

# [Dementia in latin america: an emergent silent tsunami](https://assignbuster.com/dementia-in-latin-america-an-emergent-silent-tsunami/)

[](https://assignbuster.com/)[Health & Medicine](https://assignbuster.com/essay-subjects/health-n-medicine/)

Recently the Lancet Neurology Commission ( [Winblad et al., 2016](#B35) ) has provided expert recommendations and highlighted that European Union (EU) is well positioned to take the work lead to prevent and cure the Alzheimer's disease and other dementias, and to provide models for care. This panorama strongly contrasts with the one of Latin America. Although there is an evident growing interest in dementia among Latin American countries (LAC) ( [Lancet, 2015](#B17) ), important barriers in this region involves big challenges to join the fight against dementia. In this article, we identify some key issues regarding dementia diagnosis that could trigger immediate actions in LAC, contrasting them with the EU scenario ( [Winblad et al., 2016](#B35) ).

Demographic characteristics of LAC have substantially changed over the past 25 years, with an extensive decline of mortality and life expectancy increasing ( [Barreto et al., 2012](#B8) ). Demographical transitions have contributed to a large and rapid growth in the number of people suffering from dementia ( [Sousa et al., 2010](#B34) ). Predictions suggest that by 2050, the number of people aged 60 years will increase by 1. 25 billion, with 79% living in the world's less developed regions ( [Prince et al., 2013](#B30) ). In spite of the huge economic and social impact that dementia is causing in LAC ( [Manes, 2016](#B19) ), loss of awareness and deficiencies in health system are more accentuated in LAC than in the EU. Some of these obstacles are addressed in this article, including the limited access to health facilities, the need for standardizing diagnostic practices, and the existing barriers regarding resources and culture.

In LAC, the diagnosis is usually made by specialists (i. e., neurologists, psychiatrists, or gerontologists) and sporadically by a general practitioner (GP). However, only private health insurances cover such specialized services. In contrast, in many European countries most of patients with dementia are diagnosed by the GP and some patients are referred to neurologists or psychiatrists in private practice ( [Winblad et al., 2016](#B35) ). Both in LAC and in the EU only a very small proportion of patients are diagnosed in specialized centers such as memory clinics. Unlike EU [where the public health system tends to dominate ( [Winblad et al., 2016](#B35) )], in most LAC the division of private and public health systems determines the quality and promptness of the diagnosis, as well as the proportion of people that can access health care facilities. At the public level, there are no centers of excellence providing multidisciplinary and individualized assessments. This, added to socioeconomic inequalities, emphasizes the importance of delineating actions toward these outstanding needs in LAC ( [Maestre, 2012](#B18) ).

In addition, basic recommendations and guidelines for dementia diagnosis are only available in some LAC (e. g., Chile, Argentina, and Brazil; [Fuentes et al., 2008](#B12) ; [Allegri, 2011](#B1) ; [Caramelli et al., 2011](#B9) ; [Chavez et al., 2011](#B11) ). In contrast, most of the EU countries have National Plans or guidelines for dementia diagnosis, the care for patients, and the recommended treatment ( [Winblad et al., 2016](#B35) ). Although some LAC has reached awareness regarding the importance of harmonizing diagnostic actions, this is not true for the regional level. The acceptance by scientific and academic communities about international guidelines on dementia is increasing, but with no adequate support from Latin American governments.

Regarding the diagnostic procedures, in most LAC, diagnosis of dementia is primarily clinical, and detailed cognitive assessments are offered mainly in private institutions. Diagnosis relies on the history, interview with the patient and the family, cognitive screening tests, and laboratory tests. Imaging and biomarkers are very restricted to a few private centers. In EU countries, the instruments employed for dementia diagnosis include comprehensive and detailed cognitive batteries, scales of functional impairment, informant-based questionnaires about basic and instrumental activities of daily living, and assessments of neuropsychiatric symptoms, quality of life, and disease burden. Structural neuroimaging is well established in the clinical diagnosis and the use of biomarkers is becoming part of the clinical routine in memory clinics ( [Winblad et al., 2016](#B35) ). Currently, dementia biomarkers are not sufficiently standardized for the use in everyday clinical practice, but standardization initiatives are ongoing in the EU countries. This kind of initiatives are lacking in LAC.

Finally, several cultural issues affect dementia diagnosis in LAC. For instance, low education and illiteracy are key problems affecting most LAC ( [Prince et al., 2003](#B29) ). The illiteracy rate in the older population is approximately 10% ( [Nitrini et al., 2009](#B22) ). This problem is highly relevant since the prevalence of dementia in illiterates is two times higher than that in literates ( [Nitrini et al., 2009](#B22) ). In addition, LAC are not homogenous in terms of language (e. g., aboriginal groups). However, neuropsychological tests used as part of the diagnosis process have been adapted and translated from those designed to assess populations with a different cultural background ( [Nitrini et al., 2004](#B23) ; [Parra, 2014](#B24) ). The basis of cultural effects is poorly understood, but population-based studies ( [Sosa et al., 2009](#B33) ) suggest that normative data should not be generalized across populations with different sociocultural contexts. The extent to which these cultural factors are influencing the dementia prevalence in LAC needs to be investigated with upmost priority.

The key issues presented here highlight the importance of developing harmonized global strategies in LAC in order to overcome the existing barriers preventing an accurate and early dementia diagnosis. Some research groups in Latin America are already addressing relevant clinical issues regarding Alzheimer's disease ( [Parra et al., 2009](#B25) , [2010](#B26) , [2015](#B27) ; [Pietto et al., 2016](#B28) ) and other dementias ( [Cardona et al., 2013](#B10) ; [Ibáñez et al., 2013](#B15) ; [Baez et al., 2014a](#B2) , [b](#B5) , [2015](#B3) , [2016a](#B4) , [b](#B6) , [c](#B7) ; [Kargieman et al., 2014](#B16) ; [Garcia-Cordero et al., 2015](#B14) , [2016](#B13) ; [Melloni et al., 2015](#B21) , [2016](#B20) ; [Santamaria-Garcia et al., 2016](#B31) ; [Sedeno et al., 2016](#B32) ). The urgent need now is to develop and implement health-care strategies and national plans that meet the needs of individuals with dementia and their families. Though some LAC are developing national plans, important challenges remain to improve the quality of dementia diagnosis ( [Manes, 2016](#B19) ). Latin American governments should strengthen health services, improve training for health professionals to diagnose/treat dementia and promote the creation of public memory clinics. In facing the fight against dementia, LAC should capitalize on the experience of EU countries.

## Author Contributions

Both authors developed the study concept, drafted the manuscript and approved its final version.

## Funding

This work was partially supported by grants from CONICET, CONICYT/FONDECYT Regular (1130920 and 1140114), FONCyT-PICT 2012-0412, FONCyT-PICT 2012-1309, FONDAP 15150012, and the INECO Foundation.

## Conflict of Interest Statement

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

## References

Allegri, R. (2011). Clinical practice guideline. *Neurol. Argent.* 3, 120–137. doi: 10. 2215/CJN. 04040907

[PubMed Abstract](http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=ShowDetailView&TermToSearch=25927070) | [CrossRef Full Text](http://dx.doi.org/10.2215/CJN.04040907)

Baez, S., Couto, B., Torralva, T., Sposato, L. A., Huepe, D., Montañes, P., et al. (2014a). Comparing moral judgments of patients with frontotemporal dementia and frontal stroke. *JAMA Neurol.* 71, 1172–1176. doi: 10. 1001/jamaneurol. 2014. 347

[PubMed Abstract](http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=ShowDetailView&TermToSearch=25047907) | [CrossRef Full Text](http://dx.doi.org/10.1001/jamaneurol.2014.347)

Baez, S., Herrera, E., Gershanik, O., Garcia, A. M., Bocanegra, Y., Kargieman, L., et al. (2015). Impairments in negative emotion recognition and empathy for pain in Huntington's disease families. *Neuropsychologia* 68, 158–167. doi: 10. 1016/j. neuropsychologia. 2015. 01. 012

[PubMed Abstract](http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=ShowDetailView&TermToSearch=25582408) | [CrossRef Full Text](http://dx.doi.org/10.1016/j.neuropsychologia.2015.01.012) | [Google Scholar](http://scholar.google.com/scholar_lookup?author=S.+Baez&author=E.+Herrera&author=O.+Gershanik&author=A.+M.+Garcia&author=Y.+Bocanegra&author=L.+Kargieman+&publication_year=2015&title=Impairments+in+negative+emotion+recognition+and+empathy+for+pain+in+Huntington's+disease+families&journal=Neuropsychologia&volume=68&pages=158-167)

Baez, S., Kanske, P., Matallana, D., Montañes, P., Reyes, P., Slachevsky, A., et al. (2016a). Integration of intention and outcome for moral judgment in frontotemporal dementia: brain structural signatures. *Neurodegener. Dis.* 16, 206–217. doi: 10. 1159/000441918

[PubMed Abstract](http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=ShowDetailView&TermToSearch=26859768) | [CrossRef Full Text](http://dx.doi.org/10.1159/000441918) | [Google Scholar](http://scholar.google.com/scholar_lookup?author=S.+Baez&author=P.+Kanske&author=D.+Matallana&author=P.+Montañes&author=P.+Reyes&author=A.+Slachevsky+&publication_year=2016a&title=Integration+of+intention+and+outcome+for+moral+judgment+in+frontotemporal+dementia%3A+brain+structural+signatures&journal=Neurodegener.+Dis.&volume=16&pages=206-217)

Baez, S., Manes, F., Huepe, D., Torralva, T., Fiorentino, N., Richter, F., et al. (2014b). Primary empathy deficits in frontotemporal dementia. *Front. Aging Neurosci.* 6: 262. doi: 10. 3389/fnagi. 2014. 00262

[PubMed Abstract](http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=ShowDetailView&TermToSearch=25346685) | [CrossRef Full Text](http://dx.doi.org/10.3389/fnagi.2014.00262) | [Google Scholar](http://scholar.google.com/scholar_lookup?author=S.+Baez&author=F.+Manes&author=D.+Huepe&author=T.+Torralva&author=N.+Fiorentino&author=F.+Richter+&publication_year=2014b&title=Primary+empathy+deficits+in+frontotemporal+dementia&journal=Front.+Aging+Neurosci.&volume=6&issue=262)

Baez, S., Morales, J. P., Slachevsky, A., Torralva, T., Matus, C., Manes, F., et al. (2016b). Orbitofrontal and limbic signatures of empathic concern and intentional harm in the behavioral variant frontotemporal dementia. *Cortex* 75, 20–32. doi: 10. 1016/j. cortex. 2015. 11. 007

[PubMed Abstract](http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=ShowDetailView&TermToSearch=26707083) | [CrossRef Full Text](http://dx.doi.org/10.1016/j.cortex.2015.11.007) | [Google Scholar](http://scholar.google.com/scholar_lookup?author=S.+Baez&author=J.+P.+Morales&author=A.+Slachevsky&author=T.+Torralva&author=C.+Matus&author=F.+Manes+&publication_year=2016b&title=Orbitofrontal+and+limbic+signatures+of+empathic+concern+and+intentional+harm+in+the+behavioral+variant+frontotemporal+dementia&journal=Cortex&volume=75&pages=20-32)

Baez, S., Santamaría-García, H., Orozco, J., Fittipaldi, S., García, A. M., Pino, M., et al. (2016c). Your misery is no longer my pleasure: Reduced schadenfreude in Huntington's disease families. *Cortex* 83, 78–85. doi: 10. 1016/j. cortex. 2016. 07. 009

[PubMed Abstract](http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=ShowDetailView&TermToSearch=27498039) | [CrossRef Full Text](http://dx.doi.org/10.1016/j.cortex.2016.07.009) | [Google Scholar](http://scholar.google.com/scholar_lookup?author=S.+Baez&author=H.+Santamaría-García&author=J.+Orozco&author=S.+Fittipaldi&author=A.+M.+García&author=M.+Pino+&publication_year=2016c&title=Your+misery+is+no+longer+my+pleasure%3A+Reduced+schadenfreude+in+Huntington's+disease+families&journal=Cortex&volume=83&pages=78-85)

Barreto, S. M., Miranda, J. J., Figueroa, J. P., Schmidt, M. I., Munoz, S., Kuri-Morales, P. P., et al. (2012). Epidemiology in Latin America and the Caribbean: current situation and challenges. *Int. J. Epidemiol.* 41, 557–571. doi: 10. 1093/ije/dys017

[PubMed Abstract](http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=ShowDetailView&TermToSearch=22407860) | [CrossRef Full Text](http://dx.doi.org/10.1093/ije/dys017) | [Google Scholar](http://scholar.google.com/scholar_lookup?author=S.+M.+Barreto&author=J.+J.+Miranda&author=J.+P.+Figueroa&author=M.+I.+Schmidt&author=S.+Munoz&author=P.+P.+Kuri-Morales+&publication_year=2012&title=Epidemiology+in+Latin+America+and+the+Caribbean%3A+current+situation+and+challenges&journal=Int.+J.+Epidemiol.&volume=41&pages=557-571)

Caramelli, P., Texeira, A., Buchpiguel, C., Lee, H., Livramento, J., Fernandez, L., et al. (2011). Group recommendations in alzheimer's disease and vascular dementia of the brazilian academy of neurology. diagnosis of alzheimer's disease in Brazil: supplementary exams. *Dement. Neuropsychol.* 5, 167–177. Available online at: [http://www. scielo. br/pdf/dn/v5n3/1980-5764-dn-5-03-00167. pdf](http://www.scielo.br/pdf/dn/v5n3/1980-5764-dn-5-03-00167.pdf)

Cardona, J. F., Gershanik, O., Gelormini-Lezama, C., Houck, A. L., Cardona, S., Kargieman, L., et al. (2013). Action-verb processing in Parkinson's disease: new pathways for motor-language coupling. *Brain Struct. Funct.* 218, 1355–1373. doi: 10. 1007/s00429-013-0510-1

[PubMed Abstract](http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=ShowDetailView&TermToSearch=23412746) | [CrossRef Full Text](http://dx.doi.org/10.1007/s00429-013-0510-1) | [Google Scholar](http://scholar.google.com/scholar_lookup?author=J.+F.+Cardona&author=O.+Gershanik&author=C.+Gelormini-Lezama&author=A.+L.+Houck&author=S.+Cardona&author=L.+Kargieman+&publication_year=2013&title=Action-verb+processing+in+Parkinson's+disease%3A+new+pathways+for+motor-language+coupling&journal=Brain+Struct.+Funct.&volume=218&pages=1355-1373)

Chavez, M., Godinho, C., Porto, C. S., Mansur, L., Carthery-Goulart, M., Yassuda, M. S., et al. (2011). Group recommendations in Alzheimer's disease and vascular dementia of the Brazilian academy of neurology. cognitive, functional and behavioral assessment: Alzheimer's disease. *Dement. Neuropsychol.* 5, 153–166. Available online at: [http://148. 215. 2. 10/articulo. oa? id= 339529029003](http://148.215.2.10/articulo.oa?id=339529029003)

Fuentes, P., Donoso, A., Slachevsky, A., Villalobos, A., and Flores, L. (2008). *Guía Clínica Trastornos Cognitivos y Demencia en el Adulto Mayor* . Chile: MINSAL.

Garcia-Cordero, I., Sedeno, L., de la Fuente, L. A., Slachevsky, A., Forno, G., Klein, F., et al. (2016). The functional neuroanatomical organization of interoceptive dimensions: multimodal evidence from neurodegeneration and stroke. *Philos. Trans. R. Soc.* 371: 20160006. doi: 10. 1098/rstb. 2016-0006

[CrossRef Full Text](http://dx.doi.org/10.1098/rstb.2016-0006)

García-Cordero, I., Sedeño, L., Fraiman, D., Craiem, D., de la Fuente, L. A., Salamone, P., et al. (2015). Stroke and neurodegeneration induce different connectivity aberrations in the Insula. *Stroke* 46, 2673–2677. doi: 10. 1161/STROKEAHA. 115. 009598

[PubMed Abstract](http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=ShowDetailView&TermToSearch=26185182) | [CrossRef Full Text](http://dx.doi.org/10.1161/STROKEAHA.115.009598) | [Google Scholar](http://scholar.google.com/scholar_lookup?author=I.+García-Cordero&author=L.+Sedeño&author=D.+Fraiman&author=D.+Craiem&author=L.+A.+de+la+Fuente&author=P.+Salamone+&publication_year=2015&title=Stroke+and+neurodegeneration+induce+different+connectivity+aberrations+in+the+Insula&journal=Stroke&volume=46&pages=2673-2677)

Ibáñez, A., Cardona, J. F., Dos Santos, Y. V., Blenkmann, A., Aravena, P., Roca, M., et al. (2013). Motor-language coupling: direct evidence from early Parkinson's disease and intracranial cortical recordings. *Cortex* 49, 968–984. doi: 10. 1016/j. cortex. 2012. 02. 014

[PubMed Abstract](http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=ShowDetailView&TermToSearch=22482695) | [CrossRef Full Text](http://dx.doi.org/10.1016/j.cortex.2012.02.014) | [Google Scholar](http://scholar.google.com/scholar_lookup?author=A.+Ibáñez&author=J.+F.+Cardona&author=Y.+V.+Dos+Santos&author=A.+Blenkmann&author=P.+Aravena&author=M.+Roca+&publication_year=2013&title=Motor-language+coupling%3A+direct+evidence+from+early+Parkinson's+disease+and+intracranial+cortical+recordings&journal=Cortex&volume=49&pages=968-984)

Kargieman, L., Herrera, E., Baez, S., García, A. M., Dottori, M., Gelormini, C., et al. (2014). Motor-language coupling in Huntington's disease families. *Front. Aging Neurosci.* 6: 122. doi: 10. 3389/fnagi. 2014. 00122

[PubMed Abstract](http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=ShowDetailView&TermToSearch=24971062) | [CrossRef Full Text](http://dx.doi.org/10.3389/fnagi.2014.00122) | [Google Scholar](http://scholar.google.com/scholar_lookup?author=L.+Kargieman&author=E.+Herrera&author=S.+Baez&author=A.+M.+García&author=M.+Dottori&author=C.+Gelormini+&publication_year=2014&title=Motor-language+coupling+in+Huntington's+disease+families&journal=Front.+Aging+Neurosci.&volume=6&issue=122)

Lancet, N. (2015). A neurology revival in Latin America. *Lancet Neurol.* 14, 1143. doi: 10. 1016/S1474-4422(15)00307-5

[PubMed Abstract](http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=ShowDetailView&TermToSearch=26527174) | [CrossRef Full Text](http://dx.doi.org/10.1016/S1474-4422(15)00307-5) | [Google Scholar](http://scholar.google.com/scholar_lookup?author=N.+Lancet+&publication_year=2015&title=A+neurology+revival+in+Latin+America&journal=Lancet+Neurol.&volume=14&pages=1143)

Maestre, G. E. (2012). Assessing dementia in resource-poor regions. *Curr. Neurol. Neurosci. Rep.* 12, 511–519. doi: 10. 1007/s11910-012-0300-9

[PubMed Abstract](http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=ShowDetailView&TermToSearch=22864986) | [CrossRef Full Text](http://dx.doi.org/10.1007/s11910-012-0300-9) | [Google Scholar](http://scholar.google.com/scholar_lookup?author=G.+E.+Maestre+&publication_year=2012&title=Assessing+dementia+in+resource-poor+regions&journal=Curr.+Neurol.+Neurosci.+Rep.&volume=12&pages=511-519)

Manes, F. (2016). The huge burden of dementia in Latin America. *Lancet Neurol.* 15, 29. doi: 10. 1016/S1474-4422(15)00360-9

[PubMed Abstract](http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=ShowDetailView&TermToSearch=26700903) | [CrossRef Full Text](http://dx.doi.org/10.1016/S1474-4422(15)00360-9) | [Google Scholar](http://scholar.google.com/scholar_lookup?author=F.+Manes+&publication_year=2016&title=The+huge+burden+of+dementia+in+Latin+America&journal=Lancet+Neurol.&volume=15&pages=29)

Melloni, M., Billeke, P., Baez, S., Hesse, E., de la Fuente, L., Forno, G., et al. (2016). Your perspective and my benefit: multiple lesion models of self-other integration strategies during social bargaining. *Brain J. Neurol.* doi: 10. 1093/brain/aww231. [Epub ahead of print].

[PubMed Abstract](http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=ShowDetailView&TermToSearch=27679483) | [CrossRef Full Text](http://dx.doi.org/10.1093/brain/aww231) | [Google Scholar](http://scholar.google.com/scholar_lookup?author=M.+Melloni&author=P.+Billeke&author=S.+Baez&author=E.+Hesse&author=L.+de+la+Fuente&author=G.+Forno+&publication_year=2016&title=Your+perspective+and+my+benefit%3A+multiple+lesion+models+of+self-other+integration+strategies+during+social+bargaining&journal=Brain+J.+Neurol.)

Melloni, M., Sedeño, L., Hesse, E., García-Cordero, I., Mikulan, E., Plastino, A., et al. (2015). Cortical dynamics and subcortical signatures of motor-language coupling in Parkinson's disease. *Sci. Rep.* 5: 11899. doi: 10. 1038/srep11899

[PubMed Abstract](http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=ShowDetailView&TermToSearch=26152329) | [CrossRef Full Text](http://dx.doi.org/10.1038/srep11899) | [Google Scholar](http://scholar.google.com/scholar_lookup?author=M.+Melloni&author=L.+Sedeño&author=E.+Hesse&author=I.+García-Cordero&author=E.+Mikulan&author=A.+Plastino+&publication_year=2015&title=Cortical+dynamics+and+subcortical+signatures+of+motor-language+coupling+in+Parkinson's+disease&journal=Sci.+Rep.&volume=5&pages=11899)

Nitrini, R., Bottino, C. M., Albala, C., Custodio Capuñay, N. S., Ketzoian, C., Llibre Rodriguez, J. J., et al. (2009). Prevalence of dementia in Latin America: a collaborative study of population-based cohorts. *Int. Psychogeriatr.* 21, 622–630. doi: 10. 1017/S1041610209009430

[PubMed Abstract](http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=ShowDetailView&TermToSearch=19505354) | [CrossRef Full Text](http://dx.doi.org/10.1017/S1041610209009430)

Nitrini, R., Caramelli, P., Herrera Júnior, E., Porto, C. S., Charchat-Fichman, H., Carthery, M. T., et al. (2004). Performance of illiterate and literate nondemented elderly subjects in two tests of long-term memory. *J. Int. Neuropsychol. Soc.* 10, 634–638. doi: 10. 1017/S1355617704104062

[PubMed Abstract](http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=ShowDetailView&TermToSearch=15327741) | [CrossRef Full Text](http://dx.doi.org/10.1017/S1355617704104062) | [Google Scholar](http://scholar.google.com/scholar_lookup?author=R.+Nitrini&author=P.+Caramelli&author=E.+Herrera+Júnior&author=C.+S.+Porto&author=H.+Charchat-Fichman&author=M.+T.+Carthery+&publication_year=2004&title=Performance+of+illiterate+and+literate+nondemented+elderly+subjects+in+two+tests+of+long-term+memory&journal=J.+Int.+Neuropsychol.+Soc.&volume=10&pages=634-638)

Parra, M. (2014). Overcoming barriers in cognitive assessment of Alzheimer's disease. *Dement. Neuropsychol.* 8, 95–98. doi: 10. 1590/S1980-57642014DN82000002

[CrossRef Full Text](http://dx.doi.org/10.1590/S1980-57642014DN82000002) | [Google Scholar](http://scholar.google.com/scholar_lookup?author=M.+Parra+&publication_year=2014&title=Overcoming+barriers+in+cognitive+assessment+of+Alzheimer's+disease&journal=Dement.+Neuropsychol.&volume=8&pages=95-98)

Parra, M. A., Abrahams, S., Fabi, K., Logie, R., Luzzi, S., and Della Sala, S. (2009). Short-term memory binding deficits in Alzheimer's disease. *Brain J. Neurol.* 132, 1057–1066. doi: 10. 1093/brain/awp036

[PubMed Abstract](http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=ShowDetailView&TermToSearch=19293236) | [CrossRef Full Text](http://dx.doi.org/10.1093/brain/awp036) | [Google Scholar](http://scholar.google.com/scholar_lookup?author=M.+A.+Parra&author=S.+Abrahams&author=K.+Fabi&author=R.+Logie&author=S.+Luzzi&author=S.+Della+Sala+&publication_year=2009&title=Short-term+memory+binding+deficits+in+Alzheimer's+disease&journal=Brain+J.+Neurol.&volume=132&pages=1057-1066)

Parra, M. A., Abrahams, S., Logie, R. H., Méndez, L. G., Lopera, F., and Della Sala, S. (2010). Visual short-term memory binding deficits in familial Alzheimer's disease. *Brain J. Neurol.* 133, 2702–2713. doi: 10. 1093/brain/awq148

[PubMed Abstract](http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=ShowDetailView&TermToSearch=20624814) | [CrossRef Full Text](http://dx.doi.org/10.1093/brain/awq148) | [Google Scholar](http://scholar.google.com/scholar_lookup?author=M.+A.+Parra&author=S.+Abrahams&author=R.+H.+Logie&author=L.+G.+Méndez&author=F.+Lopera&author=S.+Della+Sala+&publication_year=2010&title=Visual+short-term+memory+binding+deficits+in+familial+Alzheimer's+disease&journal=Brain+J.+Neurol.&volume=133&pages=2702-2713)

Parra, M. A., Saarimäki, H., Bastin, M. E., Londoño, A. C., Pettit, L., Lopera, F., et al. (2015). Memory binding and white matter integrity in familial Alzheimer's disease. *Brain J. Neurol.* 138, 1355–1369. doi: 10. 1093/brain/awv048

[PubMed Abstract](http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=ShowDetailView&TermToSearch=25762465) | [CrossRef Full Text](http://dx.doi.org/10.1093/brain/awv048) | [Google Scholar](http://scholar.google.com/scholar_lookup?author=M.+A.+Parra&author=H.+Saarimäki&author=M.+E.+Bastin&author=A.+C.+Londoño&author=L.+Pettit&author=F.+Lopera+&publication_year=2015&title=Memory+binding+and+white+matter+integrity+in+familial+Alzheimer's+disease&journal=Brain+J.+Neurol.&volume=138&pages=1355-1369)

Pietto, M., Parra, M. A., Trujillo, N., Flores, F., García, A. M., Bustin, J., et al. (2016). Behavioral and electrophysiological correlates of memory binding deficits in patients at different risk levels for Alzheimer's Disease. *J. Alzheimers Dis.* 53, 1325–1340. doi: 10. 3233/JAD-160056

[PubMed Abstract](http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=ShowDetailView&TermToSearch=27372640) | [CrossRef Full Text](http://dx.doi.org/10.3233/JAD-160056) | [Google Scholar](http://scholar.google.com/scholar_lookup?author=M.+Pietto&author=M.+A.+Parra&author=N.+Trujillo&author=F.+Flores&author=A.+M.+García&author=J.+Bustin+&publication_year=2016&title=Behavioral+and+electrophysiological+correlates+of+memory+binding+deficits+in+patients+at+different+risk+levels+for+Alzheimer's+Disease&journal=J.+Alzheimers+Dis.&volume=53&pages=1325-1340)

Prince, M., Acosta, D., Chiu, H., Scazufca, M., and Varghese, M. (2003). Dementia diagnosis in developing countries: a cross-cultural validation study. *Lancet* 361, 909–917. doi: 10. 1016/S0140-6736(03)12772-9

[PubMed Abstract](http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=ShowDetailView&TermToSearch=12648969) | [CrossRef Full Text](http://dx.doi.org/10.1016/S0140-6736(03)12772-9) | [Google Scholar](http://scholar.google.com/scholar_lookup?author=M.+Prince&author=D.+Acosta&author=H.+Chiu&author=M.+Scazufca&author=M.+Varghese+&publication_year=2003&title=Dementia+diagnosis+in+developing+countries%3A+a+cross-cultural+validation+study&journal=Lancet&volume=361&pages=909-917)

Prince, M., Bryce, R., Albanese, E., Wimo, A., Ribeiro, W., and Ferri, C. P. (2013). The global prevalence of dementia: a systematic review and metaanalysis. *Alzheimers Dement.* 9, 63. e2–75. e2. doi: 10. 1016/j. jalz. 2012. 11. 007

[PubMed Abstract](http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=ShowDetailView&TermToSearch=23305823) | [CrossRef Full Text](http://dx.doi.org/10.1016/j.jalz.2012.11.007) | [Google Scholar](http://scholar.google.com/scholar_lookup?author=M.+Prince&author=R.+Bryce&author=E.+Albanese&author=A.+Wimo&author=W.+Ribeiro&author=C.+P.+Ferri+&publication_year=2013&title=The+global+prevalence+of+dementia%3A+a+systematic+review+and+metaanalysis&journal=Alzheimers+Dement.&volume=9&pages=63.e2-75.e2)

Santamaria-García, H., Reyes, P., Garcia, A., Baéz, S., Martinez, A., Santacruz, J. M., et al. (2016). First symptoms and neurocognitive correlates of behavioral variant frontotemporal dementia. *J. Alzheimers Dis.* 54, 957–970. doi: 10. 3233/JAD-160501

[PubMed Abstract](http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=ShowDetailView&TermToSearch=27567867) | [CrossRef Full Text](http://dx.doi.org/10.3233/JAD-160501) | [Google Scholar](http://scholar.google.com/scholar_lookup?author=H.+Santamaria-García&author=P.+Reyes&author=A.+Garcia&author=S.+Baéz&author=A.+Martinez&author=J.+M.+Santacruz+&publication_year=2016&title=First+symptoms+and+neurocognitive+correlates+of+behavioral+variant+frontotemporal+dementia&journal=J.+Alzheimers+Dis.&volume=54&pages=957-970)

Sedeño, L., Couto, B., García-Cordero, I., Melloni, M., Baez, S., Morales Sepúlveda, J. P., et al. (2016). Brain network organization and social executive performance in frontotemporal dementia. *J. Int. Neuropsychol. Soc.* 22, 250–262. doi: 10. 1017/S1355617715000703

[PubMed Abstract](http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=ShowDetailView&TermToSearch=26888621) | [CrossRef Full Text](http://dx.doi.org/10.1017/S1355617715000703) | [Google Scholar](http://scholar.google.com/scholar_lookup?author=L.+Sedeño&author=B.+Couto&author=I.+García-Cordero&author=M.+Melloni&author=S.+Baez&author=J.+P.+Morales+Sepúlveda+&publication_year=2016&title=Brain+network+organization+and+social+executive+performance+in+frontotemporal+dementia&journal=J.+Int.+Neuropsychol.+Soc.&volume=22&pages=250-262)

Sosa, A. L., Albanese, E., Prince, M., Acosta, D., Ferri, C. P., Guerra, M., et al. (2009). Population normative data for the 10/66 dementia research group cognitive test battery from Latin America, India and China: a cross-sectional survey. *BMC Neurol.* 9: 48. doi: 10. 1186/1471-2377-9-48

[PubMed Abstract](http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=ShowDetailView&TermToSearch=19709405) | [CrossRef Full Text](http://dx.doi.org/10.1186/1471-2377-9-48)

Sousa, R. M., Ferri, C. P., Acosta, D., Guerra, M., Huang, Y., Jacob, K., et al. (2010). The contribution of chronic diseases to the prevalence of dependence among older people in Latin America, China and India: a 10/66 Dementia Research Group population-based survey. *BMC Geriatr.* 10: 53. doi: 10. 1186/1471-2318-10-53

[PubMed Abstract](http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=ShowDetailView&TermToSearch=20691064) | [CrossRef Full Text](http://dx.doi.org/10.1186/1471-2318-10-53) | [Google Scholar](http://scholar.google.com/scholar_lookup?author=R.+M.+Sousa&author=C.+P.+Ferri&author=D.+Acosta&author=M.+Guerra&author=Y.+Huang&author=K.+Jacob+&publication_year=2010&title=The+contribution+of+chronic+diseases+to+the+prevalence+of+dependence+among+older+people+in+Latin+America,+China+and+India%3A+a+10%2F66+Dementia+Research+Group+population-based+survey&journal=BMC+Geriatr.&volume=10&pages=53)

Winblad, B., Amouyel, P., Andrieu, S., Ballard, C., Brayne, C., Brodaty, H., et al. (2016). Defeating Alzheimer's disease and other dementias: a priority for European science and society. *Lancet Neurol.* 15, 455–532. doi: 10. 1016/S1474-4422(16)00062-4

[PubMed Abstract](http://www.ncbi.nlm.nih.gov/sites/entrez?Db=pubmed&Cmd=ShowDetailView&TermToSearch=26987701) | [CrossRef Full Text](http://dx.doi.org/10.1016/S1474-4422(16)00062-4) | [Google Scholar](http://scholar.google.com/scholar_lookup?author=B.+Winblad&author=P.+Amouyel&author=S.+Andrieu&author=C.+Ballard&author=C.+Brayne&author=H.+Brodaty+&publication_year=2016&title=Defeating+Alzheimer's+disease+and+other+dementias%3A+a+priority+for+European+science+and+society&journal=Lancet+Neurol.&volume=15&pages=455-532)