



Validation of the Italian version of HIV-Dementia Scale: a screening tool for the detection of subcortical cognitive deficits

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Neuropsychological evaluation

Set of procedures to describe and measure cognitive functioning

- Standardized exam
- Detection and quantification of cognitive symptoms
- Contributes to the formulation of a diagnosis
- Differential diagnosis between the different clinical forms



Cognitive Dysfunctions

CORTICAL PATTERN

- Memory deficits
- Alteration of other higher cortical functions (language)
- Loss of critical/judgment ability

SUBCORTICAL PATTERN

- Psychomotor slowing
- Attention deficits
- Executive dysfunctions
- Visual-spatial deficits

Neurological disorders associated with cognitive deficits

	Cortical Pattern	Subcortical Pattern
Alzheimer's disease	+	-
Fronto-temporal dementia	+	+
Lewy body dementia	+	-
Parkinson disease Dementia (PDD)	+	+
Subcortical ischaemic vascular dementia	-	+
Multiple Sclerosis	+	+
Normal pressure hydrocephalus	+	+
HIV-associated dementia	-	+

Mini Mental State Examination (MMSE)

Folstein et al., 1975

MMSE

1. ORIENTAMENTO

• In che (anno) – (stagione) – (giorno della settimana) – (giorno del mese) – (mese) – siamo?
PUNTEGGIO:/5

• Dove ci troviamo? (stato) – (regione) – (città) – (ospedale, ambulatorio, etc) – (piano)
PUNTEGGIO:/5

2. MEMORIA

• Pronunciare il nome di tre oggetti comuni (es.: mela, tavolo, moneta): dedicare un secondo ad ogni parola, quindi chiedere al paziente di ripeterle tutte e tre. Al primo tentativo, assegnare 1 punto per ogni risposta giusta. Quindi ripeterle fino a quando il soggetto le ha imparate tutte e tre. Conteggiare i tentativi necessari e annotarli.
Tentativi:.....

PUNTEGGIO:...../3

3. ATTENZIONE E CALCOLO

• Chiedere di contare indietro da 100 togliendo 7:
 $93 - 86 - 79 - 72 - 65$
• Far pronunciare la parola "carne", lettera per lettera, partendo dall'ultima. Il punteggio è costituito dal numero di lettere specificate nell'ordine giusto
 $E - N - R - A - C$

PUNTEGGIO:/5

4. RICORDO

• Chiedere i tre oggetti precedentemente memorizzati. Assegnare 1 punto per ogni risposta giusta.
(NOTA: non si può testare il ricordo se durante la memorizzazione il paziente non è riuscito ad imparare il nome di tutti e tre gli oggetti)

PUNTEGGIO:...../3

5. LINGUAGGIO

• Chiedere al paziente di riconoscere, denominandoli, una "matita" ed un "orologio".
PUNTEGGIO:...../2

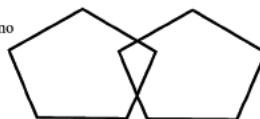
• Far ripetere quanto segue "non c'è ne se né ma che tenga".
PUNTEGGIO:...../1

• Far eseguire le seguenti istruzioni: "Prenda il foglio con la mano destra"
"Lo ripieghi a metà" e
"Lo appoggi sul tavolo/me lo restituisca"
PUNTEGGIO:...../3

• Far leggere ed eseguire la seguente frase: "CHIUDA GLI OCCHI".
PUNTEGGIO:...../1

• Chiedere di scrivere una frase di senso compiuto (almeno soggetto e verbo).
PUNTEGGIO:...../1

• Far copiare il disegno



PUNTEGGIO:...../1

Orientation

Attention

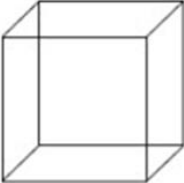
Memory

Language

Visuo-spatial abilities

HIV-Dementia Scale (HDS)

van Harten et al., 2004

Maximum Score	Score	
		MEMORY - REGISTRATION Give four words to recall (dog, hat, green, peach) – 1 second to say each. Then ask the patient all 4 after you have said them.
4	()	ATTENTION Anti-saccadic eye movements: 20 commands _____ errors of 20 trials ≤3 errors = 4; 4 errors = 3; 5 errors = 2; 6 errors = 1; >6 errors = 0
6	()	PSYCHOMOTOR SPEED Ask patient to write the alphabet in upper case letters horizontally across the page and record time. _____ in seconds. <21 sec = 6; 21.1 to 24 sec = 5; 24.1 to 27 sec = 4; 27.1 to 30 sec = 3; 30.1 to 33 sec = 2; 33.1 to 36 sec = 1; >36 sec = 0
4	()	MEMORY/RECALL Ask for 4 words from Registration above. Give 1 point for each correct. For words not recalled, prompt with a "semantic" clue, as follows: animal (dog); piece of clothing (hat), color (green), fruit (peach). Give 1/2 point for each correct word after prompting.
2	()	CONSTRUCTION Copy the cube below; record time: _____ seconds <25 sec = 2; 25 to 35 sec = 1; >35 sec = 0
		
TOTAL SCORE: _____ /16		

- Originally created for detecting cognitive impairment in HIV patients
- Useful in other neurological diseases with subcortical damage
- Rapid administration (6-10 minutes)

Suitability of HDS in detecting subcortical cognitive deficits

Validation phases

1. **Forward-backward translation of the original version**
2. Sensitivity and specificity (ROC-analysis)
3. Criterion Validity

HIV- Dementia Scale (HDS) Italian Version

REGISTRAZIONE: CANE, CAPPELLO, VERDE, PESCA

I. ATTENZIONE

TOT= 16

Numero di errori

≤ 3 errori = 4; 4 errori = 3; 5 errori = 2; 6 errori = 1; > 6 errori = 0

PUNTEGGIO MASSIMO: 4

II. VELOCITÀ PSICOMOTORIA

Tempo impiegato

≤ 21 s = 6; 21,1-24 sec = 5; 24,1-27 = 4; 27,1-30 s = 3; 30,1- 33 s = 2; 33,1-36 s = 1; > 36 s = 0

PUNTEGGIO MASSIMO: 6

III. RICHIAMO DIFFERITO

Numero di parole ricordate

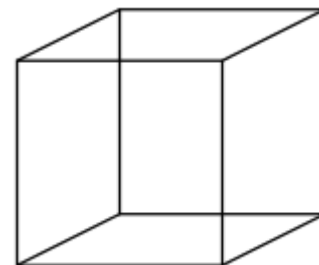
PUNTEGGIO MASSIMO: 4

IV. ABILITA' VISUO- COSTRUTTIVE

Tempo impiegato

< 25 s = 2; 25-35s = 1; > 35 = 0; cubo scorretto = 0

PUNTEGGIO MASSIMO: 2



Whole Sample (N=133)

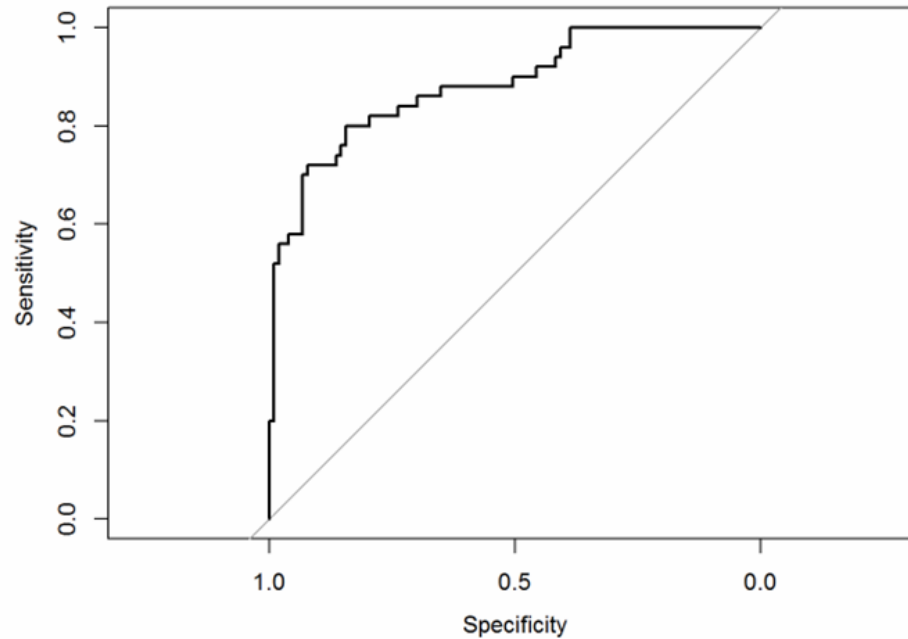
- 104 cognitively healthy and functionally independent subjects
(46 M, 58 F; mean age: 71.1 ± 4.2)
- 29 patients with subcortical neurological disorders: 14 subcortical ischemic vascular disease, 9 normal pressure hydrocephalus and 6 HIV infection
(21 M, 8 F; mean age: 69.3 ± 10.1)

Suitability of HDS in detecting subcortical cognitive deficits

Validation phases

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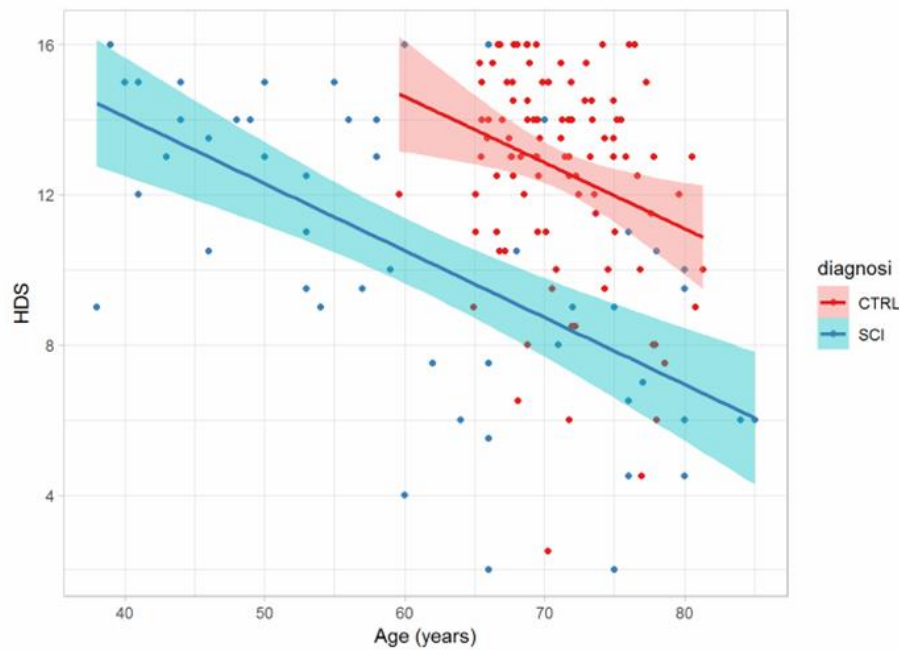
ROC ANALYSIS



Cut-off ≥ 11

Sensitivity: 0,76

Specificity: 0,82

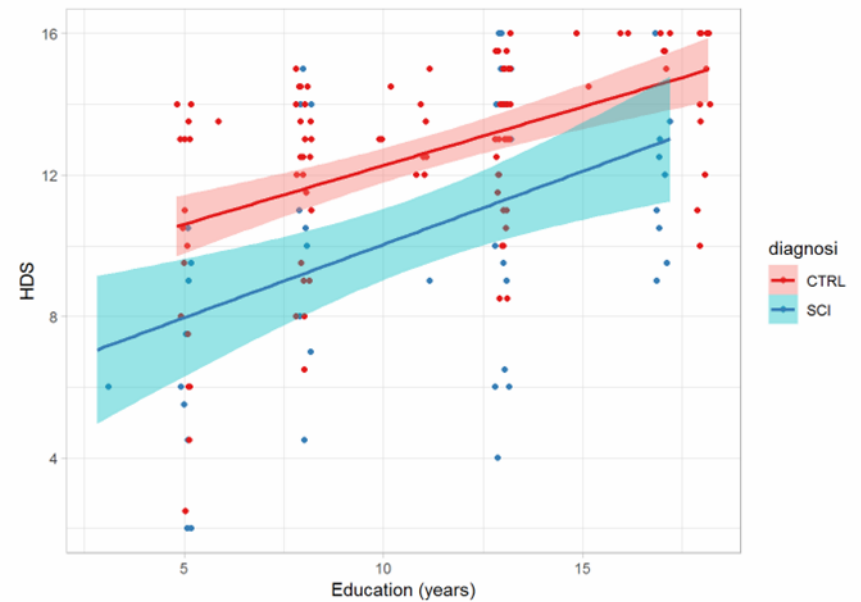


HDS TOTAL SCORE – AGE

$$rS = -0.21, p < 0.001$$

HDS TOTAL SCORE – EDUCATION

$$rS = 0.52, p < 0.001$$

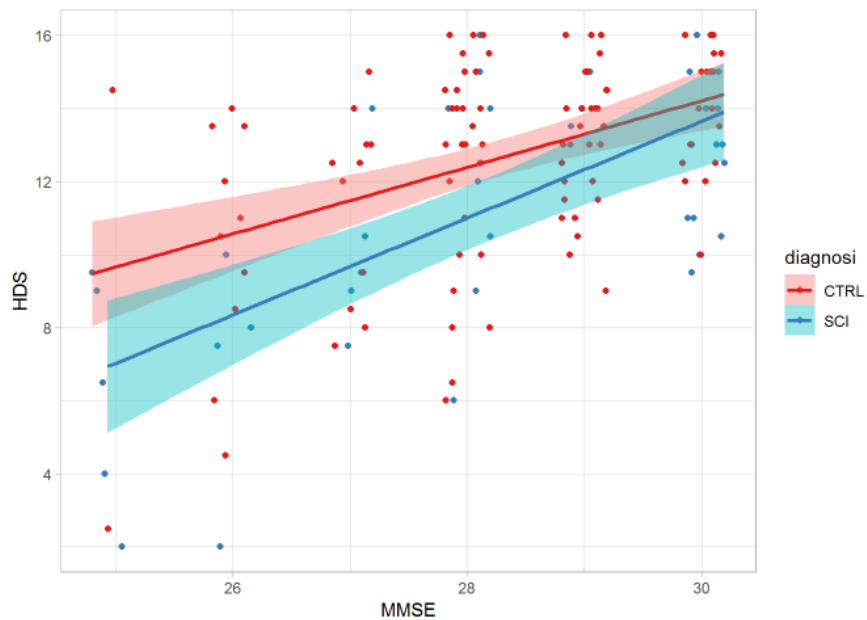


Suitability of HDS in detecting subcortical cognitive deficits

Validation phases

1. Forward-backward translation of the original version
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Criterion Validity



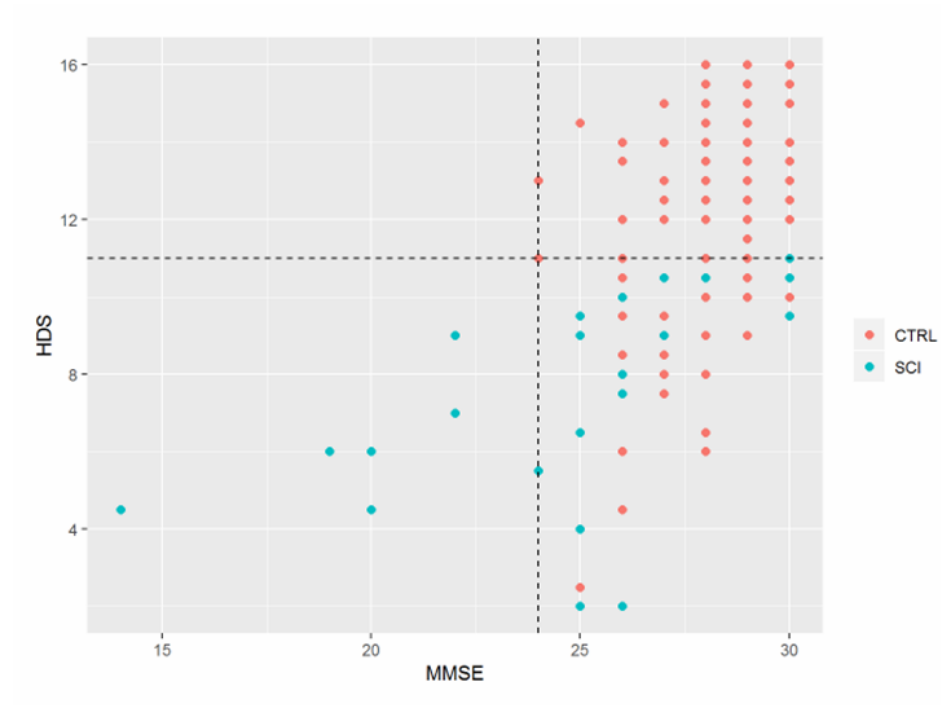
HDS vs MMSE

$r_s = 0.37, p < 0.001$

Suitability of HDS in detecting subcortical cognitive deficits

Validation phases

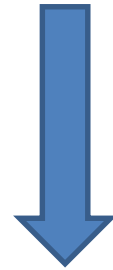
1. Forward-backward translation of the original version
2. Sensitivity and specificity (ROC-analysis)
3. Criterion Validity



A subgroup of patients showed lower scores on HDS vs MMSE
(9.5 ± 4.0 vs. 12.8 ± 3.1 , $p < 0.001$)

Test-retest reliability

The test retest reliability was tested in a subset of controls and SCI subjects (n=34)



$$r_s = 0.69 \ (p < 0.001)$$



Conclusions

Our results support the use of HDS as a screening tool for detecting subcortical cognitive deficits, being complementary to MMSE in clinical practice.

Acknowledgments

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