Prevalence of Dementia and its Correlation with Cognitive Function in Elderly Post-Stroke Patients

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ABSTRACT

BACKGROUND: Post-stroke dementia (PSD) is a clinical entity that encompasses all types of dementia following an index stroke, which may affect up to one third of stroke survivors. Unlike physical disability after stroke, cognitive function usually worsens over time and are often overlooked with detrimental impacts on the quality of life of survivors.

MATERIALS AND METHOD: This work is a cross-sectional questionnaire-based study. Elderly post-stroke patients participated in this study. We adopted Dementia Severity Rating Scale (DSRS) and The Mini Mental State Examination (MMSE) we recorded the prevalence of dementia and its correlation with cognitive function in elderly post stroke patients.

RESULT: Data of 46 participants was analysed. The mean age group was above 60years, as this study was conducted in elderly post-stroke patients. In this study 41% females and 59% males participated based on the inclusion and exclusion criteria. Two components were collected using Dementia Severity Rating Scale (DSRS) and The Mini Mental State Examination (MMSE).

CONCLUSION: The study concluded that in present scenario of post stroke patient. the sub items of questionnaire (MMSE) and (DSRS) have increased values indicating towards risk factor of dementia and cognitive functions in post-stroke elderly patients in Pravara Rural Hospital is mostly when the age increases as shown significant correlation in Group B with age group of 60-70 years. whereas in Group A with age group of 71-80 years shows that there is no significant correlation. Hence, our study concluded that there is a co-relation of dementia and cognitive function in elderly post stroke patients. So, it determines that the correlation between dementia and cognitive function is more significant at age 71-80 hence, statistically proved.

KEYWORDS: Post stroke dementia (PSD), Dementia, Cognitive Function, Dementia Severity Rating Scale (DSRS), Mini Mental State Of Examination (MMSE).

INTRODUCTION

A stroke, also known as a cerebrovascular accident (CVA), is an abruptreduction of brain blood flow that results in a loss of neurological function.[1].A stroke is a clinically defined syndrome of rapidly developing symptoms orsigns of focal loss of cerebral function with no apparent cause other than that of vascularorigin, but the loss of function can at times be global (applied to patients in deep comaand to those with subarachnoid haemorrhage). Symptoms last more than 24 h or leadto death. Stroke is a serious cerebrovascular disease classified as:1. Ischemic or haemorrhagic, with ischemic caused by thrombosis overlying aruptured atherosclerotic plaque in the cerebral arteries 2. Haemorrhagic being due to a rupture of a cerebral vessel leading to a raisedintracranial pressure .[5]A Transient ischemic attack (TIA) commonly known as a mini stroke. It is abrief episode of neurological dysfunction caused by loss of blood flow in the brain,spinal cord or retina without tissue death. After a stroke, there is an immediate risk of post-stroke dementia. About onethird of dementia patients are diagnosed with both Alzheimer's disease and stroke, indicating that not all cases of PSD have vascular origins. PSD most likely has a complex etiology, influenced by white matter alterations, vascular lesions, and related Alzheimer's lesions. Older patients and those with pre-existing cognitive decline—no dementia, severe stroke, prior stroke, white matter abnormalities, and cerebral atrophy—are more likely to develop dementia2. Dementia that developed within three months after the start of the stroke is the main indicator of cognitive impairment or dementia following a stroke. Whatever the case, a lot of stroke survivors experience delayed dementia that manifests after three months or just following another stroke. When cognitive impairment is identified in the acute phase following a stroke, it can provide crucial information to the doctor that can help with early cognitive rehabilitation and better care to avoid early death[1] The types, volumes, numbers, locations, and severity of the stroke can all affect the cognitive domains that are

implicated in the development of dementia following a stroke. A stroke results in part of the brain's blood supply being cut off, which kills brain cells. Many people who have had a stroke may experience cognitive impairments, which are issues with memory and thought processes3.Also, lesions affecting the prefrontal-subcortical circuit that mediates executive dysfunction as well as the dominant hemisphere are important crucial regions. The most impaired frontal lobe functions include working memory, processing speed, reaction time, and executive task assessments. The types, volumes, numbers, locations, and severity of the stroke can all affect the cognitive domains that are implicated in the development of dementia following a stroke. If a single massive cortico-subcortical brain ischemia lesion is situated in a functionally important location for cognition, the patient may exhibit immediate cognitive decline. Large-vessel dementia is thought to be the source of strategic infarct dementia in the angular gyrus, medial frontal lobe, and inferomedial region of the temporal lobe[4].

TYPES OF DEMENTIA:

A. Vascular dementia, a form of dementia caused by conditions that damage blood vessels in the brain or interrupt the flow of blood and oxygen to the brain. stepwise progression, prolonged plateaus or fluctuating curse

B. Frontotemporal dementia, a rare form of dementia that tends to occur in people younger than 60. It is associated with abnormal amounts or forms of the protein tau and TDP-43.

C. Lewy body dementia, a form of dementia caused by abnormal deposits of the protein alpha-synuclein, called Lewy bodies.

D. Mixed dementia, the combination of two or more types of dementia. For example, many people had a combination of brain changes associated with different forms of dementia.

E. Alzheimer's disease, the most common dementia diagnosis among older adults. Caused by changes in brain, including abnormal buildups of proteins known as amyloid plaques and tau tangles.

The signs and symptoms can vary depending on the types and may include:

- Experiencing memory loss, poor judgement, and confusion.
- Difficulty speaking, understanding and expressing thoughts or reading and writing.
- Wandering and getting lost in familiar neighborhood.
- Trouble handling money responsibility and paying bills.
- Repeating questions.
- Using unusual words to refer to familiar objects.
- Taking longer to complete normal daily tasks.
- Losing interest in normal daily activities or events.
- Acting impulsively.
- Not caring about other people's feelings.
- Losing balance and problems with movement.

MATERIAL AND METHODOLOGY

1. **STUDY SETTING:** Data was collected from Pravara institute of medical sciences, PRAVARA MEDICAL TRUST , Loni, Ahmednagar.
2. **DURATION OF THE STUDY:** 6 months
3. **METHOD OF COLLECTION OF THE DATA:** Data will be primary and will be collected by principle investigator.
4. **STUDY DESIGN:** A cross-sectional survey.
5. **SAMPLE SIZE**: 46 Sample
6. **STUDY POPULATION**: Elderly post stroke patients.
7. **MATERIALS AND EQUIPMENTS TO BE USED**:

- Consent form
- Dementia Severity Rating Scale (DSRS).
- The Mini Mental State Examination (MMSE).
- Pen / pencil

8 **INCLUSION CRITERIA**

- Age above 60 years.
- Elderly post stroke patients.
- Both male and female participants.
- Able to give consent and follow instructions

9. EXCLUSION CRITERIA

- Age less than 60 years.
- Patients who haven't had stroke.
- Patients with visual and hearing dysfunction and one who is unable to speak.

10. OUTCOME MEASURES

1. Dementia Severity Rating Scale (DSRS).

The dementia severity rating scale (DSRS) is an informed based, multiple-choice questionnaire that assesses severity from the mildest to the most severe stages in major functional and cognitive function affected in post stroke patients with dementia.   Interpretation: Add up the points from all sections. SCORE:0-18- Mild,19 – 36 Moderate,37- 54 – Severe.

2. The Mini Mental State Examination (MMSE)

The mini mental state examination (MMSE) is tool that can be used to systemically and thoroughly assess smental status. It is an 11 question measure that tests five areas of cognitive function: orientation, registration, attention, and calculation, recall, and language. Interpretation: Add up the points for all sections. SCORE: 0 - 17—Sever, 18 – 23 –Mild, 24-30-- None .

PROCEDURE:
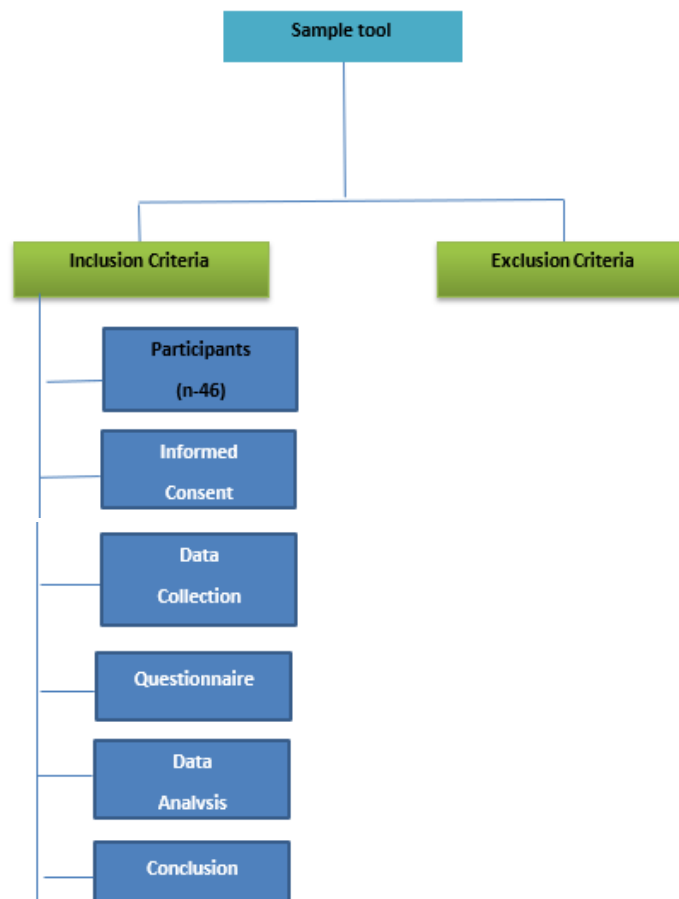
The sample pool 46 is drawn for the study design were selected based on inclusion and exclusion criteria. The purpose of the study along with complete information was shared With the participants and an informed consent was taken from all the participants, participating in the study. The data was collected for each participants and the procedure of the study was explained to all of then. the responses were collected using Dementia Severity Rating Scale (DSRS) and The Mini Mental State Examination (MMSE). Which was further divided into two groups Group A and Group B. which were further differentiate by the age of the patients and gender. The data obtain was utilized to determine the dementia and its correlation with cognitive function in elderly post-stroke patients. Then data analysis was done.

DATA ANALYSIS AND INTERPRETATION

In this study the total number of participants was 46 elderly post-stroke patients. The age group was above 60 then further the participants were divided into two groups which is Group A and Group B. The participants were again divided according to age group in which group A participants were from age 60-70 years and in group B the participants were from age 71-80 years. There were two outcome measure scales taken which shows the correlation between dementia and cognitive function in elderly post-stroke patients which are MMSE and DSRS. In group A there are 25 participants in which 15 are males and 10 females. In this group the participants were from age 60-70 years of age. In group B there are 21 participants in which 12 are males and 9 are females. In this group the participants are from age 71-80 years of age.
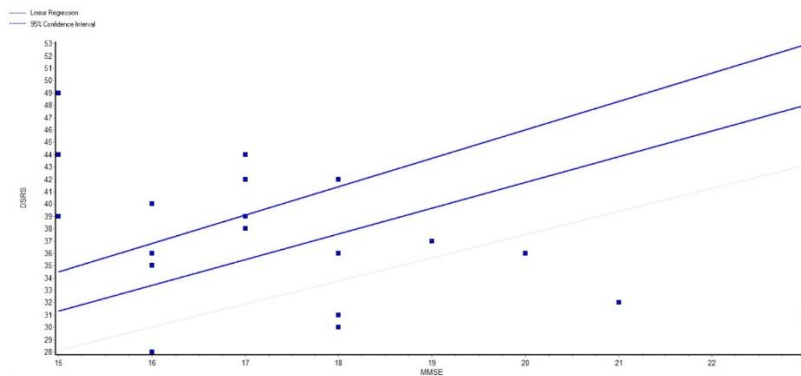
Graph 6.00: represents that the correlation of dementia and cognitive function in elderly post stroke patients is significant as the age increases that is in group B age 60-70years whereas in group A age 71-80 years considered not quite significant . According to linear regression analysis and pearson r test in experimental group P<0.05 is statistically significant that is with age group of 71-80 years is more significant where as 60-70 is less significant so it determines that the correlation between dementia and cognitive function is more significant at age 71-80 hence, statistically proved .

RESULT

Data of 46 participants was analysed. The mean age group was above 60years, as this study was conducted in elderly post-stroke patients. In this study 41% females and 59% males participated. Participants were included on based of the inclusion and exclusion criteria. Two components were used that are Dementia Severity Rating Scale (DSRS) and The Mini Mental State Examination (MMSE). Through this we concluded that prevalence of dementia and its correlation with cognitive function is seen in this study

which was done in elderly post-stroke patients. The mean value age group is 69.91304 whereas the mean of MMSE and DSRS is 19.80435 & 28.32609. According to linear regression analysis and pearson r test in experimental group P<0.05 is statistically significant that is with age group of 71-80 years is more significant where as 60-70 is less significant so it determines that the correlation between dementia and cognitive function is more significant at age 71-80 hence, statistically proved.

DISCUSSION

The current discussion was conducted to see the prevalence of dementia and its correlation with cognitive functions on elderly post-stroke patients. Cognitive impairment or dementia after stroke is predominantly defined by dementia that occurred within three months after stroke onset. Irrespective, many stroke survivors develop delayed dementia beyond three months or only after recurrent stroke(s). The recognition of cognitive impairment in the acute phase after stroke may offer vital information to the clinician for early cognitive rehabilitation and preventing early fatality by improved management. The cognitive domains involved in the development of dementia after stroke may also vary depending on stroke characteristics such as stroke type, volume, numbers, location and severity. In this study, post-stroke dementia is included which encompasses of dementia. This cross-sectional study comprises of two main scales that is Dementia Severity Rating Scale (DSRS) & Mini Mental State Examination (MMSE) where, we could see the prevalence of dementia and its correlation with cognitive function in elderly post-stroke patients. The cognitive domains involved in the development of dementia after stroke may also vary depending on stroke characteristics such as stroke type, volume, numbers, location and severity. Important critical locations also include dominant hemisphere and lesions affecting the prefrontal–subcortical circuit that mediates executive dysfunction. Frontal lobe functions comprising processing speed, reaction time, working memory and executive task measures are most affected ones. Dementia mainly occurs after stroke that is post-stroke, it is the impairment of some or all aspects of the intellectual functioning in person who is fully alert. The term refers to deterioration of intellectual or cognitive function with little with little or no disturbance in consciousness or perception. Each type of dementia has its own signs & symptoms which depends on the particular area of brain affected. There are many types of dementia, that is Vascular, Frontotemporal, Lewy body, Mixed & Alzheimer. Dementia generally involves memory loss. It's often one of the early symptoms of the condition. But having memory loss alone doesn't mean you have dementia. Memory loss can have different causes. Alzheimer's disease is the most common cause of dementia in older adults, but there are other causes of dementia. Depending on the cause, some dementia symptoms might be reversible. Cognitive changes include Memory loss, which is usually noticed by someone else. Problems communicating or finding words, Trouble with visual and spatial abilities, such as getting lost while driving, Problems with reasoning or problem solving, Trouble performing complex tasks, Trouble with planning and organizing, Poor coordination and control of movements & Confusion and disorientation. Psychical changes included Personality changes, Depression, Anxiety, Agitation, Inappropriate behaviour, being suspicious, known as paranoia, seeing things that aren't there, known as hallucinations. A person's ability to think, otherwise known as their cognitive functions, is a crucial subject of research. The cognitive functions are a variety of different, but related, skills involving learning and problem-solving etc. The cognitive functions are collectively known by many of different names. Many researchers with different expertise call these general cognitive function, cognitive ability, cognitive

capacity, and intelligence. Dementia and cognitive function is always neglected in stroke patients commonly in elderly patients so, there is lack of studies related to dementia severity and cognitive function in elderly post stroke patients in rural areas. So this study will help to create the awareness in elderly post stroke patients about how dementia and its co-relation with cognitive function. The 2 main objectives of the study were to study the prevalence of dementia in elderly post stroke patients and to study the relationship between cognitive function in elderly post stroke patients in rural area. In this there were 2 groups which included that - Group A, we have taken patients from age 60 to 71 years. Where we got to know that whether the males or females are mostly affected with scale MMSE & DSRS. And in Group – B, we took same scales as Group – A but the only difference is the age group which was 71 to 80 years considering both males and females. In group A there are 25 participants in which 15 are males and 10 females. In this group the participants were from age 60-70 years of age. In group B there are 21 participants in which 12 are males and 9 are females. In this group the participants are from age 71-80 years of age. In this study we have undertaken 46 participants which were thereafter analysed. The mean group for age was 60 years, which showed that 41% females & 59% males participated. The participants were selected on basis of inclusion and exclusion criteria. The study was undertaken for 6 months and data was collected from. Pravara Institute of Medical Sciences, Loni. The study consists both males and females and those who are ready to give their consent. The study included data of 46 participants. The mean age group was above 60years, as this study was conducted in elderly post-stroke patients. In this study 41% females and 59% males participated. The mean value age group is 69.91304 whereas the mean of MMSE and DSRS is 19.80435 & 28.32609.

CONCLUSION

The study concluded that in present scenario of post stroke patient. the sub items of questionnaire (MMSE) and (DSRS) have increased values indicating towards risk factor of dementia and cognitive functions in post-stroke elderly patients in Pravara Rural Hospital is mostly when the age increases as shown significant correlation in Group B with age group of 60-70 years. whereas in Group A with age group of 71-80 years shows that there is no significant correlation. Hence, our study concluded that there is a co-relation of dementia and cognitive function in elderly post stroke patients. So, it determines that the correlation between dementia and cognitive function is more significant at age 71-80 years as compared to 60-70 years hence, statistically proved .

LIMITATIONS OF THE STUDY

1. The study was limited to Loni, Maharashtra
2. There were only 2 outcome measure taken.
3. The age group was above 60 years

FUTURE SCOPE OF THE STUDY

1. It is very much essential to find out the correlation between dementia and cognitive function in elderly post stroke patients.
2. More research is required to determine the prevalence of dementia and its correlation between elderly post stroke patients.

3. More research is needed to explore better results.

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