is an average improvement in the satisfaction of life achievements in the post Physiotherapy treated patients than the pre-treated patients. (Table 5). There is an increase in the standard of living post the Physiotherapy treatment than the pre- Physiotherapy treatment. (Table 5). There is an average improvement in the satisfaction of life achievements in the post Physiotherapy treated patients than the pre-treated patients. (Table 5). The graph shows an increase improvement in the personal relationships post the Physiotherapy treatment than in the patient's pre-Physiotherapy treatment. (Table 2 & 3). The feeling of one's safety in behavioral change in more post the Physiotherapy treatment than in pre-Physiotherapy treated patients. (Table 2 & 3). The satisfaction of feeling a part of the community is slightly more in the post Physiotherapy treated patients than pre-treated. (Table 2 & 3). The study shows that patients post Physiotherapy treated are more satisfied with their future security than they were pre-Physiotherapy treatment. (Table 2 & 3) Improvement in cognitive, sensory, and motor deficits that can be explained physiologically will probably cease within weeks or months after the stroke (Current Concepts of Cerebrovascular Disease — Stroke Emotional Problems after Stroke LAURENCE M. BINDER et.al)

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