

ASSESSMENT OF NEUROLOGICAL DEFICITS AND COGNITIVE IMPAIRMENT IN ELDERLY PATIENTS WITH STROKE

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ABSTRACT:

BACKGROUND: Stroke ranks fourth globally in terms of disability and is the second most common cause of death. Neurological abnormalities and cognitive impairments are typical in most stroke patients, and most stroke cases involve elderly adults. We assessed elderly patients' neurological deficits and cognitive impairment following a stroke.

MATERIALS AND METHODS: We conducted a cross-sectional evaluation of sixty stroke patients, ranging in age from 55 to 80. During the academic year of 2022–2023, this study was carried out in the general medicine department at the Rajiv Gandhi Institute of Medical Sciences (RIMS), Kadapa, Andhra Pradesh, South India, from November to April. MMSC and NIHSS scales were used to investigate the neurological deficits and cognitive impairment assessed in stroke patients. The patients with psychological impairments were not included.

RESULTS: In this study, results reveal that most stroke patients were between the age group of 55-60. In 60 patients, most of the stroke patients were male 37 (61.66%). The cognitive impairment and neurological deficits were found to be MODERATE in the stroke patients by using MMSE and NIHSS scales respectively. The prevalence of cognitive impairment among 60 patients, about 60% was MODERATE, and the prevalence rate for neurological deficits among 60 patients, about 60% was MODERATE, and the 31.66% prevalence rate for SEVERE.

CONCLUSION: we observed that all patients had cognitive impairment and neurological deficits, whereas the majority of patients had a moderate degree of impairment. The prevalence of cognitive impairment in stroke patients is high. The prevalence of neurological deficits was moderate. Most of the elderly patients were affected aged between 55-65. In this study, we have observed that most of the patients who were affected by stroke were Male.

KEYWORDS:

Stroke, Neurological deficits, Cognitive impairment, NIHSS, MMSE, cerebral infarction,

INTRODUCTION:

The World Health Organization defines stroke as “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”. Stroke is a global health problem. It is the second most common cause of death and the fourth leading cause of disability worldwide. Globally, an estimated 160 lakh people suffered from a first-ever stroke in the year 2005, with an estimated prevalence of 620 lakh stroke survivors. In the absence of any meaningful clinical or public health interventions, it is expected that this number will increase to an estimated 230 lakh first-ever strokes, with an associated 780 lakh deaths, by 2030. ^[1-3]

Stroke is a medical condition in which poor blood flow to the brain causes cell death ^[4]. Effective prevention strategies include targeting the key modifiable factors: hypertension, elevated lipids, and diabetes. Risks due to lifestyle factors can also be addressed: smoking, low physical activity levels, unhealthy diet, and abdominal obesity ^[5]. The Stroke Investigative Research and Educational Network study is investigating the underlying risk factors for stroke occurrence, subtype, and outcome among people of African ancestry ^[6].

Managing acute stroke in low-resource settings requires a novel approach, one that could restart the original WHO global stroke initiative as a collaboration between the World Health Organization (WHO), the World Stroke Organization, and the World Federation of Neurology, to increase awareness of stroke, generate better surveillance data and guide better prevention and management ^[7].

Other key events contributing to stroke pathology are inflammation, energy failure, loss of homeostasis, acidosis, increased intracellular calcium levels, and excitotoxicity ^[8].

INTRACEREBRAL HEMORRHAGE:

About 10% of acute stroke episodes are caused by intracerebral hemorrhage, which is more prevalent in underdeveloped nations. A high volume of hemorrhage may be difficult to distinguish from primary intracerebral hemorrhage both clinically and radiologically if it regularly happens in an area of brain infarction. ^[9].

NEUROLOGICAL DEFICITS:

Neurological Deficit means Symptoms of dysfunction in the nervous system that are present on clinical examination and expected to last throughout the insured person's life. Symptoms that are covered include numbness, increased sensitivity, paralysis, and localized weakness. Abnormal reflexes, Inability to speak, decreased sensation, Loss of balance, Mental function problems, such as memory loss Vision changes, Walking problems, and Weakness of the arms or legs. The severity of neurological deficits due to stroke varies greatly depending on the location and extent of the damaged brain area. This condition can be due to a blockage of blood vessels of the brain by thrombus or Embolism, thus causing ischemic or infarct brain tissue ^[10].

COGNITIVE IMPAIRMENT:

Cognitive impairment is when a person has trouble remembering, learning new things, concentrating, or making decisions that affect their everyday life. Cognitive Impairment ranges from mild to severe. With mild impairment, people may begin to Notice changes in cognitive functions but still be able to do their everyday activities. Cognitive impairment is not caused by any one Disease or condition, nor is it limited to a specific Age group.

The most common Cognitive impairments among stroke survivors are memory, Orientation, language and Attention, executive dysfunction (initiation inhibition, mental flexibility), and aphasia ^[11,12].

MATERIALS AND METHODS:

The study design was a cross-sectional study in a single institution, Rajiv Gandhi Institute of Medical Sciences (RIMS) Kadapa, from November 2022 to April 2023. The study was conducted on 60 patients over 55 years of age with stroke. Psychologically impaired patients were excluded. To assess the cognitive impairment and neurological deficits appropriately, we have taken the two scales that are commonly used to analyze the severity of the stroke. Those are the MMSE and NIHS scales.

Mini-Mental State Examination Scale:

The MMSE assesses 'cognitive aspects of mental function' and consists of two sections, one covering orientation, memory, and attention and requiring only verbal responses. The second addresses the ability to follow verbal and written commands, name, write a sentence spontaneously, and copy a complex polygon figure. As an assessment of cognitive state, it shows good discrimination between the cognitively impaired and 'normal' and has demonstrable validity and reliability.

National Institute of Health Stroke Scale: To examine Neurological Deficits and severity of stroke patients.

We participated in ward rounds in both the male and female general medicine wards after receiving consent from the institutional ethical committee. After observing each stroke event and choosing the samples according to our inclusion criteria, we spoke with the patients and their caregivers to get vital data regarding the patient's background and current health. We went over the complete questionnaire with the patients and requested appropriate responses. We used the interpretation tables above to score each scale based on their response and assess the patient's condition.

The distribution of the 60 sample data was based on the following variables: prevalence of both scale findings, age, gender, score on both scales, neurological deficits, and epidemiological characteristics.

After gathering the data, the percentage was calculated based on how many patients were classified into each category. Microsoft Excel is used to analyze and understand the gathered data. The data analysis is documented, and the outcomes are discussed.

FINDINGS:

60 patients were taken for the study of cognitive impairment and neurological deficits in elderly patients.

DISTRIBUTION OF DATA BASED ON AGE:

Among 60 patients, around 21 (35%) patients were between the ages of 55-60, 11 (18.33%) patients were between the ages of 66-70, 7 (11.66%) patients were between the ages of 71-75 and 9 (15%) patients were between the ages of 76-80.

DISTRIBUTION OF DATA BASED ON GENDER: Among 60 stroke patients, 37(61.66%) patients were male and the remaining 23(38.33%) patients were female.

DISTRIBUTION OF DATA BASED ON THE MINI-MENTAL STATE EXAMINATION SCALE (MMSE):

Out of the 60 stroke patients, 12 (20%) had a mild degree of impairment, 36 (60%) had a moderate degree of impairment, and 12 (20%) had a severe degree of impairment

DISTRIBUTION OF DATA BASED ON THE NATIONAL INSTITUTES OF HEALTH STROKE SCALE (NIHSS):

After the assessment, 60 stroke patients showed varying degrees of severity: 2 (3.33%) had mild degrees, 36 (60%) had moderate degrees, 19 (31.66%) had severe degrees, and 3 (5%) had extremely severe degrees.

DISTRIBUTION OF DATA BASED ON NEUROLOGICAL DEFICITS IN TOTAL PATIENTS:

In all of 60 stroke patients, 47 had a level of consciousness, 52 had best gaze, 45 had visual issues, 54 had facial palsy, 57 had some motor arm issues, 56 had motor leg issues, 53 had limb ataxia, 46 had sensory issues, 56 had best language, 56 had dysarthria, and 29 had extinction and inattention.

DISTRIBUTION OF DATA BASED ON EPIDEMIOLOGICAL FACTORS INFLUENCING COGNITIVE IMPAIRMENT IN STROKE PATIENTS:

It was shown that out of 60 stroke patients, 23 (38.33%) had hypertension, 15 (25%) had diabetes mellitus, 20 (33.33%) smoked, 35 (58.33%) had hyperlipidemia, and 28 (46.66%) had consumed alcohol.

DISTRIBUTION OF DATA-BASED PREVALENCE RATE OF MMSE RESULTS:

The prevalence rates of mild conditions were 20%, moderate conditions were 60%, and severe conditions were 20% among 60 persons, respectively.

DISTRIBUTION OF DATA BASED ON THE PREVALENCE RATE OF NIHSS RESULTS:

A prevalence rate of 3.33% for mild, 60% for moderate, 31.66% for severe, and 5% for very severe conditions were present among 60 stroke patients.

DISTRIBUTION OF DATA BASED ON AGE IN COGNITIVE IMPAIRMENT PATIENTS:

Out of sixty stroke patients, 5 fell into the mild category, 20 into the moderate category, and 8 into the severe category. These patients were aged between 55 and 65. In the age range of 66-75, 2 patients were mild, 15 were moderate, and 2 were severe; in the age range of 76-85, there were 2 mild, 3 moderate, and 3 severe patients, respectively.

DISTRIBUTION OF DATA BASED ON AGE IN NEUROLOGICAL DEFICIT PATIENTS:

Between the ages of 55 and 65, there were 60 individuals: 0 were mild, 21 were moderate, 10 were severe, and 1 was very severe; between the ages of 66 and 75, there were approximately 0 mild, 13 were moderate, 7 were severe, and 0 were very severe. 2 patients were mild, two were moderate, 1 was severe, and 3 were extremely severe in the age range of 76–85.

DISCUSSION:

One of the main causes of death and disability in the globe is cerebrovascular stroke (CVS). Many patients nevertheless have cognitive deficits. A higher degree of disability and a lower quality of life are linked to cognitive impairment, which has been observed in the majority of patients. One increasingly acknowledged risk factor for long-term incapacity following a stroke is cognitive impairment. Depending on assessment techniques, criteria, or sample features, the prevalence of cognitive impairment differs amongst research. Screening tools such as the Mini-Mental State Examination (MMSE) are often used. According to neuropsychological testing, both subacute and chronic patients frequently have deficiencies in executive functioning, attention, mental processing speed, visual perception, and construction ability.

The majority of stroke patients in this study were found to be between the ages of 55 to 60, according to the findings. Of the 60 patients, about 21 (35%) were between the ages of 55 to 60, 11 (18.33%) between the ages of 61 to 65, 12 (20%) between the ages of 66 to 70, 7 (11.66%) between the ages of 71 to 75, and 9 (15%) between the ages of 76 to 80 years.

The majority of the stroke patients in this study were men. Of the 60 stroke patients, 37 (61.66%) were men and the remaining 23 (38.33%) were women.

By using the Mini-Mental State Examination Scale, the following findings were obtained about 60 stroke patients: 12 (20%) had a mild degree of impairment, 36 (60%) had a moderate degree of impairment, and 12 (20%) had a severe degree of impairment.

Most of the patients in this assessment of cognitive impairment had a MODERATE degree of impairment, as did those who were between the ages of 55 and 65.

According to research by Dr. Uma Sundar et al. in 2010, 31.7% (52/164) of their patients had cognitive dysfunction; those with frontal executive dysfunction, abnormal MMSE for age, or both were classified as having cognitive dysfunction^[13].

The National Institutes of Health Stroke Scale results showed that, out of the 60 stroke patients, 47 had problems with consciousness, 52 had best gaze, 45 had visual issues, 54 had facial palsy, 57 had a motor arm, 56 had motor leg, 53 had limb ataxia, 46 had sensory issues, 56 had best language, 56 had dysarthria, and 29 had extinction and inattention concerns.

The majority of patients with a MODERATE degree of severity and those between the ages of 55 to 65 had neurological impairments according to this assessment.

According to a 2017 study by Arne E. Nakling et al., the majority of patients had relatively mild strokes, based on the relatively low average NIHSS scores, which indicate the severity of the stroke. Furthermore, the additional studies showed that the patients who were coming back were younger and had, on admission, milder strokes (based on the NIHSS). Furthermore, 38 individuals who underwent assessment were either disqualified for aphasia or were unable to finish the battery of tests^[14].

There were 60 stroke patients in all; 47 had a consciousness issue, 52 had best gaze, 45 had visual issues, 54 had facial palsy, 57 had motor arm, 56 had motor leg, 53 had limb ataxia, 46 had a sensory issue, 56 had best language, 56 had dysarthria, and 29 had extinction and inattention.

The majority of stroke patients experience cognitive impairment due to certain epidemiological characteristics. These include smoking, alcohol consumption, diabetes mellitus, hypertension, and hyperlipidemia. A total of sixty patients suffered from stroke, 20 (33.33%) had hypertension, 15 (25%) had diabetes mellitus, 33 (33.33%) had smoking, 35 (35.33%) had hyperlipidemia, and 28 (46.66%) had alcohol consumption.

In 2010, a study was carried out by Dr. Uma Sundar and colleagues. demonstrates how stroke patients' epidemiological characteristics affect their cognitive impairment. These include hyperlipidemia, smoking, diabetes mellitus, and hypertension^[13].

According to the prevalence of cognitive impairments in MMSE, out of 60 patients, 20% had mild cognitive impairments, 60% had moderate cognitive impairments, and 20% had severe cognitive impairments. The current investigation found that the moderate category had a greater occurrence rate.

According to the NIHS scale, the prevalence rate of neurological deficits among 60 individuals is around 3.33% for mild, 60% for moderate, 31.66% for severe, and 5% for very severe cases.

CONCLUSION:

In our study, we found that while most patients had a moderate degree of impairment, all patients had neurological deficits and cognitive impairment. Cognitive impairment is highly prevalent in stroke victims. Affected individuals were mostly elderly and between the ages of 55 and 65. It was shown in this study that men made up the majority of stroke victims.

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Table No: 1. Interpretation of Mini Mental State Examination Scale:

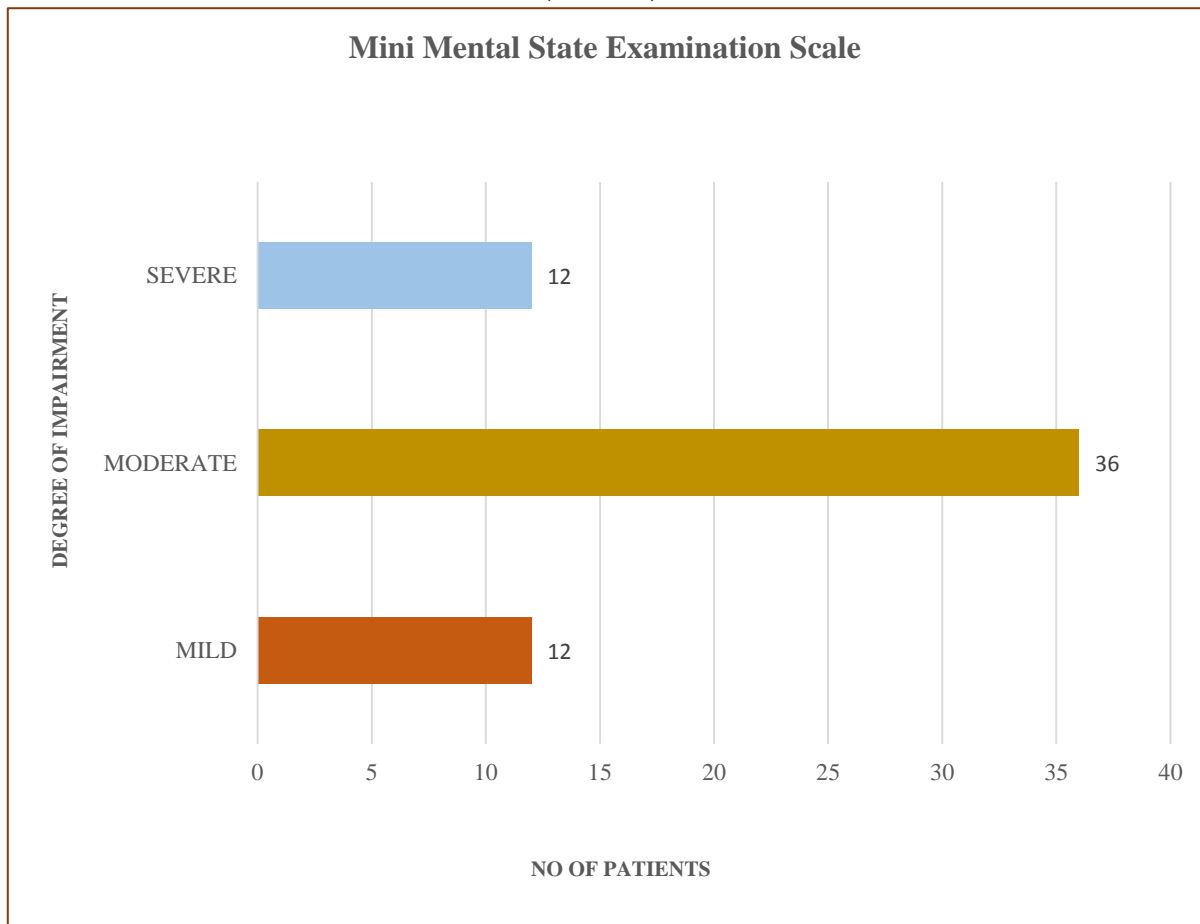
Score	Degree of Impairment	Formal Psychometric Assessment	Day-to-Day Functioning
25-30	Questionably significant	If clinical signs of cognitive impairment are present.	May have clinically significant but mild deficits.
20-25	Mild	Formal assessment may be helpful to better determine the pattern and extent of deficits	Significant effect. May require some supervision, support, and assistance
10-20	Moderate	A formal assessment may be helpful if there are specific clinical indications.	Clear impairment. May require 24-hour supervision
0-10	Severe	Patient not likely to be testable	Likely to require 24-hour supervision and assistance.

Table No: 2. Interpretation of National Institute of Health Stroke Scale:

score	Stroke severity
0	No stroke symptoms
1-4	Mild stroke
5-15	Moderate stroke
16-20	Moderate to severe stroke
21-42	Severe stroke

Table No:3. Distribution of Data Based on Age

AGE GROUPS	NO OF PATIENTS	PERCENTAGE (%)
55-60	21	35%
61-65	11	18.44%
66-70	12	20%
71-75	7	11.66%
76-80	9	15%
TOTAL	60	100%

Figure No:1. Distribution of Data Based on The Mini-Mental State Examination Scale (MMSE):**Figure No:2. Distribution of Data Based on The National Institutes of Health Stroke Scale (NIHSS):**

