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International Psychogeriatrics: page 1 of 14 © International Psychogeriatric Association 2018
doi:10.1017/S1041610218001370

REVIEW

Is the Montreal Cognitive Assessment (MoCA) screening superior to the Mini-Mental State Examination (MMSE) in the detection of mild cognitive impairment (MCI) and Alzheimer's Disease (AD) in the elderly?

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ABSTRACT

Objective: T c a e eac a y f M -Me a S a e E a a (MMSE) a d f e M ea C e A e e (M CA) ac d c e a e (MCI) a d A e e' D ea e (AD).

Method: A S e a c e e f e P bMed, B e e, Sc e ce D ec, C c a e Lb ay, a d Py cI f da aba e a c d ced. U c a d e c e aa d a 1,629 a ce, 34 a ce e e ec ed. T e Qa y f e e ec ed e ea c a e a a ed d e Qa y A e e f D a c Acc a y S d e 2 (QUADAS-2).

Result: M e a 80% f e a c e ed M CA be e MMSE d c a be ee d d a d c e a e ad c e a e. T ea ea de e e a ed f. 0.71 0.99 f M CA, a d 0.43 0.94 f MMSE, e ea a e ab y d c a e MCI e c e y ea y e de y d d a, a d 0.87 0.99 a d 0.67 0.99, e ec y, e ea a e de ec f AD. T e AUC ea a e f M CA a fica y a e c a ed e MMSE d c a MCI f c . [0.883 (CI 95% 0.855-0.912) MMSE 0.780 (CI 95% 0.740-0.820) $p < 0.001$].

Conclusion: T e c ee M CA e MMSE de fica f MCI, a d b e e f d be acc a e e de ec f AD.

Ke ords: A fi

Introduction

De e a a d de b c ea be. Acc d e W d Hea O a a, 2012, 36 e e ed ed de e a, a a e ce a e f 4.7%. F e e de a 65, e e a ce a e ac ca y d b ede ey fi ea. I add e e a ce, e ac ec y, ea , a d ca a d f de e a a ea (A e e' A ca , 2011; H d *et al.*, 2013; P ce *et al.*, 2013; W *et al.*, 2013a; 2013b; Z *et al.*, 2015). A e , de e a a bec ea y f ac d a ed ac b e E ea U a a ba a e. Se e a c e a a a e f de e a a d e - a ce, c e a e ea y d a a d e e (Ba ee, 2010; P ce *et al.*, 2011).

A e e' D ea e (AD) e a ca e f de e a. I a e e e e d - ea e, c ca y c a ac e ed b e a e f c eab ea d f c , a e a ca e be a (D b *et al.*, 2015). A e c e d de c a c ec a ace c be ee a c a d de e a d c e a e (MCI). I ac ca a d c e y d e ce ea d a cc e a (Pe e e, 2004). T d a e MCI, e f eeded: c a f a dec e c e f c , b- a ed f e d d a a f a

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02 F 2018; 6 27 F 2018; 24 J 2018; 6 29 J 2018.

e a e ; e de e a f e c e d a a e e a e ec ed a e e a e a d ed ca f e a e , c - ff ed a b ec e a e by a fe a j e ac e e e ; de e de f c e- e ed, a e ca a d ab e f e d d a (A be *et al.*, 2011).

T e c e dec e c d be f a a e y f c e d a , c d e y, e eq e f c , a e , a g a e, a d a a ab y. I a ed e dc e y, a ed c e ab y ea a d e a e f a , e e- ca y ee a e MCI, c d a e e e de e a f AD (A be *et al.*, 2011). T ea a c e a e f MCI AD a e f 6% (F e a *et al.*, 2010), 10%–15% (Pe e e *et al.*, 1999), 31% a y ea (B c a d L e e, 2004).

T e ef e, de y e MCI f da e a f e e eq f e e ea d ea g c e e ea y a e f ed ea e (Sc ec *et al.*, 2005). H e e, e da a f MCI a c e a a e, c de a ece a y fe- e y d g f e a fea a fea y f f e de e a a d ec e ca e a d e a a ce f a .

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Table 1.

Table 1.

Study; country	Population (n sampling)	Age (years) average SD	Female gender (%)	Education (years) – average SD	Cut off MoCA – control vs MCI control vs AD	Accuracy of MoCA (AUC) – control vs MCI	Accuracy of MoCA (AUC) – control vs AD	Accuracy of MMSE (AUC) – control vs MCI	Accuracy of MMSE (AUC) – control vs AD	MoCA control vs MCI sensitivity/ specificity	MoCA control vs dementia sensitivity/ specificity	MMSE control vs MCI sensitivity/ specificity	MMSE control vs dementia sensitivity/ specificity	Test which presented a higher accuracy
T a *et al.* (2016); Ta a	C (26) MCI (59) AD (57)	76.2 8.5	49.6	E e e ay . c . . : 35.9% . r . c . . : 16.2% Se . r . c . . : 19.0% U e . y : 28.9%	23/24 19/20	0.91	0.87	0.88	0.89	88/73	79/80	88/70	84/86	M CA . MCI –
C *et al.* (2015); H r K r	C (115) MCI (87) AD (64)	72.2 6.1 77.2 6.3 78.5 5.8	75.7 63.2 60.9	6.97 4.69 4.62 5.19 4.56 5.00	22/23 19/20	0.85	0.99	0.78	0.99	78/73	94/92	67/83	94/98	M CA . MCI
H *et al.* (2015); USA	C (124) MCI (126) AD (67)	69.6 7.9 69.4 7.7 74.4 8.1	67 52 37	15.3 2.6 14.5 2.8 15.2 2.7	25/26 19/20	0.88	0.93	0.79	0.95	–	–	–	–	M CA . MCI
H *et al.* (2015); Ta a	C (260) AD (16)	67.93 6.06	50.7	11.4 4.0	– 23/24	–	0.89	–	0.7	–	78/94	–	38/92	M CA
Ta *et al.* (2015); C a	C (4150) MCI (2311) De e a (984)	80.9 4.6 82.1 4.5 83.9 4.9	4.9 3.6 3.9	8.5 5.5 7.5 5.7 6.0 6.0	60–79y ea . : 25/26 24/25 80–89y ea . : 24/25 21/22 ≥90y ea . : 23/24 19/20	0.94	0.91	0.85	0.89	>85/>85	>80/>74	–	–	M CA
Ceca *et al.* (2014); B a	C (39) MCI (45) AD (52)	71.8 6.9 76.6 7.1 77.9 7.0	74.4 60.0 63.5	>9y ea . : 58.8	24/25 22/23	0.94	0.99	0.83	0.95	82.2/92.3	98.1/100.0	80.0/82.1	92.3/82.1	M CA
K a *et al.* (2014); T .	C (246) MCI (114) AD (114)	68.0 10.3 74.2 8.8 77.2 9.1	60.1 43.0 57.0	–	E e e ay : 17/18 15/16 H r . c . . : 20/21 18/19 H r e ed ca . : 22/23 19/20	0.85	0.99	0.84	0.98	E e e ay : 67/83 H r . c . . : 73/85 H r e ed ca . : 81/86	89/90 98/97 99/99	– – –	– – –	M CA . MCI
Ma e - A ad *et al.* (2014); USA	C (73) MCI (39) AD (34)	82.59 7.67 80.54 8.43 84.74 6.74	45.2 46.2 38.2	14.55 2.41 14.77 2.53 14.56 3.15	– –	0.71	0.94	0.76	0.97	–	–	–	–	–
Y r *et al.* (2014); H r K r	C (49) MCI (93) De e a (130)	73.6 7.6 76.4 7.5 79.5 6.8	59.0 53.0 65.0	5.61 4.27 4.80 4.78 3.26 4.03	21/22 18/19	0.85	0.97	0.86	0.99	82.8/73.5	92.3/91.8	78.5/81.6	95.4/89.8	–

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Study; country	Population (*N* sampling)	Age (years) average sd	Female gender (%)	Education (years) – average sd	Cut off MoCA – control vs MCI control vs AD	Accuracy of MoCA (AUC) – control vs MCI	Accuracy of MoCA (AUC) – control vs AD	Accuraav

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Study; country	Population (*N* sampling)	Age (years) average SD	Female gender (%)	Education (years) – average SD	Cut off MoCA – control vs MCI control vs AD	Accuracy of MoCA (AUC) – control vs MCI	Accuracy of MoCA (AUC) – control vs AD	Accuracy of MoCA (AUC) – control vs AD

AD, e *National Institute of Neurological and Communicative Disorders and Stroke — Alzheimer's Disease and Related Disorders Association* (NINCDS-ADRDA) c e a (McK a *et al.*, 1984) a J ed f e a c e. Pe e ' c e a (2004) a e J ed f ' e d a f MCI. T e A ea de e ' e (AUC) ca a ed f e ROC ' e, a J ed c a e ed a c ac ' a f M CA a d MMSE. Of e 34 J de e ec ed, 31 ed f ' a ' e a d ' e ac - ' a f M CA a d MMSE de ec ' MCI. T e fi e a c e (80.6%) ed J e ' y f M CA MMSE d c a ' d a d c ' e a ' e a d d c ' e a ' e (Ceca *et al.*, 2014; C e *et al.*, 2016; C J *et al.*, 2015; De ad *et al.*, 2017; D ' *et al.*, 2012; F e a *et al.*, 2013; H a a *et al.*, 2010; G *et al.*, 2010; H ' *et al.*, 2015; H J *et al.*, 2015; H *et al.*, 2013; Ja e d e *et al.*, 2017; K a *et al.*, 2014; Lee *et al.*, 2008; L f *et al.*, 2012; L *et al.* 2011; L *et al.*, 2009; Mar e a *et al.*, 2012; Me ' *et al.*, 2016; Me ' a *et al.*, 2013

Discussion

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