COMPARISION BETWEEN MMSE AND 6 CIT SCALE IN STROKE

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ABSTRACT **Materials and Methodology** The research design is used for comparative study. The data collected was primary. Individuals who suffered from stroke were included in the study. The sample included participants who fulfilled the inclusion and exclusion criteria and were willing to be a part of the study. The sample size was 50 and the equipment used were two scales namely 6-CIT and MMSE. **Results :** Study done in geriatric stroke patients to assess cognition using 6CIT scale to MMSE scale, the 6-CIT scale is found to be reliable and highly significant and thus can be extensively used in these patients to assess cognitive deficits.

KEYWORDS :

INTRODUCTION

The age-related impairments in cognition are expected to increase dramatically.[1] Aging is a natural phenomenon characterized by loss of neurons and decrements in neurotransmitter release and physiological function. The aging process is accompanied by deterioration of cognitive functions such as memory, attention, reaction time, and speed of information processing.[2,3,4] The neurotransmitter systems play an important role in the process of cognition, and deterioration of the transmitter systems causes cognitive decrement in aging.[5]

Dementia of the Alzheimer's disease (AD) type is the most frequent form of age-related dementia [6,7] Clinically, initial progressive memory deficits that are eventually accompanied by more global cognitive and attention deficits are typical in AD dementia. Major pathologies in the brain associated with AD dementia have been identified. [8] The frequency of Neuropsychiatric symptoms such as apathy and depression is much higher in people with AD and mild cognitive impairment (MCI) than in the general population. [9]

Behavioural research on ageing has mapped contrasting patterns of decline and stability in cognition across the adult lifespan. Understanding age-associated changes in cognition is challenging for several reasons. First, it is often difficult to separate the effects of normal ageing from those of pathological processes that compromise cognition. Most older adults experience some form of age-related neural pathology, because ageing is associated strongly with risk for Alzheimer's disease, Parkinson's disease, Diabetes, Hypertension and Arteriosclerosis. [10]

However, research involving highly select and healthy older adults indicates that:
- Even in the best case, normal ageing is associated with changes in the neural basis of cognition.
- Because age cannot be experimentally manipulated, conclusions regarding the effects of ageing are necessarily correlational.
- Studies of ageing are often based on cross-sectional comparisons between age groups, to avoid the time and expense of longitudinal research. Few studies have followed individuals from young adulthood into old age, although an increasing number of studies have examined longitudinal changes above the age of 60 years.
- Many brain and mental changes occur in parallel during ageing, and correlational approaches make it challenging to relate particular changes in the brain with particular mental changes. [10]

In an effort to infer causal relationships with ageing, researchers attempt to show that age is related to some, but not other, neurocognitive functions. Even with these challenges, advances in brain imaging methods have allowed unprecedented insights into the neural correlates of healthy ageing [10]

Cognitive deficits resulting from stroke are frequent and can have devastating impact on both patients and their families [11]. Studies report that up to 65% of stroke survivors demonstrate new onset or worsening of cognitive impairments after stroke. [12] Stroke-related cognitive deficits interfere with functional recovery and the potential benefits of rehabilitation. [13]

The Mini-Mental Stage Examination (MMSE) is the instrument most widely used in screening for cognitive problems in hospitalised patients and in outpatient settings. It comprises thirty items providing information about orientation, attention, learning, calculation, delayed recall, and construction [14] Several studies report acceptable validity of the MMSE as a screening instrument and its relationship to functional outcome in stroke patients [15] Others conclude that it is not an accurate screening tool for cognitive deficits in stroke patients, as it cannot differentiate between focal and diffuse lesions, it is language-, age-, and education-dependent, and it is insensitive to right-sided lesions [16].

The Six-Item Cognitive Impairment Test (6-CIT), originally called the Six-Item Orientation- Memory-Concentration Test, developed by Katzman et al. [17] by shortening Blessed et al.'s [32] Mental Status Test, was designed as a screening test for dementia. It is also known as the Short Orientation-Memory-Concentration Test and the Short Blessed Test. For consistency, it is referred to as 6-CIT throughout this paper. [18] It involves three tests of temporal orientation (year; month; time), two tests of attention (counting backwards from 20 to 1; reciting the months of the year in reverse) and short-term memory (5-item address). It is scored out of 28; higher scores indicate greater impairment. It has been utilised in a broad range of settings, including screening for dementia in primary care [19], cognitive screening in acute care, [20] in large population-based studies [21] and in studies of Alzheimer's disease. [22,23] It has been used as a reference standard in evaluating other cognitive tools/assessments [24,25] and recommended as a cognitive screening tool in hospitals [26]. It takes less than 5 min to complete [27] and requires minimal training. A patient's score on the 6-CIT is influenced by increasing age, [28] similar to other cognitive tests, for example the Mini-Mental State Examination (MMSE). [29] Because of its brevity and simplicity, the 6-CIT may be particularly useful for cognitive screening in busy primary and secondary care settings. In this paper, we review the existing literature on the use of the 6-CIT for this purpose. [30]

MATERIAL/METHODOLOGY

The research design is used for comparative study. The data collected was primary. Individuals who suffered from stroke were included in the study. The sample included participants who fulfilled the inclusion and exclusion criteria and were willing to be a part of the study. The sample size was 50 and the equipment used were two scales namely 6-CIT and MMSE.

Data interpretation: Graph 1
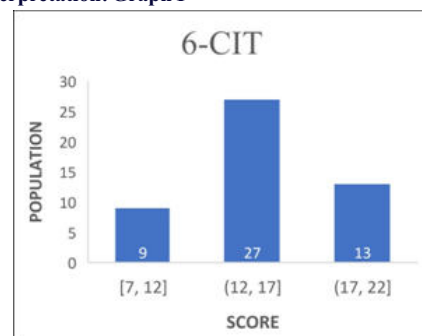
Inference:
- The graph concludes that 9 subjects have a score between 7-12 out of 28 in 6-CIT scale. 27 subjects have score between 12 and 17 out of 28 while 13 subjects have score between 17 and 22 out of 28.
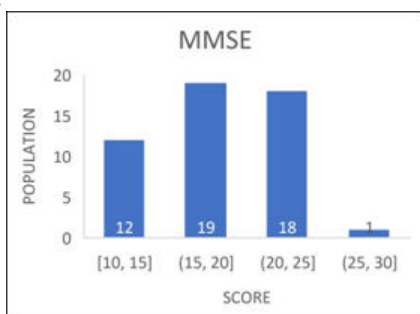
Inclusion criteria:
- Stroke patients
- Age: 60-85 years [31]
- Subjects that can understand English

Exclusion Criteria:
- Individuals who are not willing to be a part of the study.
- Individuals with any other neurological condition
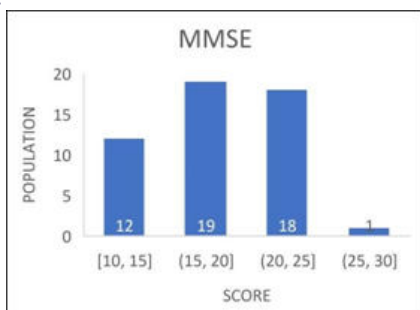- Individuals diagnosed with dementia or Alzheimer's Disease
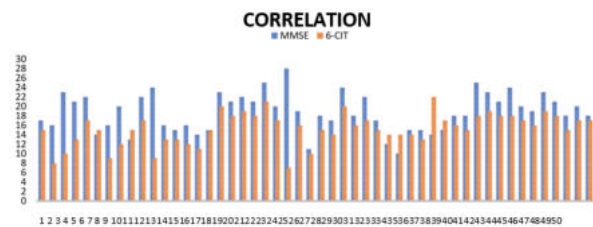
Graph 2:

Inference:
- The graph shows that 12 subjects have score between 10-15 in MMSE scale out of 30. 19 subjects scored between 15-20 out of 30, 18 scored between 20-25 out of 30 and only 1 subject scored between 25 and 30 out of 30

Graph 3:

Inference:
- This correlational graph is between MMSE and 6-CIT scale in stroke patients. The blue bars depict MMSE scale of 50 subjects that were assessed while the red bar shows 50 subjects who were assessed for 6-CIT scale.

Inference:

This correlational graph is between MMSE and 6-CIT scale in stroke patients. The blue bars depict MMSE scale of 50 subjects that were assessed while the red bar shows 50 subjects who were assessed for 6 CIT scale.

Demographics

MMSE 18.78±4 ±4.012 >0.10 6-CIT 15.28±3 ±3.375 0.0428 the mean values of MMSE scales are 18.78 (± 4.01) while that of 6-CIT scale is 15.28 (± 3.37). The above values conclude that our study is extremely significant. According to Kolmogorov Smirnov test the study is extremely significant.

Discussion :

Geriatric population is prone to have mild cognitive impairments. Age related changes in cognition is noted specially in adults with more than 65years. [32] Stroke patients suffer from disturbances in cognition such as memory problems and mental slowness. In the acute phase after stroke, these cognitive deficits often remain unrecognised because, at that time, a patient frequently is not fully aware of possible cognitive dysfunction. Furthermore, a thorough neuropsychological evaluation is not routinely administered. After a longer period after stroke, however, cognitive impairment is considerably prevalent. [33] The Mini-Mental State Examination is a brief, quantitative measure of cognitive status in adults. It can be used to screen for cognitive impairment at a given point in time, to follow the course of cognitive changes in an individual over time, and to document an individual's response to treatment. [34]

6CIT is an acceptable and accurate test for the assessment of cognitive problems. [35] A study of 6-CIT to MMSE has not yet performed in geriatric stroke patients. Therefore, this study was performed in this population.

The above study concludes that 6-CIT scale is highly significant (p value >0.04) to assess cognition when compared to the standard scale which is MMSE. After this study it is proven that 6-CIT shall also be used as a considerate scale for assessing cognition in geriatric stroke patients.

RESULTS

On the basis of the above study done in geriatric stroke patients to assess cognition using 6CIT scale to MMSE scale, the 6-CIT scale is found to be reliable and highly significant and thus can be extensively used in these patients to assess cognitive deficits.

CLINICAL IMPLICATION:

MMSE scale was widely used to assess cognition in neurological conditions with cognitive deficits as compared to the 6-CIT scale. According to the study 6-CIT scale is found to be reliable for assessing cognition in geriatric stroke patients. The advantage being that it has lesser components and can be performed in shorter duration of time and hence will be beneficial for assessment of cognition.

Limitations:

This study had small sample size. Hence can be assessed using a larger population size as well as in other neurological conditions.

REFERENCES
1) Özkaya GY et al, Effect of strength and endurance training on cognition in older people. Journal of sports science & medicine. 2005 Sep;4(3):300.
2) Jolles J, Houx PJ, Van Boxtel MP, Ponds RW. The Maastricht Aging Study.Determinants of cognitive aging. Maastricht: Neuropsych Publishers. 1995:192.
3) Poon LW. Differences in human memory with aging: Nature, causes, and clinical implications.
4) Salthouse TA. Age-related changes in basic cognitive processes.
5) Cohen JA, Verghese J, Zwerling JL. Cognition and gait in older people. Maturitas. 2016 Nov 1;93:73-7.
6) Ott, A. et al. (1998) Incidence and risk of dementia. The Rotterdam Study. Am. J. Epidemiol. 147, 574–580
7) Seshadri, S. et al. (2011) Operationalizing diagnostic criteria for Alzheimer's disease and other age-related cognitive impairment: Part 2. Alzheimers Dement. 7, 35–52
8) Hedden T, Gabrieli JD. Insights into the ageing mind: a view from cognitive neuroscience. Nature reviews neuroscience. 2004 Feb;5(2):87-96.
9) Lyketsos CG, Carrillo MC, Ryan JM, Khachaturian AS, Trzepacz P, Amatniek J, Cedarbaum J, Brashear R, Miller DS. Neuropsychiatric symptoms in Alzheimer's disease. Alzheimers Dement. 2011 Sep;7(5):532-9. doi: 10.1016/j.jalz.2011.05.2410. PMID: 21889116; PMCID: PMC3299979.
10) Hedden T, Gabrieli JD. Insights into the ageing mind: a view from cognitive neuroscience. Nature reviews neuroscience. 2004 Feb;5(2):87-96
11) Zinn S, Dudley TK, Bosworth HB, Hoenig HM, Duncan PW, Horner RD. The effect of poststroke cognitive impairment on rehabilitation process and functional outcome. Arch Phys Med Rehabil. 2004;85:1084-1090.
12) Ballard C, Stephens S, McLaren A, et al. Neuropsychological deficits in older stroke patients. Ann N Y Acad Sci. 2002;977:179-182.
13) Duncan PW, Lai SM, Keighley J. Defining post-stroke recovery: implications for design and interpretation of drug trials. Neuropharmacology. 2000;39:835-841.
14) Folstein MF, Folstein SE, McHugh PR (1975) Mini-mental state. A practical method for grading the cognitive state of patients for the clinician. J Psychiatr Res 12(3):189– 198
15) Tombaugh TN, McIntyre NJ (1992) The mini-mental state examination: a comprehensive review. J Am Geriatr Soc 40(9):922–935
16) Dick JP, Guiloff RJ, Agron J et al (1984) Mini-Mental State Examination in neurological patients. J Neurol Neurosurg Psychiatry 47(5):496–499
17) Katzman R, Brown T, Fuld P: Validation of a short orientation-memoryconcentration test of cognitive impairment. Am J Psychiatry 1983;140:734–739.
18) Blessed G, Tomlinson BE, Roth M: The association between quantitative measures of dementia and of senile change in the cerebral grey matter of elderly subjects. Br J Psychiatry 1968;114:797–811.
19) Brooke P, Bullock R: Validation of a 6 item cognitive impairment test with a view to primary care usage. Int J Geriatr Psychiatry 1999;14:936–940.
20) Goring H, Baldwin R, Marriott A, Pratt H, Roberts C: Validation of short screening tests for depression and cognitive impairment in older medically ill inpatients. Int J Geriatr Psychiatry 2004;19:465–471.
21) Etgen T, Sander D, Huntgeburth U, Poppert H, Förstl H, Bickel H: Physical activity and

incident cognitive impairment in elderly persons: the INVADE study. Arch Intern Med 2010;170:186–193.

22) Villareal DT, Grant E, Miller JP, Storandt M, McKeel DW, Morris JC: Clinical outcomes of possible versus probable Alzheimer's disease. Neurology 2003;61:661– 667.

23) Williams MM, Roe CM, Morris JC: Stability of the clinical dementia rating, 1979– 2007. Arch Neurol 2009;66: 773–777.

24) Ball LJ, Ogden A, Mandi D, Birge SJ: The validation of a mailed health survey for screening of dementia of the Alzheimer's type. J Am Geriatr Soc 2001;49:798–802.

25) Locke T, Keat S, Tate M, Bown A, Hart A, Ghosh R: Assessing the performance of the four question abbreviated mental test in the acute geriatric setting. Acute Med 2012;12:13–17. 26) Alzheimer's Society: Helping You to Assess Cognition: A Practical Toolkit for Clinicians. 2013.

27) Adelman AM, Daly MP: Initial evaluation of the patient with suspected dementia. Am Fam Physician 2005;71: 1745–1750.

28) Davous P, Lamour Y: Elementary test of concentration, orientation and memory. Application to the detection of dementia states in daily practice (in French). Presse Med 1988;17:513–515.

29) Crum RM, Anthony JC, Bassett SS, Folstein MF: Population-based norms for the Mini-Mental State Examination by age and educational level. JAMA 1993;269:2386– 2391.

30) O'Sullivan D, O'Regan NA, Timmons S. Validity and reliability of the 6-item cognitive impairment test for screening cognitive impairment: a review. Dementia and geriatric cognitive disorders. 2016;42(1-2):42-9.

31) Anto EJ, Siagian LO, Siahaan JM, Silitonga HA, Nugraha SE. The relationship between hypertension and cognitive function impairment in the elderly. Open access Macedonian journal of medical sciences. 2019 May 15;7(9):1440.

32) Feldman HH, Jacova C. Mild cognitive impairment. The American Journal of Geriatric Psychiatry. 2005 Aug 1;13(8):645-55.

33) Bour A, Rasquin S, Boreas A, Limburg M, Verhey F. How predictive is the MMSE for cognitive performance after stroke?. Journal of neurology. 2010 Apr;257(4):630-7

34) Mystakidou K, Tsilika E, Parpa E, Galanos A, Vlahos L. Brief cognitive assessment of cancer patients: Evaluation of the mini□mental state examination (MMSE) psychometric properties. Psycho□Oncology: Journal of the Psychological, Social and Behavioral Dimensions of Cancer. 2007 Apr;16(4):352-7.

35) Abdel-Aziz K, Larner AJ. Six-item cognitive impairment test (6CIT): pragmatic diagnostic accuracy study for dementia and MCI. International psychogeriatrics. 2015 Jun 1;27(6):991