MCI in Latin American Countries

MCI 2017
Mount Sinai Medical Center
Miami Beach, Florida

Ricardo Nitrini, USP, Brazil

MCI in LAC. Reasons for a difference

- Genetics of the population
- Low education (low cognitive reserve)
- Cultural differences (meaning of the cognitive decline in aging)
- Control of risk factors (low SES; low education)

- Difficulty of assessment (illiteracy/low education)

Dementia in LAC

- Higher prevalence than in developed countries (Prince et al., 2013)

Alzheimer's & Dementia 9 (2013) 63–75

Review Articles

The global prevalence of dementia: A systematic review and metaanalysis

Martin Prince[a,*], Renata Bryce[a], Emiliano Albanese[a,b], Anders Wimo[c,d], Wagner Ribeiro[a,e], Cleusa P. Ferri[a,e]

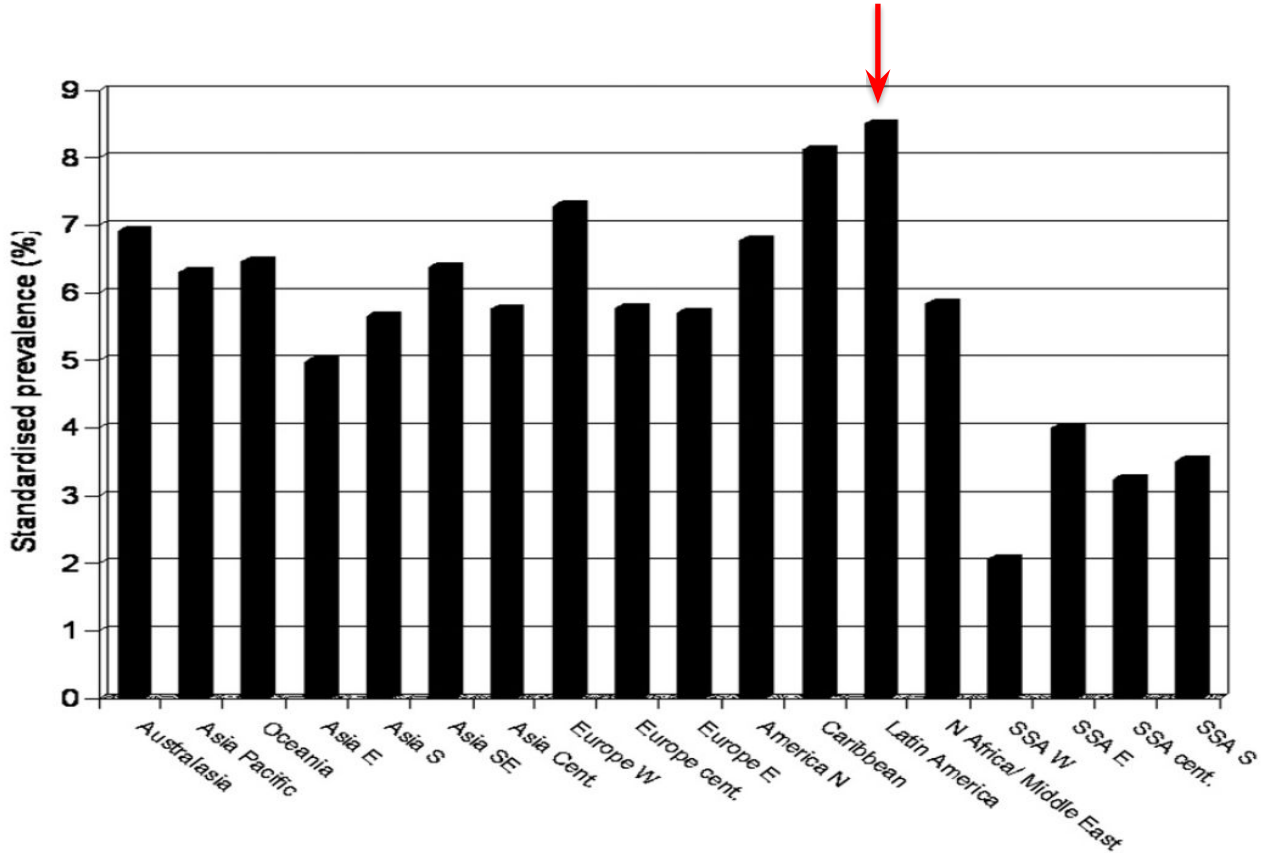

Fig. 1. Estimated prevalence of dementia for those aged ≥60 years, standardized to the Western Europe population, by Global Burden of Disease region.

Prevalence of dementia in Latin America:

A collaborative study of population-based cohorts. (8 studies from 6 countries)

Brazil (3)
Chile
Cuba
Peru
Uruguay
Venezuela

Nitrini R, Bottino CMC, Albala C, Custodio Capuñay NS, Ketzoian C, Rodriguez JJL, Maestre GE, Ramos-Cerqueira AT, Caramelli P.

International Psychogeriatrics, 2009

Latin American data compared with a systematic review of dementia prevalence (21 studies)

Age	LA studies Mean (%) (95% CI)	Systematic review Mean (%) (95% CI)
65-69	**2.4 (2.1-2.7)**	**1.2 (0.8 – 1.5)**
70-74	3.6 (3.1-4.0)	3.7 (2.6 – 4.7)
75-79	7.0 (6.3-7.6)	7.9 (6.2 – 9.5)
80-84	11.8 (10.8-12.9)	16.4 (13.8 – 18.9)
85-89	20.2 (18.6-21.7)	24.6 (20.5 – 28.6)
90-94	33.0 (29.9-36.2)	39.9 (34.4 – 45.3)
> 95	-	54.8 (45.6 – 63.9)

Dementia in LAC

1) High prevalence of dementia in Latin America
2) Dementia may start earlier in Latin America
   (due to low cognitive reserve)

High frequency of vascular dementia in a neuropathological study

BASIC RESEARCH

Prevalence of dementia subtypes in a developing country: a clinicopathological study

Lea T. Grinberg,[I,II] Ricardo Nitrini,[III] Claudia K. Suemoto,[IV] Renata Eloah de Lucena Ferretti-Rebustini,[V] Renata E. P. Leite,[I] Jose Marcelo Farfel,[IV] Erika Santos,[I] Mara Patricia Guilhermino de Andrade,[I,VI] Ana Tereza Di Lorenzo Alho,[I,VI] Maria do Carmo Lima,[I,VI] Katia C. Oliveira,[I] Edilaine Tampellini,[I,VI] Livia Polichiso,[I,VI] Glaucia B. Santos,[I,VI] Roberta Diehl Rodriguez,[I] Kenji Ueda,[VII] Carlos A. Pasqualucci,[I] Wilson Jacob-Filho[IV]

2013

Author, year/country	N	AD	AD+VaD	VaD	LBD	FTD	Others
Galasko, 1994, USA	170	56.5	7.1	2.4	22.4	NR	11.8
Victoroff, 1995, USA	196	44.9	12.8	4.6	6.6	NR	31.1
Jellinger, 1996, Austria	540	65.0	4.1	8.5	6.1	2.8	13.5
Akatsu, 2002, Japan	158	46.2	5.7	21.5	17.7	3.2	5.3
Barker, 2002, USA	382	41.6	11.3	3.1	22.0	4.7	17.3
Fu, 2004, USA	202	63.9	2.5	5.9	11.9	4.0	11.9
Brunnström, 2008, Sweden	524	42.0	21.6	23.7	0.2	4.0	8.6
Grinberg, 2013, Brazil	113	35.4	13.3	21.2	5.3	2.6	22.2

MCI in population studies in LAC

Author Year	City/Country	N Age	Prevalence of MCI	Journal
Mias et al.	Córdoba/Argentina	418 >50	13.6% (a-MCI: 9.1%)	Rev Neurol, 2007
Henao-Arboleda et al.	Medellin/Colombia	848 >50	9.7% (a-MCI)	Rev Neurol, 2008
Juarez-Cedillo et al.	Mexico C./ Mexico	2944 ≥ 60	6.45% (a-MCI: 4.97%)	Dement Ger Cogn Disord, 2012

MCI prevalence (age≥ 60) in numerous international studies: 12-18%

Petersen, 2016

OPEN ACCESS Freely available online

PLoS MEDICINE

Prevalence, Distribution, and Impact of Mild Cognitive Impairment in Latin America, China, and India: A 10/66 Population-Based Study

Ana Luisa Sosa[1☯], Emiliano Albanese[2☯], Blossom C. M. Stephan[3], Michael Dewey[4], Daisy Acosta[5], Cleusa P. Ferri[4], Mariella Guerra[6], Yueqin Huang[7], K. S. Jacob[8], Ivonne Z. Jiménez-Velázquez[9], Juan J. Llibre Rodriguez[10], Aquiles Salas[11], Joseph Williams[12], Isaac Acosta[1], Maribella González-Viruet[13], Milagros A. Guerra Hernandez[14], Li Shuran[7], Martin J. Prince[4], Robert Stewart[4]*

2012

Table 3. Prevalence of aMCI by country, gender, and age group.

Country and Gender	aMCI Prevalence, % (95% CI)				Crude Prevalence (95% CI)	Standardized Prevalence (95%CI)[a]
	65–69 y	70–74 y	75–80 y	80+y	All Age Groups	All Age Groups
Cuba (*n*)	738	739	582	555	1.8 (1.3–2.3)	1.5 (1.0–1.9)
Males	1.5 (0.0–3.0)	1.8 (0.2–3.4)	0.0 (0.0–0.0)	1.7 (−0.2 to 3.6)	—	—
Females	2.7 (1.3–4.2)	2.6 (1.1–4.0)	1.6 (0.3–2.9)	0.8 (−0.1 to 1.7)	—	—
Dominican Rep. (*n*)	511	483	345	428	1.4 (0.9–2.0)	1.3 (0.7–1.8)
Males	1.7 (−0.2 to 3.6)	2.2 (0.0–4.4)	2.7 (−0.4 to 5.7)	2.9 (0.1–5.7)	—	—
Females	0.9 (−0.1 to 1.9)	1.7 (0.2–3.1)	0.4 (−0.4 to 1.3)	0.7 (−0.3 to 1.7)	—	—
Peru (*n*)	538	475	368	386	3.1 (2.3–3.9)	2.6 (1.9–3.3)
Males	5.4 (2.1–8.6)	2.7 (0.3–5.1)	2.1 (−0.3 to 4.5)	4.4 (1.4–7.4)	—	—
Females	2.3 (0.7–3.8)	1.7 (0.2–3.2)	3.6 (1.1–6.0)	3.4 (0.9–5.9)	—	—
Venezuela (*n*)	813	450	320	236	1.2 (0.7–1.7)	1.0 (0.7–1.4)
Males	1.3 (0.0–2.6)	0.0 (0.0–0.0)	2.6 (−0.3 to 5.5)	0.0 (0.0–0.0)	—	—
Females	1.6 (0.5–2.7)	1.4 (0.0–2.9)	1.5 (−0.2 to 3.1)	0.0 (0.0–0.0)	—	—
Mexico (*n*)	537	552	384	348	3.2 (2.4–4.1)	2.8 (2.0–3.6)
Males	3.7 (0.8–6.7)	4.3 (1.5–7.0)	5.1 (1.6–8.6)	4.0 (0.8–7.2)	—	—
Females	1.3 (0.2–2.5)	4.1 (2.0–6.2)	3.9 (1.4–6.5)	1.0 (−0.4 to 2.4)	—	—

Prevalence of a-MCI

Country	Standardized prevalence (95% CI)
Cuba	1.5 (1.0-1.9)
Dominican Republic	1.3 (0.7-1.8)
Peru	2.6 (1.9-3.3)
Venezuela	1.2 (0.7-1.7)
Mexico	2.8 (2.0-3.6)

Sosa et al., 2012

Prevalence of MCI in LAC

- Range: 1.2 to 13.6%
- Lower than in developed countries?

- MCI prevalence (age≥ 60) in numerous international studies: 12-18%

Petersen, 2016

Cognitive impairment no dementia (CIND)

Authors	City/Country	N/ Age	Prevalence of CIND	Journal
Ortiz et al.	Guadalajara/ Mexico	1142 ≥ 60	13.8%	Curr Gerontol Geriatr Res 2012
Caramelli et al.	Caeté/ Brazil	639 ≥ 75	25.2%	Arq Neuropsiquiatr 2011
César et al.	Tremembé/Brazil	630 ≥ 60	19.8%	Alz Dis Assoc Diseases 2016
Brucki	Amazon river banks/Brazil	163 ≥ 50	7.7%	Dement Neuropsychol 2013

(CIND prevalence in USA and Canada ranges from 17 to 23%. Brucki SMD. Review in Dementia & Neuropsychologia, 2013)

Incidence of MCI in LAC

- The incidence rate for a-MCI was 13.2/1000 persons-years (aged ≥ 65) in Southern Brazil

Chaves et al., 2009

a-MCI incidence of 8.5-25.9/1000 persons-year in a global systematic review

Ward et al., 2012

Dement Neuropsychol 2010 March;4(1):28-34

Allegri et al. **Annual conversion rate: 13.7%**

Role of cognitive reserve in progression from mild cognitive impairment to dementia

Table 4. Relative risk predictors for conversion to dementia in multivariate analysis.

Predictor	Hazard ratio	z	p value	95% CI
Age over 75	1.634	2.03	0.043	1.016-2.628
Education less than 12 years	1.640	1.99	0.042	1.075-2.760
Not working	2.409	2.30	0.022	1.137-5.104
Global IQ less than 111	0.964	–2.57	0.010	0.938-0.991
Vocabulary score	3.943	4.42	0.000	2.146-7.237
Naming score less than 51	1.932	2.15	0.032	1.059-3.526
Mini Mental State less than 27	2.947	3.35	0.001	1.566-5.548
MCI amnesic type	2.696	2.44	0.015	1.215-5.977

Estimation of the risk of conversion of mild cognitive impairment of Alzheimer type to Alzheimer's disease in a south Brazilian population-based elderly cohort: the PALA study

The a-MCI annual conversion rate to AD was 8.5% (CI 95% 3.9–16.1)

Table 4. Cox regression – multivariate analysis: MCI diagnosis as main factor, variables age, sex, education, and MMSE as co-variates for the outcome progression to probable AD

PREDICTORS	B	HR (95%CI)	P VALUE
MCI diagnosis*	3.91	49.83 (3.6–698.1)	0.004
MMSE	−0.22	0.80 (0.59–1.092)	0.163
Age	0.04	1.04 (0.91–1.2)	0.579
Sex	−0.18	0.84 (0.15–4.74)	0.843
Education	0.16	1.17 (0.98–1.40)	0.089

Godinho et al.
Internat Psychogeriatrics 2012

Tremembé Incidence Study

- 135 cases of CIND were identified In the prevalence study
- 75 cases were reevaluated after ≈3.5 years

Diagnosis	N	Progression to Dementia	Normal at reevaluation
MCI	60	19 (9.0%/year)	9 (4.28%/year)
CIND (without cognitive complaints)	15	1 (1.9%/year)	5 (9.52%/year)

Cesar et al., unpublished

Predictors of progression (univariate analysis) in the Tremembé Incidence study

- Age
- MMSE
- Phonemic fluency (“p”)
- Clock Drawing Test
- Functional Activities Questionnaire (Pfeffer et al., 1982)

Cesar et al., unpublished

Progression of MCI to dementia in 3 LA studies

- Annual rate from 8.5 to 13.7% (Allegri et al.; Chaves et al.; César et al.)
- Education was a predictor of progression in one of these studies

- 8-15% in most studies (Petersen, 2016)

Neuropathological study of CDR 0.5 cases

- Brain Bank of the Brazilian Aging Study Group
- When there is no death certificate autopsy is mandatory in the city of São Paulo, Brazil
- Brains from deceased individuals aged ≥ 50 were collected after a next-of-kin provided information through standardized questionnaires.
- Follows ethical norms and international procedures for pathological diagnosis

Grinberg et al., 2007

Leite, Molina, Diehl-Rodriguez et al. Unpublished

Neuropathological study of CDR 0.5 cases

CDR 0.5	N =51
Gender	27W/24M
Age	72.7 (±10.6)
Education (schooling-years)	3.8 (±2.9)
CDR Sum of the boxes	1.8 (±1.0)

CDR 0.5 Neuropathological diagnosis	N
Alzheimer's disease	8 (1 with LBD)
Vascular Cognitive impairment	15
Lewy Body Disease	3
Argyrophilic grain disease (as the only abnormality)	1
Hippocampal sclerosis	1
Normal (any abnormality)	1
Undetermined	22

Leite, Molina, Diehl-Rodriguez et al. Unpublished

Primary age-related tauopathy (PART): working classification

1. Requires:

NFT present with Braak stage ≤ IV (usua lly III or lower)

2. Then subclassify as follows:

Category	Thal Aβ Phase[a]	Other disease associated with NFT[b]
Definite	0	Absent
Possible	1-2	Absent

Or Definite when neuritic plaques classified as none in CERAD criteria

Possible when sparse neuritic plaques in CERAD criteria

Crary et al. Acta Neuropathol 2014

MCI with without NP diagnosis

Normal and undetermined diagnosis	23 cases
Normal	1
Primary age related tauopathy (PART) definite	10
Primary age related tauopathy (PART) possible	4

Leite, Molina, Diehl-Rodriguez et al. Unpublished

Mild behavioral impairment and risk of dementia

- Mild behavioral impairment (MBI): a late-life syndrome with prominent psychiatric and behavioral symptoms in the absence of prominent cognitive symptoms that may also be a dementia prodrome.
- High risk for dementia (mainly FTD)

Taragano et al. J Clin Psychiatry. 2009

Conclusions

- More studies are needed to evaluate:
  - Prevalence and incidence of MCI in LAC
  - Influence of education in MCI epidemiology and progression to dementia
  - Vascular cognitive impairment as a frequent cause of MCI in LAC