Montreal Cognitive Assessment and Mini Mental State Examination compared as cognitive screening tools in community dweller older adults residing in the central area of Sicily

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Background/Aims: The increase in life expectancy has resulted in a high occurrence of cognitive impairment and dementia. The new diagnostic criteria shift the focus to detecting the disease as early as possible, prior to the onset of dementia. From the above, adequate psychometric screening tools are needed. The aim of the study was to examine Montreal Cognitive Assessment (MoCA) performance in subjects with normal global cognition according to the Mini Mental State Examination (MMSE) in routine clinical practice.

Methods: This was a prospective, clinical validation study in 502 consecutive subjects (mean age 65.43 ± 5.38), referring to our dementia centre for suspected cognitive impairment over a 12-month period. All subjects underwent a standard clinical assessment comprising a history and physical and neurologic examination and a neuropsychological testing. The MMSE and the MoCA were administered on the same day as the clinical evaluation within two hours of each other. To compare the score changes unpaired t-test was used.

Results: A total of 502 consecutive elderly patients were screened. 314 (154, males; 160, females) were included in the study. The mean age of the study sample was of 65.43 ± 5.38; mean education was 7.52 ± 3.08. 188 subjects diagnosed with any type of mild or major neurocognitive disorder were excluded from the normative sample. 314 (62.54%) of 502 evaluated subjects with a MMSE score between 26 and 30/30 had a pathological MoCA score (< 26). 192/314 (61.14%) patients with a MMSE score between 26 and 29/30 obtained MoCA scores below the norm; 122/314 (38.85%) patients with a 30/30 MMSE had a MoCA score below the norm. Recall ($p < .0001$) and attention ($p < .0001$) were the domains that differed significantly on the two screening instruments. Orientation ($p= 0.32$) and language ($p= 0.13$) domains were not statistically significant.

Discussion: To our knowledge, this is the Italian validation study with the largest number of subjects enrolled. Data of our study have extended upon previous findings, that the MoCA is a superior screening tool than the MMSE for detecting cognitive impairment. Using raw scores, MoCA was more frequently impaired ($p<0.001$) than MMSE in a large population based cohort of elderly individuals.

Variable	n	Min	Max	Mean	SD	Percent
Sex, female/male	264/238	-	-	-	-	52.58/47.41
Age, y	502	49	74	65.43	5.38	-
Education, y	502	5	17	7.52	3.08	-
MMSE score	502	26	30	28.71	1.40	-
MoCA score	502	15	29	24.66	3.08	-
IADL score	502	5	8	7.73	0.45	-
ADL score	502	6	6	6	0.00	-
GDS-15 score	502	2	5	3.99	0.90	-

MMSE raw score	Patients with MoCA ≤ 26 (n= 314)	
	n	(%)
26/30	45	14.33
27/30	47	14.96
28/30	52	16.56
29/30	48	15.28
30/30	122	38.85

	Mean	St. dev.	Median	Range
MMSE total raw score	28.71	1.40	29	26-30
Orientation	9.99	0.09	10	0-10
Registration-Memory	3	0	3	0-3
Attention and calculation	4.72	0.44	5	0-5
Recall	2.38	0.85	3	0-3
Language -Naming	7.61	0.48	8	0-8
Praxis	1	0	1	0-1
MoCA total raw score	24.44	4.88	23.5	15-30
Visuospatial-Executive	4.47	1.05	5	0-5
Naming - Memory	2.74	0.50	3	0-3
Attention	4.21	1.16	6	0-6
Language	2.02	1.11	3	0-3
Abstraction	1.49	0.55	2	0-2
Delayed- recall	2.50	1.77	5	0-5
Orientation	5.95	0.21	6	0-6

Comparison of changes in similar subdomains between MMSE and MoCA				
	MMSE		MoCA	
Subdomains	Mean difference	p value	Mean difference	p value
Orientation	- 0.01 (± 0.9)	0.20	- 0.05 (± 0.8)	0.32
Attention	- 0.27 (± 1.2)	0.33	- 1.88 (± 1.4)	< 0.001*
Recall	- 0.01 (± 0.8)	0.35	- 2.59 (± 1.7)	< 0.001*
Language	- 0.38 (± 1.4)	0.28	- 0.07 (± 0.9)	0.13

Conclusion: The additional use of MoCA, as a global assessment tool for the initial screening process, has allowed the identification of patients with cognitive deficit, despite their performance at MMSE had been the norm.

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