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Comparison of the Montreal Cognitive Assessment and 7minute Screen Test to Assess Mild Cognitive Impairment Among Geriatric Population

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Abstract

Background: Ageing is associated with various cognitive changes which can differ considerably both inter- and intra-individually. Mild cognitive impairment is an intermediate clinical state between normal cognitive ageing and mild cognitive impairment is a precursor to Alzheimer Disease. Screening for Mild Cognitive Impairment is an important aspect when it comes to neurological rehabilitation. TheMoCA and 7MS have shown to be superior to the MMSE in detecting Mild Cognitive Impairment. However there is lack of information on comparison of 7MS withMoCA which could be considered in screening mild cognitive among geriatric patients. **Aim of the Study:** To compare the 7MS to the MoCA for assessing MCI in a geriatric population. **Methods**: An Observational Prospective type of study was conducted with sample size of 95 geriatric populations. On day one the MoCA was administered and on day two screening was done using the 7MS. The scores were compared for data analysis. **Dataanalysis:** Descriptive statistical analysis of total score of the MoCAand 7MS was carried out and results were expressed in terms of mean and standard deviation. Diagnostic test to validate 7MS test for sensitivity and specificity was calculated. **Results**: The sensitivity of 7MS was found to be 100% but the specificity was only 1.8% compared to the MoCA which has a sensitivity of 100% to a very good to excellent specificity of 87%.**Conclusion:** The results indicate thatMoCA is a more sensitive and specific tool than the 7MS to assess Mild Cognitive Impairment in a geriatric population.

Keywords:Mild Cognitive Impairment, Montreal Cognitive Assessment, 7 Minute Screen.

Introduction

Cognition is a process of knowing, discrimination between and selection of relevant information, acquisition of information, understanding and retention, and the expression and application of knowledge in the appropriate situation. Human ageing is associated with various physical social and cognitive changes, which can differ considerably both inter and intra individually. The speed at which information is processed, inhibitory function and episodic memory all show age related declines **[1, 2, 4]**Cognitive decline is a normal part of ageing and is a result of brain changes that accompany normal ageing.

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Cognitive impairment is emerging as a major risk factor for Alzheimer's disease (AD) and dementia and it may cause functional problems for older people.**[3,4]**Classification of different degrees of cognitive decline (but not dementia) has not yet been clearly established. The presence of Mild cognitive impairment (MCI) has not been clearly established and can have an impact on prognosis and quality of life. Mild cognitive impairment defines a transitional stage between normal ageing and dementia, and reflects the clinical situation where a person has memory complaints and objective evidence of cognitive impairment but no evidence of dementia. Mild cognitive impairment is important in terms of recognizing memory loss in older people as well as identifying a group of individuals at high risk of developing dementia and who may benefit from prevention strategies.**[5]**The presence of mild cognitive impairment in elderly individuals is often a clinical challenge of uncertain prognostic value. The presence of mild cognitive impairment was noted by Dr.Ronald Peterson(2011) who typically separated MCI into two categories: Amnestic MCI: where memory impairment

is predominant and Non Amnestic MCI: where there is impairment in other domains such as language, attention, visuospatialfunction.**[6]**Prevalence of Amnestic MCI accounts for 11.1% and 4.9% for non-Amnestic MCI. Amnestic MCI may lead to Alzheimer's disease (AD) whereasnonamnestic MCI can cause frontotemporal lobe degeneration or dementia with Lewy bodies.**[6]**Mild cognitive impairment is also associated with characteristic neuropsychiatric symptoms, such as dysphoria, apathy, irritability, and anxiety.**[1]**The current increase in aged individuals number and proportion of the general population warrants dependable strategies to improve early detection of cognitive Impairment. Cognitive assessment is commonly used for the following reasons: Screening for cognitive impairment, differential diagnosis of cause and rating of severity of disorder or monitoring disease progression.**[7]**

A study to screen cognitive impairment was conducted and six brief screening tests including Memory Impairment Screen (MIS), Letter Scoring Test (LST), Verbal Fluency (VF), ClockDrawing Test (CDT) was assessed independently. Results showed that LST yielded a diagnostic accuracy for AD and MCI patients. A combination of LST, MIS, VF and CDT, sensitivity for AD and MCI was more and therefore concluded that screening tests will help detect patients with AD and Mild Cognitive impairment.**[8]**

A wide range of tools have been developed to aid the clinician in screening the cognition impairment in geriatric population. These vary from brief screening tools that take less than a minute to complete, to formal neuropsychological assessments that take several hours; appropriate choices depend both on the time available and purpose of assessment. A composite of screening tests suitable for application in general outpatient care in neurological and psychiatric services reliably detects patients with AD and MCI. Although several screening tools are available for detecting dementia, the Folstein Mini Mental State Examination (MMSE) has been used by clinicians as a cognitive screening tool for its convenience, even though it is not sensitive, and often fails to detect cognitive impairment and has low sensitivity for MCI.**[9]** Recently among the few validated scales for screening MCI and dementia, the Montreal Cognitive Assessment (MoCA) has shown to have excellent sensitivity (90%for MCI and 100% for AD) and specificity of 87% for MCI.**[10]**

The Montreal Cognitive Assessment (MoCA) was developed by DrNasreddin in 1996, and then validated with the help of Chertkow, Philips, Whitehead, and Bergman in 2005. The MoCA is a one page 30-point test administered in 10 minutes. It assesses the following cognitive domain: attention and concentration, executive functions, memory, visuo-constructional skills, conceptual thinking calculations and orientation. The suggested cut off point on the MoCA is 26. A score less than26 are indicative of Mild Cognitive Impairment in geriatric population. There are several features in MoCA design that likely explain its superior sensitivity for detecting MCI. The MoCA memory testing involves more words, fewer learning trails and a longer delay before recall than the MMSE. Executive functions, higher –level language abilities, and complex visuospatial processing can also be mildly impaired in MCI participants and are assessed by the MoCA with more numerous and demanding tasks than the MMSE. The MoCA promises to fill an urgent and unmet need for brief tool capable of detecting patients with MCI and distinguishing them from cognitively intact older person and feasible to use in clinical setting, where assessment time is often limited. **[10]**However the MoCA has certain disadvantages as it does not include procedural memory, mind body co-ordination and learning of complex tasks.

The 7 Minute Screen (7MS) a neurocognitive screening test highly sensitive to various types of dementia and has shown to be superior to the MMSE in detection of early symptoms of Alzheimer's disease and MCI. The 7MS Test has shown to have a sensitivity and specificity of 92.9% and 93.5% for Alzheimer's disease.**[8]**The seven minute screen test consists of four cognitive domains:Benton temporal orientation enhanced cued recall, clock drawing,and verbal fluency. The mean duration of the test is 7-12 minutes. The 7MS test has more to do with mental concentration. This particularly applies for the memory tasks such as the enhanced cued recall, in which 16 items have to be remembered, whereas in the MMSE only three items have to be recalled freely. The clock drawing test also requires more mental concentration than copying a figure, which is used in the MMSE to test visuo-construction. Additionally, the specificity of the MMSE appears to be compromised when used with patients less than an eighth grade education or with high levels of education, whereas the 7MS test is not affected by subject level of education, age or gender. The disadvantage of 7MS test is that the scoring system can be difficult if the clinician is not acquainted with the 7MS. The presence of depression confounds the 7MS results and lowers its specificity. **[11]**

An ideal cognitive screening instrument that can be used in a primary care setting should be brief, accurate, simple to administer, acceptable to patients, less time consuming and should have a broad coverage of cognitive domains. Therefore there is a need to identify

a better primary care screening tool for Mild cognitive impairment. The MoCA and 7MS can distinguish patients with mild cognitive impairment from cognitively intact older person and both are considered superior to MMSE in detecting MCI.**[4, 12]**The MoCA could be considered the new 'gold standard' in cognitive evaluation in geriatric patients.**[13]**The 7MS Test also assesses Mild Cognitive Impairment.**[12]** Both the scales take the same time to assess the cognition function. This comparative study carried out to compare the 7 Minute Screen with the MoCA (gold standard) which will help in identifying which scale would be ideal to be used in a clinical setting for mild cognitive impairment screening.

Materials and methods

Objective of the study

- To assess MCI using the Montreal Cognitive Assessment and 7 Minute Screen Test.
- To assess the sensitivity and specificity of the 7 Minute Screen Test.
- To compare the 7 Minute Screen Test to the Montreal Cognitive Assessment for assessing Mild Cognitive Impairment in a geriatric population.

Study Design

Observational, Prospective study

Source of data collection

Geriatric Subjects between 60-76 years of age were recruited from Out Patient Department of RamaiahMemorial and Teaching Hospitals, Bangalore and from Dignity Foundation Centre, Hebbal in Bangalore City.

Method of sampling

Convenience Sampling

Sample Size

95 subjects

Inclusion Criteria

- Males and Females between 60-76 years of age.
- Patients who are not demented.
- Normal general Cognitive Function.
- Subjects with normal hearing abilities.
- Subjects should be well educated to understand English.

Exclusion Criteria

- Patients with Neurological Disorders.
- Moderate to severe cognitive impairments.
- Presence of any psychiatric impairment.
- Subjects who are visually and hearing impaired.

Materials Used

- Montreal Cognitive Assessment (Original Version 7.1)
- 7 Minute Screen
- Stop Watch

Figure 1: Instruction to the subject regarding the scales

Figure 2: Subject undergoing screening test for Cognition impairment

Anethical Clearance was obtained from ethical committee of Ramaiah Medical College. The study included 95 geriatric subjects both males and females who fulfilled the inclusion criteria for the study were assessed using MoCA and 7MS.

All the geriatric patients aged between 60-76 years were recruited from Out Patient Department of M.S.Ramaiah Hospitals. The study was explained to each subject and an informed consent was obtained from each subject.Instructions and the components of the scales were explained prior to their administration. On day one Montreal Cognitive Assessment was administered following which the scores were calculated. On day two screening was done using the 7MStest. Each session lasted for around 10-15 minutes.

Data Analysis

Statistical Strategy

The data collected were in Microsoft Excel and statistical analysis was performed was the Statistical Package for Social Sciences (SPSS version 20) software.

Statistical Methods

Descriptive statistical analysis has been carried out for the current study. Results for related samples are presented on Mean and Standard Deviation. The sensitivity and specificity of the MoCA& 7MS was determined.

Results

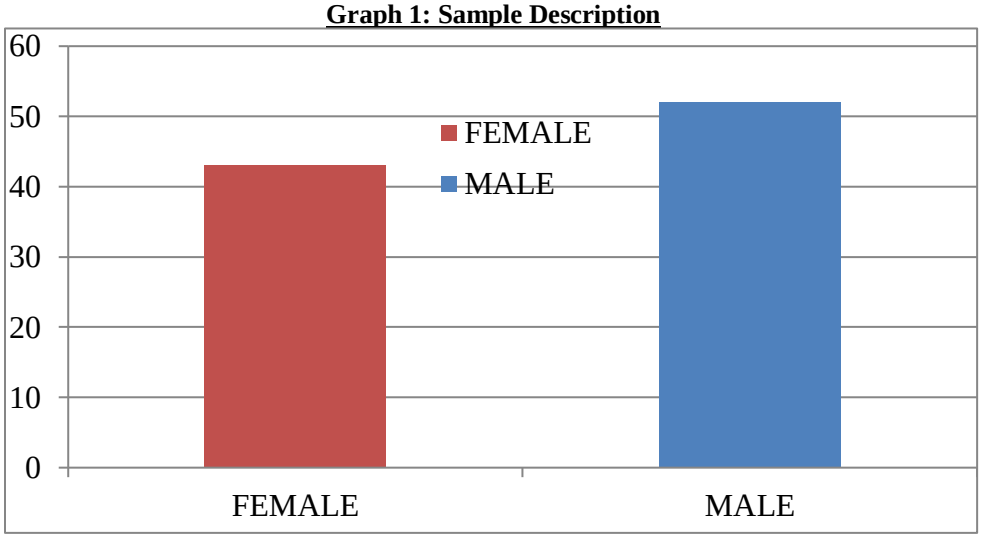
The main aim of the study was to asses MCI in geriatric population using MoCA and 7MS and to compare the 7 MS test to the Montreal Cognitive Assessment to assess Mild Cognitive Impairment in a geriatric population. Results included descriptive statistics of the MoCA and 7MS scores, diagnostic test to assess sensitivity and specificity of the two scales, comparison of the sensitivity and specificity of the MoCA and 7MS and descriptive analysis of quantitative variables of the two scales in terms of Mean and Standard Deviation.

Table 1: Description of Sample

Description of Sample					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	FEMALE	43	45.3	45.3	45.3
	MALE	52	54.7	54.7	100.0
	Total	95	100.0	100.0	

The above table shows the distribution of sample. A total of 95 subjects were present in the study of which 45.3%were female and 54.7% were male.

Graph 1: Sample Description



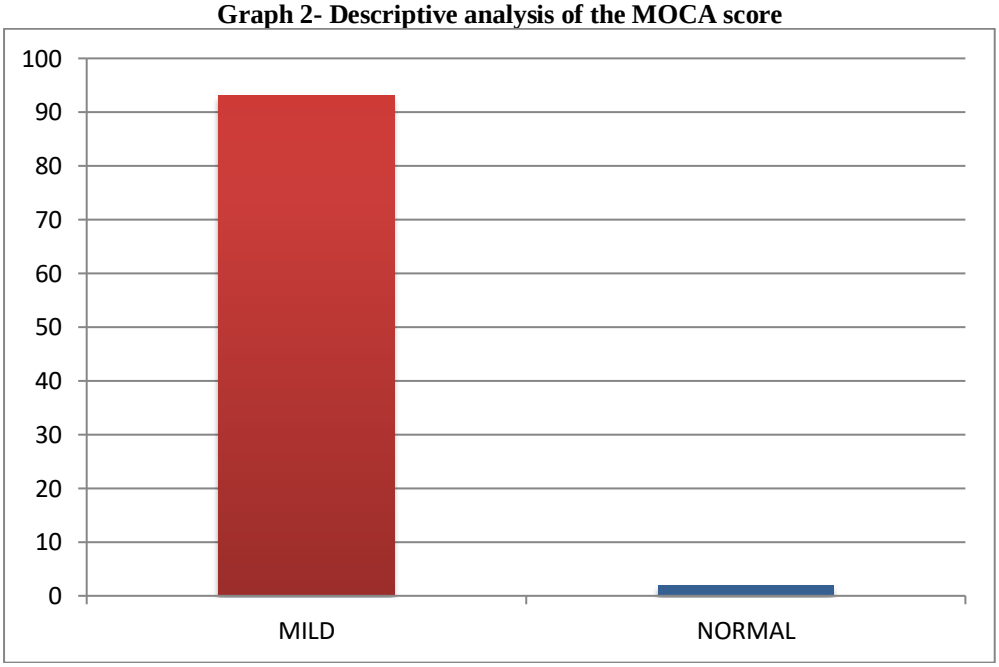
The above graph shows the distribution of sample

Table 2: Descriptive Statistics of the MOCA Score

MOCA					
		Frequency	Percent	Valid Percent	Cumulative Percent
	1(MCI)	93	97.9	97.9	97.9
	2(NORMAL)	2	2.1	2.1	100.0
	Total	95	100.0	100.0	

The above table shows the percentage of MCI among geriatric subjects. 97.9% of the population were shown to have MCI and 2.1% of the population showed normal cognitive function.

Graph 2- Descriptive analysis of the MOCA score



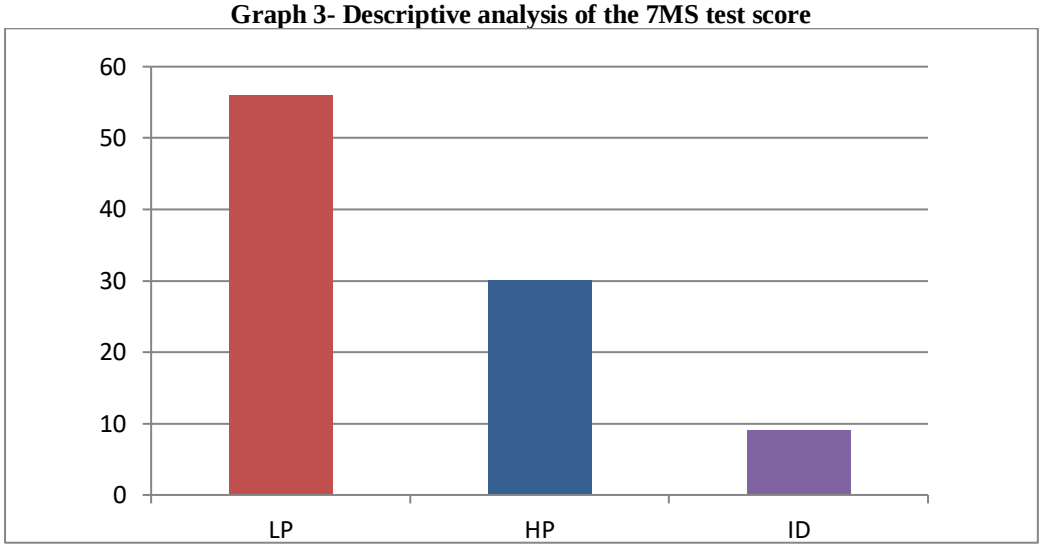
The above graph shows the frequency of MCI among geriatric subjects. 93 subjects showed to have MCI and 2 subjects had normal cognitive function.

Table 3: Descriptive Statistics of The 7 Minute Screen Test Score

Descriptive Statistics of The 7 Minute Screen Test Score					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1(LP)	56	58.9	65.1	65.1
	2(HP)	30	31.6	34.9	100.0
	Total	86	90.5	100.0	
Missing	9	9	9.5		
Total		95	100.0		

The above table shows total score of 7 MS with 58.9% of subjects having low probability(LP) to dementia, 31.6% of patients having high probability(HP) to dementia and 9.5% of the data being insufficient to make a diagnosis.

Graph 3- Descriptive analysis of the 7MS test score



The above graph shows the total score of 7MS. 56 patients had a low probability for dementia, 30 subjects have a high probability for dementia and 9 subject data was insufficient to make a conclusion.

Table 4: Diagnostic Test to validate the Sensitivity and Specificity of 7MST

MOCA * Total score 7 MST Crosstabulation

			Total score 7 MST		Total
			Low prob	High prob	
MOCA	Mild	Count	55	30	85
		% within MOCA	64.7%	35.3%	100.0%
		% within Total score 7 MST	98.2%	100.0%	98.8%
		% of Total	64.0%	34.9%	98.8%
	normal	Count	1	0	1
		% within MOCA	100.0%	0.0%	100.0%
		% within Total score 7 MST	1.8%	0.0%	1.2%
		% of Total	1.2%	0.0%	1.2%
Total		Count	56	30	86
		% within MOCA	65.1%	34.9%	100.0%
		% within Total score 7 MST	100.0%	100.0%	100.0%
		% of Total	65.1%	34.9%	100.0%

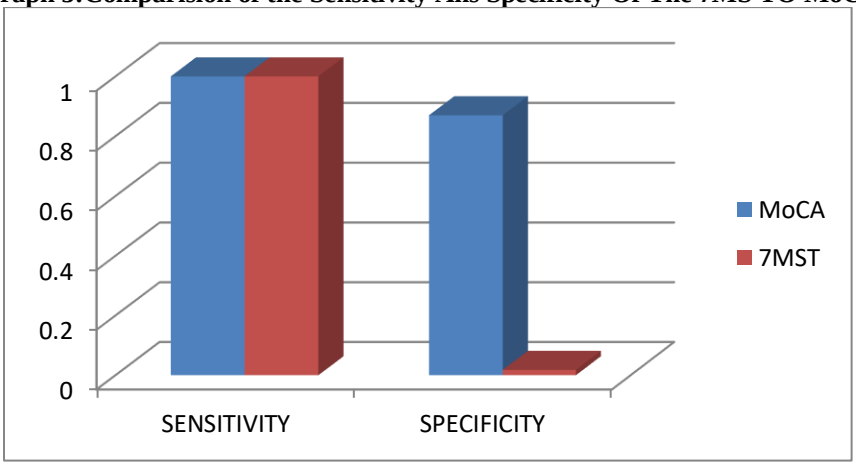
The above table shows cross tabulation between the MoCA and 7MS. The 7MS and MoCA showed to have 100% sensitivity but the specificity of 7MS was shown to be only 1.8%.

Table 5: Comparision of the sensitivity and specificity of the 7MST to the MoCA

SCALE	SENSITIVITY	SPECIFICITY
MoCA	100%	87%
7MS	100%	1.8%

The above table shows the sensitivity and specificity of the 7MS and MoCA. The MoCA and 7MS shows to have 100%sensitivity to MCI but the 7MS has a poor specificity of 1.8% compared to the MoCA which has an excellent specificity of 87%. This shows that 7MST can pick up cognitive deficits but it is poor at picking up Mild Cognitive Impairment making MoCA a superior screening tool to identify MCI.

Graph 5:Comparision of the Sensitivity Ans Specificity Of The 7MS TO MoCA



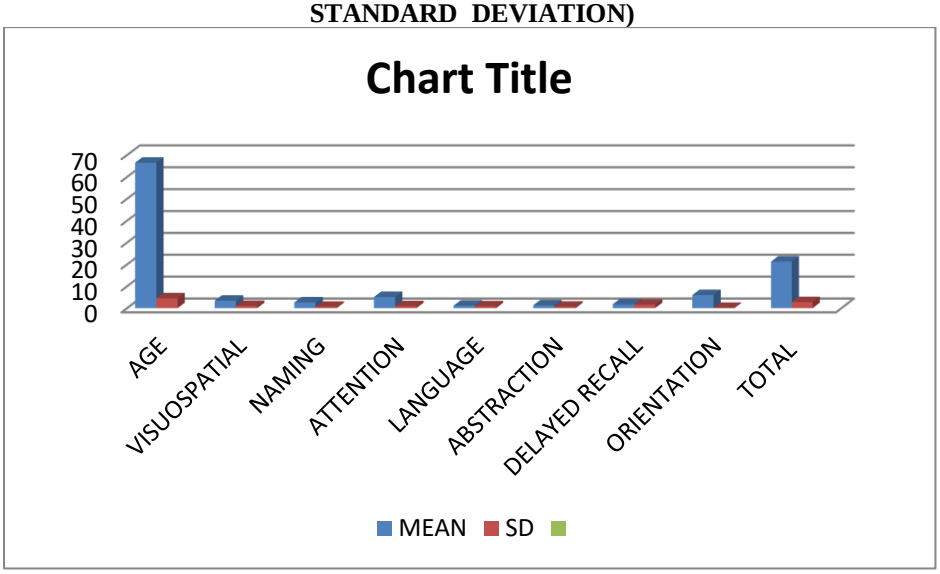
The above graph shows the sensitivity and specificity of the MoCA and 7MS. It shows that the 7 MST is sensitive enough to pick up a cognitive impairment but not specific in picking up Mild Cognitive Impairment whereas the MoCA shows high sensitivity and specificity for MCI.

Table 6- Descriptive analysis of quantitative variables of MoCA (mean and standard deviation)

	Age	Visuo-Spatial	Naming	Attention	Language	Abstraction	Delayed Recall	Orientation	Total
Mean	66.46	3.41	2.61	5.09	1.13	1.27	1.77	5.99	21.27
Sd	4.498	.973	.589	.900	.828	.643	1.5888	.103	2.750

The above table shows quantitative variables of the MoCA in terms of mean and standard deviation. The mean age of subjects was 66.46+/-4.498. The mean score for visuospatial was3.41+/-.973out of a total score of 5,the mean score fornaming was2.61+/-.589 outof 3,themeanscoreforattentionwas5.09+/-.900 outof6,the mean score for language was1.13+/-.828out of 3, the mean score for abstraction was1.27+/-.643 out of 2,the means core for delayed recall was1.77+/- 1.5888out of 5,the mean score for orientationwas5.99+/- outof6. The mean score on MoCA was 21.27+/- 2.750 out of 30 where a score of 26 or below indicates MCI.

GRAPH 6:DESCRIPTIVE ANALYSIS OF QUANTITATIVE VARIABLES OF MoCA (MEAN & STANDARD DEVIATION)



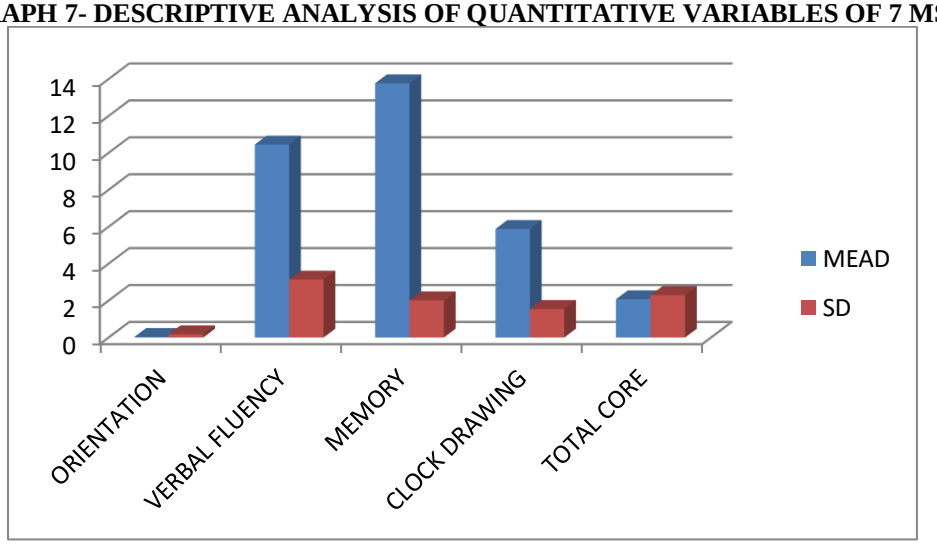
The above graph shows quantitative variables of MoCA in terms of Mean and Standard deviation.

Table 7- Descriptive Statistics of Quantitative Variables of 7ms (MEAN AND STANDARD DEVIATION)

	ORIENTATION	VERBAL FLUENCY	MEMORY	CLOCK DRAWING	TOTAL CORE
MEAD	.0316/0	10.45/45	13.77/16	5.88/7	2.0737
SD	.17580	3.138	2.013	1.547	2.29821

The above table shows quantitative variables of 7 MST in terms of mean and standard deviation.The mean score for orientation was .0316+/- .17580 out of a score 0 , the mean score for verbal fluency was 10.45 +/- 3.138 out of 45 , the mean score for memory was 13.77 +/- 2.013 out of 16 , the mean score for clock drawing was 5.88 +/- 1.547 out of 7.

GRAPH 7- DESCRIPTIVE ANALYSIS OF QUANTITATIVE VARIABLES OF 7 MST



The above graph shows quantitative variables of 7MST in terms of mean and standard deviation.

The results of the study showed:

- Mild Cognitive Impairment is present in geriatric population.
- The MoCA can be considered superior to the 7MST to assess MCI in a geriatric population.
- The 7 MST can be used to screen for cognitive impairment but it is poor in identifying patients with MCI.

Discussion

Mild cognitive impairment is a typical neuropsychiatric disorder that can progress to dementia in many cases. MCI is diagnosed when cognitive deterioration is not severe enough to impair activities of daily living. Therefore there is a need for early identification and diagnosis of MCI to aid in an effective treatment.**[14]**

Literature has shown that the MoCA and the 7MS were superior to the commonly used MMSE scale to assess MCI.**[10, 11]**Michael (2010) concluded that the MoCA could be the new gold standard in cognitive evaluation in geriatric patients.**[13]**Therefore a comparative study between the two scales would help us identify a better cognitive screening tool for MCI.

The results of the study showed that MCI is present in geriatric population. The sensitivity of the two scales was found to be 100% but the specificity of the 7MS was only 1.8% compared to the MoCA which had a specificity of 87% towards MCI.

The reason of the results obtained can be attributed to the 7 MST looked at key areas affected by AD-orientation, memory, visuospatial, verbal fluency only. Subjects with MCI have memory impairment beyond that expected for age and education yet not demented. The two scales have a memory domain. In our study the mean score for memory on MoCA was 1.77+/-1.5888 out of 5 and mean score for memory on 7 MST was 13+/-2.013 out of 16. This shows that the MoCA picks up memory impairment much better than 7MST probably because of the delayed recall which is done after 5 minutes on the MoCA whereas in the 7MS recall is immediate. The MoCA also has an advantage of giving the test interpreter additional information about the type of memory disorder for example: memory deficits due to retrieval failure, performance can be improved with a cue. For memory deficits due to encoding failure, performance does not improve with a cue. Another reason for low specificity of 7 MST could be the subscales which differ in both MoCA and 7MS. The MoCA has a detailed cognitive domain consisting of eight items unlike the 7MS which has only four domains. Complexvisuospatial/executive tasks like copying a figure is more challenging in MoCA than 7 MST. The portion of the 7 Minute Screen that focuses on visuospatial ability is a clock drawing test but the clock drawing does not appear to be useful screening tool for Mild dementia. **[15]**

The MoCA also assess more numerous and demanding tasks like attention, language and abstraction. Meulen2004 stated that the presence of depression confounds the 7 Minute Screen Test results and lowers its specificity. **[11]** The presence of depression on MoCA scores is yet not understood. As depression was not considered in this study one of the reason for low specificity of 7MS could be the presence of depression among the geriatric subjects.

Another reason for low specificity of 7MS could be the scoring system which is difficult to interpret if the examiner is not well versed with it. The interpretation of results is different on the 7MS compared to MoCA. The MoCA is a summative scale where several item scores are added to create a total score, whereas the 7MST is a Likert-type Scale. The MoCA gives us a simple scoring system where a score of 26 or below 26 out of 30 shows is considered to be MCI. Whereas the 7MS calculators reads the scores as High Probability to dementia, Low Probability to dementia or an option of insufficient data to make a diagnosis thereby giving us a probability rather than a diagnosis for MCI.

The 7MS can be influenced by level of education and gender differences. Krishna AP (2011) concluded that there are significant gender differences when assessed for cognition using 7MS. Their study showed that Males performed better than females. The cognitive performance was associated with increased level of education. Highly educated people performed better than less educated. **[16]**In our study subjects who were >/= 12 years education performed better. Diana (2009) concluded that the 7 Minute Screen can be also used as a cognitive screening tool.**[17]**The MoCA is much more specific tool to assess for MCI than the 7MS. Hence we recommend that the MoCA be used over the 7MS in a geriatric rehabilitation setting.

Another factor to be considered while choosing a screening tool is the time required to administer the scale. The Montreal Cognitive Assessment (MoCA © Version 7.1) was developed as a quick screening tool for MCI and early Alzheimer's dementia. It takes 10 minutes to administer. The MoCA is available in 36 languages with test score and instructions. The 7MS takes 7 Minutes 42 seconds for completion.

Of those with Mild Cognitive Impairment, about 15% per annum will progress to dementia and 90% of this will be AD. Hence it is important to assume that mild but significant cognitive impairment probably represents the early stage of some form of dementia. For treatment purpose with regards to rehabilitative and

pharmacological to be effective early detection of MCI is essential. **[18]**

Conclusion

With the present study it can be concluded that Mild Cognitive Impairment is present in Geriatric Population. The Montreal Cognitive Assessment was found to be superior to the 7 Minute Screento assess Mild Cognitive Impairment in geriatric population. Therefore the MoCA can be used to screen Patients for MCI in a geriatric rehabilitation setting.

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References

1. Karen M. Rodrigue, Kristen M. Kennedy. Neuroanatomical and Cognitive Mediators of Age-Related Differences in Episodic Memory. Neuropsychology. 2008 Jul; 22(4): 491–507.
2. Petersen RC, Smith GE, Waring SC. Mild Cognitive Impairment: clinical characterization and outcome. Arch Neurol 1999; 56:303-308.
3. Jennifer N. Vega, Paul A. Newhouse. Mild Cognitive Impairment: Diagnosis, Longitudinal Course, and Emerging Treatments. Curr Psychiatry Rep. 2014; 16(10): 490.
4. Anil Kumar Goswami, Kapoor SK. Prevalence and Determinants of Cognitive Impairment in rural elderly population in India. Journal of Help age India and research development. 2006; 12(2):8-15
5. Alistair Burns, Michael Zaudig. Mild Cognitive Impairment in older people. Dement Geriatric Cognition Disorder .Lancet 2002; 360:1963-65.
6. Peterson RC. Mild Cognitive Impairment in Elderly. New England Journal of Med 2011; 364:2227-2234.
7. WoodfordHJ,George J. Cognitive assessment in the elderly: a review of clinical methods. Q J Med 2007; 100:469-484.
8. Ulrike Beinhoff, Verena Hilbert. Screening for Cognitive Impairment: A Triage for Outpatient Care. Journal Of Dement Geriatric Cognition Disorder 2005; 20:278-285.
9. ArunAggarwal, Emma Kean.Comparision of the Folstein Mini Mental State Examination to the Montreal Cognitive Assessment as a Cognitive Screening Tool in an Inpatient Rehabilitation Setting. Journal of Neuroscience & Medicine 2011 ;(1):39-42.
10. Zaid S Nasreddin, Natalie A.Philip. The Montreal Cognitive Assessment, MoCA: A Brief Screening Tool for Mild Cognitive Impairment. Journal of American Geriatric Society 2005; 53:695-699.
11. MeulenEFJ. Schmand B. The seven minute screen: a neurocognitive screening test highly sensitive to various types of dementia. Journal Neurology Neurosurgery Psychiatry 2004; 75:700-705.
12. Zahinoor Ismail, TarekK Rajji. Brief Cognitive screening Instruments: an update. Journal of Geriatric Psyciatry 2010; 25:111-120.
13. Michael L, Mechthild D. Could the MoCAbe the "new gold standard" in cognitive evaluation in geriatric patient. Journal of Alzheimer's association 2010; 6:54-94.
14. Powlishta KK, Von Dras DD .The clock drawing test is a poor screen for very mild dementia. Journal of American Academy of Neurology 2002;59(6): 898-903.
15. Jin-SookCheon, Han-Cheol. Comparison of Cognitive Function in Dementia and Major Depressive Disorders Using The 7 Minute Screen Test. Journal of Psychiatry Invest 2005;2(1):66-71.
16. Krishna AP, Sen PA.Evaluation of the Efficacy of 7-Minute Screen Test For Assessment of Risk For Dementia. Asian J. Exp. Biol.Sci2011.Vol2 (2).
17. Diana .R.Kerwin. How to prevent a delayed Alzheimer's Diagnosis. Journal of family practice 2009; 1:58.
18. Celsis P. Age related cognitive decline, MCI or preclinical AD? J Ann Med 2000; 32(1):6-14.
19. Kalbe E, Kessler J., DemTect: a new sensitive cognitive screening test to support the diagnosis of MCI and early dementia. International journal of geriatric psychiatry .2004; 19(2):136-43.

List of abbreviation

MoCA : Montreal cognitive Assessment
7MS : 7 Minute Screen
MCI : Mild Cognitive Impairment
AD : Alzheimer's disease
MMSE : Mini Mental State Examination

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