A Study comparing Mini Mental State Examination and Mini Cognitive assessment as screening tool in assessing cognitive functioning in Elderly.

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Abstract

Objective
This study was undertaken to compare Mini Mental State Examination (MMSE) and Mini Cognitive Assessment (Mini cog) in assessing cognitive function in elderly patients aged above 65 years in out patient set up.

Materials and Methods
This cross sectional study was carried out in the Out Patient Department in a tertiary care center. 114 elderly patients aged above 65 years were included in this study over a period of six months. Data collected included age, sex, educational status. Cognitive status of patients were examined with mini cog and Mini Mental State Examination (MMSE) was normal in 103 patients and 11 patients showed cognitive decline. Among these 103 patients who had a normal MMSE score, 70 (61.40) patients also scored good in mini-cog examination. Of the 11 patients with abnormal MMSE, 7 (63.63) patients scored abnormal in Mini cog also. Sensitivity of mini cog is 63.64 and specificity is 67.96. Conclusion
To conclude, this study shows that mini cog is an effective screening tool in out-patient set up.

Keywords: Mini cog, MMSE, Cognitive function.

Introduction

Multiple screening tools are available to assess cognitive impairment. Most are reliable and valid. The Mini-Cog is an excellent tool that is easily and quickly administered and very accurate in identifying cognitive impairment. This tool was initially created and tested in a community-dwelling sample. Mini cog performed as well as other well-tested and validated standard screening tests that take up to 10 minutes to administer. Sensitivity of Mini cog is 76-99% and specificity is 89-96% with 95% confidence interval. These are comparable to the specificity of the MMSE in identifying the absence of cognitive impairment. Mini cog includes 3 items: recall and clock drawing test (CDT). It comprehensively assesses short term memory and constructional, visuospatial, and executive functions. It takes less than 5 min to perform the test. Subjects are classified as having cognitive impairment if unable to recall any of the three words (after performing the clock drawing) or if they recall only 1 or 2 words and draw an abnormal clock. Results obtained is that cognitive impairment is present or not, rather than a numerical scale. This adds to simplicity as a screening test but has no value in either monitoring the disease progression or severity. Some researchers prefer to use the predrawn circle because it focuses the clock drawing performance on number and hand placement, thereby bypassing some difficulties inherent in procedures in which the participant draws the circle as well. A commonly used time setting is “10 after 11” (or “10 past 11”), which helps in identifying the “pull” of executive dysfunction. It also involves both visual fields. Age affects clock drawing in adults with performance declining particularly after age 70 years. Education has little impact on performance in CDT. Clock drawing shows moderate/high correlations with measures of intellectual status. Clock drawing also provides an indication of general cognitive functioning, correlating moderately/highly with global measures such as the MMSE, as well as subtests of the WAIS-R (information, similarities, digit span, and block design subtests). Therefore, as a preliminary screen, clock drawing appears to provide a reasonable measure of cognitive functioning. Studies by Freedman et al. 3 showed that clock drawing improved from the command to the copy condition in patients with AD, whereas no such improvement occurred among patients with vascular dementia. MMSE by Folstein1 gives an overall idea of the basic cognitive functions. Studies done by Adunsky2 et al show that MMSE scores show modest relations with measures of functional capacity (e.g., driving, cooking, caring for finances, consent to participate in studies), functional outcome after stroke, and time to nursing home care. The greatest risk is for those with moderate to severe cognitive impairment, although mild impairment (MMSE scores 18-23) is also associated with increased risk. A decline of at least four points over two years is also predictive of an increased risk of mortality. MMSE is a 30 point assessment tool. It is a commonly used screening tool and aids in monitoring the progression of dementia. MMSE correlates well with other cognitive screening tests. Takes an average of 8 minutes to perform the test. Various cut values have been advocated for maximum sensitivity and specificity in different populations. It has both ceiling and floor effect.

Materials and Method:
This study was carried out in 114 patients aged above 65 years attending the out patients department of a Tertiary care center. The sample group was selected by systematic random sampling. Every 20th patient who attended the out patient department was selected and included in the study. Informed consent obtained from all of them. This is a cross sectional study done during July to December. Data collected include age, sex, education status, vision, hearing, Mini-cog and MMSE.

Data Analysis:
MMSE and mini cog were done in all patients. MMSE scores with the cut-off of 24 and above out of 30 was taken to be normal. In Mini cog persons not able to recall any word and recalling 1 to 2 of 3 words were taken as abnormal.
words with abnormal CDT are likely to have cognitive impairment. Result obtained from MMSE pointing to cognitive functioning & results obtained from mini-cog were compared and results tabulated.

Results:
Out of the 114 patients included in the study 68 were males and 46 were females. Age of the patients included in the study ranges from 65 years to 94 years. Mean age of 71.05 years. Study shows that the performance in MMSE was good in 103 patients (90.35 %) and the performance in Mini cog was good in 74 (64.9 %). Educational status ranges from basic primary education to undergraduation. 70 (61.40 %) patients showed normal performance in both MMSE and Mini cog. 33 (32.03 %) patients with normal MMSE had abnormal finding in Mini-cog. Out of 11 (9.64%) patients with abnormal MMSE 7 (63.63%) had abnormal mini cog and 4 (36.36%) had normal mini cog. 82.5% of patients with impaired performance in Mini cog performed poorly in clock drawing test. 18.9 % of patients who performed mini cog normally performed poorly in clock drawing test. 67.54% of patients showed similar level of performance in both MMSE and Mini cog.

MMSE Sensitivity of mini cog is 63.64 % and specificity is 67.96 %. Positive predictive value of mini cog is 17.5 % with 95 % confidence interval and negative predictive value is

Discussion:
This cross sectional study was done in the Out patient Department of a Tertiary care center. 114 patients were randomly selected for this study. Consent was obtained. All patients were subjected to both MMSE and Mini cog tests. Results obtained were tabulated. Usual limitations of mini-cog examination like visual impairment or difficulty in holding a writing implement were excluded. Adding the clock drawing test makes the identification of individuals with sallent visuospatial or executive dysfunction and less obvious memory deficits. Most patients who had impaired mini cog testing performed poorly in clock drawing test. This likely indicates a early dementia or mild cognitive impairment. Sensitivity of mini cog is 63.64 % (i.e. it is 63 % accurate in identifying patients with cognitive decline ) and specificity is 67.96 % (i.e. it is 67.96 % effective in identifying patients who do not have cognitive impairment ). This low sensitivity and specificity values could be due to the low formal primary education in most of the study population 7. Positive predictive value of mini cog is only 17.5 % which indicates that if minicog is impaired then the probability of the person having cognitive decline is very less. Negative predictive value of mini cog is 94.59 % which points that a normal Mini cog effectively rules out a cognitive impairment. A study done by So Borson et al, he stated that mini cog detected cognitive impairment better than MMSE in multicentric elderly individuals and less biased by low education and literacy. In another study conducted by Lostra D et al, it showed that the discriminative and reliability advances suggests better performance for subjects of MMSE compared with Mini -- cog. In another study done by Borson and Scalan et al which compared mini cog and MMSE showed the sensitivity and specificity of Mini cog compared well with that of MMSE. In our study around 67.54 % of subjects showed similar performance in both Mini cognitive and Mini Mental State Examination. Mini cog is a reliable and valid screening tool to detect early cognitive impairment. However further detailed evaluation must be carried out for definitive diagnosis of cognitive decline. Elderly patients with vision and hearing impairment were excluded from the study. In our study 40 performed poorly in mini cog testing, of which 31 patients had primary education and 9 had secondary education. 74 elderly subjects performed mini cog well , of which 47 had primary education and 27 had undergone secondary education.

Education
On comparing the educational status of these patient who showed impaired performance in Mini cog , 31 subjects had primary educational status and 9 elderly subjects had secondary educational status (i.e. 77.5 % of patients with abnormal mini cog had low educational status). Thus in our study Mini cog is influenced by educational status. A study done by Sergio Telles , Ribeiro filho, Roberto Alves Lourenio et al, showed impaired performance of minicog in a sample of low education level elderly 7.

Conclusion:
To conclude, this study shows that Mini cog is an effective screening tool for identifying cognitive decline. Being simple and easy to administer in out patient set up , it can be effectively used as a screening tool for community dwelling elderly. But however patients with lower educational status showed impaired performance in Mini cog and hence Mini cog has limitations in elderly with low educational status.

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<td>Primary</td>
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1. What is the conclusion of your study?
To conclude, this study shows that Mini cog is an effective screening tool for identifying cognitive decline. Being simple and easy to administer in out patient set up, it can be effectively used as a screening tool for community dwelling elderly. But however patients with lower educational status showed impaired performance in Mini cog and hence Mini cog has limitations in elderly with low educational status.

2. How did you select your patients?
This study was carried out in 114 patients aged above 65 years attending the out patient department. The sample group was selected by systematic random sampling, every 20th patient who attended the out patient department was selected and included in the study. Informed consent obtained from all of them.