

## COMMENTARY

# Screening of dementia with the IQCODE: can it be shortened?

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Dementia is a substantial and growing global health problem, affecting approximately 57 million persons worldwide. This number is predicted to reach over 150 million people in 2050, mainly due to population growth and aging (GBD 2019 Dementia Forecasting Collaborators, 2022). The number of people in low- and middle-income countries (LMICs) are rising relatively faster than in high-income countries (HICs) (Ferri *et al.*, 2005), because of an increase in life expectancy and the burden of risk factors such as less education, high blood pressure, obesity, depression, diabetes, or smoking (Livingston *et al.*, 2020).

While up to the present, no successful treatment for the disease has been found, despite an extensive amount of research into pharmacological agents targeting the underlying biology of Alzheimer's disease (Cummings *et al.*, 2021), there is sufficient evidence that early diagnosis is beneficial for persons with dementia (Prince *et al.*, 2011). It may provide access to a pathway of evidence-based support and care throughout the course of the disease.

The Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE) is a widely used screening instrument for assessment of potential dementia and is usually administered as a questionnaire filled out by a relevant proxy. It was first published by Jorm and Korten (1988) as a 26-item questionnaire and later a shortened version of 16 items became available and has been recommended as the preferred version (Jorm, 2004). The informants are asked to evaluate cognitive and functional performance over the last 10 years on a five-point scale ranging from 1 (has much improved), through 3 (not much change), to 5 (has become much worse). The IQCODE has been translated into many languages and in an extensive review Quinn and colleagues (2021) concluded that test accuracy was maintained comparing the 26 and 16-item versions. The instrument is copyright free, easy to administer, scoring takes around 5–7 minutes with minimal training of the interviewer and is available in many languages (<https://nceph.anu.edu.au/research/tools-resources/informant-questionnaire-cognitive-decline-elderly>). Jorm

(2004) concluded that “the IQCODE is relatively unaffected by education and pre-morbid ability or by proficiency in the culture's dominant language” (p. 289). These factors make the instrument an attractive tool for initial screening. A disadvantage is that scores may be affected by informant characteristics such as depression and anxiety and the quality of the relationship between informant and subject (Jorm, 2004).

An important note of warning in using brief tools such as the IQCODE is the risk of false positive or false negative results. Quinn *et al.* (2021) reported values of both sensitivity (the chance of correctly identifying people with the disease) and specificity (the chance of correctly identifying people without the disease) just above 0.80 (varying with the chosen threshold of the IQCODE score). These numbers will lead to substantial false positive diagnosis causing unnecessary distress in the people involved. And on the other hand, a number of people with the disease will be missed. When applied in clinical practice, it is strongly advised to combine the IQCODE with brief cognitive tests such as the Mini Mental state Examination (MMSE).

Khobragade and colleagues' (2022) article in the current issue reported on the performance of the IQCODE in India. For validation purposes they compared the IQCODE this with two cognitive tests: the Hindi Mental State Examination (HMSE) and the CERAD Word List Memory Task. The researchers used data from 4,028 respondents collected within the Longitudinal Aging Study in India-Diagnostic Assessment of Dementia (LASI-DAD) study. A stratified sample was employed to ensure that respondents from 18 states across the country were selected, from urban as well as rural areas, in order to attain a representative sample. While Hindi is the national language, in a lot of states different regional languages are spoken. The study was conducted using 13 different languages, and measurement invariance testing showed that reliability or bias of the IQCODE was not affected by the translation. Quinn *et al.* (2021) also found no implication for the accuracy of the IQCODE in different languages.

The authors used the 16-item version as advised by Jorm (2004), with an added extra response option “never did” to provide the respondents the opportunity to select this score in case the person of study had never performed the activity in question. This proves to be an effective strategy to identify items that do not add any information on the subject due to factors such as low income, illiteracy, or gender of the person. The results showed a large difference in missingness between rural and urban areas, but also gender proved to a factor in differences in the “never did” option: with the highest missing percentages in women. The generation of the informant was also related to the proportion of missingness. Similar patterns of missingness were found by Phung *et al.* (2015) in a study in Lebanon examining IQCODE performance.

The researchers also calculated IQCODE scores after removing three items: “Remember address and telephone number,” “Ability to work with familiar machines,” and “Ability to learn to use a new gadget or machine.” Thus, creating a 13-item version, which proved to be as accurate as the 16-item one in explaining scores on the HMSE. A factor analysis suggested a one-factor solution for both versions with similar amounts of variance explained (62.0% and 62.7%).

Khobragade *et al.* (2022) advocate a discussion on the use of a shorter version of the IQCODE in studies of rural populations in LMIC. Perroco *et al.* (2009) reported good accuracy of a 15-item version of the IQCODE in their study with 34 people with dementia and 57 controls in Brazil. In their study of screening for dementia in people with low education in Thailand, Senanarong *et al.* (2001) found that a selection of only three items from the IQCODE: “remembering what day and month it is,” “learning how to use a new gadget or machine” and “handling other everyday arithmetic problems” do suffice as an accurate screening tool with sensitivity of 84.9% and specificity of 92%. Whereas in the study of Khobragade *et al.* (2022) the item “learning how to use a new gadget or machine” was found difficult to answer by a sizeable proportion of the respondents (31%) and was frequently scored with the “never did” option, particularly in rural areas. Ehrensperger *et al.* (2010) studied the screening properties of the German version of the IQCODE and found that seven out of the sixteen items performed just as accurate. Two of the three items in the Thai version (Senanarong *et al.*, 2001): “learning how to use a new gadget or machine” and “handling other everyday arithmetic problems,” were not included in the German one. This shows that differences in country, culture, or living circumstances may seriously influence the scoring of particular items of the IQCODE.

Despite the differences in the retained items of the different shortened versions, these studies show that more economic versions of the IQCODE can be used with the same measurement accuracy as the 16-item IQCODE. The factor loadings in the exploratory factor analysis of all 16 items in the LASI-DAD study (Khobragade *et al.*, 2022; supplementary material) varied between 0.72 and 0.84, indicating that all non-missing items contribute in the assessment of the underlying construct, which is considered to be cognitive decline (Jorm, 2004).

Ayalon (2011) investigated a more rigorous approach and compared the use of the 16-item IQCODE with a single item informant report, where informants were asked to rate the respondents’ memory on the question: “how would you rate your friend’s or relative’s memory at the present time?” on a five-point scale. The single item question performed better than the IQCODE both in discriminating between cognitively intact people from people with cognitive impairment not dementia, and between cognitively intact people and people with dementia. Looking at all 16 items of the IQCODE the main focus appears to be memory or aspects of memory, indicating that that is the central aspect of the underlying construct of the IQCODE and as such performs as the crucial factor in its screening properties of dementia, although cognitive decline may manifest itself in a broader range of abilities and behaviors, and Ayalon (2011) argues that when “additional data concerning patients’ strengths and weaknesses are needed, the IQCODE may be desirable” (p. 168).

These findings of different studies support the notion that screening of dementia (which of course does not equal diagnosing the disease) can be accurately done more economically (Quinn *et al.*, 2021). The invitation by Khobragade *et al.* (2022) to discuss whether or not a shorter version of the IQCODE should be used in rural or low-income populations can be extended into a strong recommendation of further studies of shortened versions of the IQCODE in both high and low-income countries, and in both rural or urban environments. Whether or not different short versions of the IQCODE will be needed for screening purposes remains to be seen. Perhaps adding one or two well-selected questions from 16-item IQCODE to the single-item measure of Ayalon (2011) will enhance the measurement accuracy to an even higher level.

### Conflict of interest

The author reports there are no competing interests to declare.

## References

- Ayalon, L.** (2011). The IQCODE versus a single-item informant measure to discriminate between cognitively intact individuals and individuals with dementia or cognitive impairment. *Journal of Geriatric Psychiatry and Neurology*, 24, 168–173. DOI [10.1177/0891988711418506](https://doi.org/10.1177/0891988711418506).
- Cummings, J., Lee, G., Zhong, K., Fonseca, J. and Taghva, K.** (2021). Alzheimer's disease drug development pipeline: 2021. *Alzheimer's & Dementia (New York, N. Y.)*, 7, e12179. DOI [10.1002/trc2.12179](https://doi.org/10.1002/trc2.12179).
- Ehrensperger, M., Berres, M., Taylor, K. and Monsch, A.** (2010). Screening properties of the German IQCODE with a two-year time frame in MCI and early Alzheimer's disease. *International Psychogeriatrics*, 22, 91–100. DOI [10.1017/S1041610209990962](https://doi.org/10.1017/S1041610209990962).
- Ferri, C. P. et al.** (2005). Global prevalence of dementia: a Delphi consensus study. *Lancet (London, England)*, 366, 2112–2117. DOI [10.1016/S0140-6736\(05\)67889-0](https://doi.org/10.1016/S0140-6736(05)67889-0).
- GBD 2019 Dementia Forecasting Collaborators** (2022). Estimation of the global prevalence of dementia in 2019 and forecasted prevalence in 2050: an analysis for the Global Burden of Disease Study 2019. *The Lancet Public Health*, 7, e105–e125. DOI [10.1016/S2468-2667\(21\)00249-8](https://doi.org/10.1016/S2468-2667(21)00249-8).
- Jorm, A. F.** (2004). The Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE): a review. *International Psychogeriatrics*, 16, 275–293. DOI [10.1017/S1041610204000390](https://doi.org/10.1017/S1041610204000390).
- Jorm, A. F. and Korten, A. E.** (1988). Assessment of cognitive decline in the elderly by informant interview. *The British Journal of Psychiatry: The Journal of Mental Science*, 152, 209–213. DOI [10.1192/bjp.152.2.209](https://doi.org/10.1192/bjp.152.2.209).
- Khobragade, P. et al.** (2022). Performance of the Informant Questionnaire on Cognitive Decline for the Elderly (IQCODE) in a nationally representative study in India: the LASI-DAD study. *International Psychogeriatrics*, 1–11. DOI [10.1017/S1041610222000606](https://doi.org/10.1017/S1041610222000606).
- Livingston, G. et al.** (2020). Dementia prevention, intervention, and care: 2020 report of the Lancet Commission. *Lancet (London, England)*, 396, 413–446. DOI [10.1016/S0140-6736\(20\)30367-6](https://doi.org/10.1016/S0140-6736(20)30367-6).
- Perroco, T. R. et al.** (2009). Performance of Brazilian long and short IQCODE on the screening of dementia in elderly people with low education. *International Psychogeriatrics*, 21, 531–538. DOI [10.1017/S1041610209008849](https://doi.org/10.1017/S1041610209008849).
- Phung, T. K. et al.** (2015). Performance of the 16-Item Informant Questionnaire on Cognitive Decline for the Elderly (IQCODE) in an Arabic-speaking older population. *Dementia and Geriatric Cognitive Disorders*, 40, 276–289. DOI [10.1159/000437092](https://doi.org/10.1159/000437092).
- Prince, M., Bryce, R. and Ferri, C.** (2011). *World Alzheimer Report 2011: The Benefits of Early Diagnosis and Intervention*. London: Alzheimer's Disease International.
- Quinn, T. J., Fearon, P., Noel-Storr, A. H., Young, C., McShane, R. and Stott, D. J.** (2021). Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE) for the detection of dementia within community dwelling populations. *The Cochrane Database of Systematic Reviews*, 7, CD010079. DOI [10.1002/14651858.CD010079.pub3](https://doi.org/10.1002/14651858.CD010079.pub3).
- Senanarong, V. et al.** (2001). The IQCODE: an alternative screening test for dementia for low educated Thai elderly. *Journal of the Medical Association of Thailand = Chotmaihet thangphaet*, 84, 648–655.