Cognitive Decline among Elderly as Reported by Informants and Psychometric Properties of Short-IQCODE

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Abstract

As older population is increasing globally, the disabling issue of dementia and cognitive decline is also on increase. Early identification and treatment is the best possible strategy to reduce the mortality and morbidity associated with cognitive decline. The present study aimed to assess the cognitive decline among elderly family members as informed by service utilisers of Vayomithram clinics and to measure the psychometric properties of Malayalam version of short Informant Questionnaire on Cognitive Decline in the Elderly (short IQCODE). The study was based on Wiedenbach's Helping Art Theory of Clinical Nursing. Research approach was non-experimental with descriptive survey design. Short IQCODE was administered to 215 purposively selected service utilisers of Vayomithram clinics, who were considered as the informants. Subsequently, the elderly family members of the informants were screened using adapted version of Mini Mental State Examination, the gold standard tool for dementia. As per score of short IQCODE, 31.63 percent of elderly had cognitive decline. The direction of scoring of the two tools was opposite and a statistically significant negative correlation was found between the scores of short IQCODE and MMSE (r= -0.486). Short IQCODE yielded a sensitivity of 76.31 percent, specificity of 77.96 percent, positive predictive value of 42.64 percent and negative predictive value of 93.87 percent at a cut off score 3. According to the study findings, Malayalam version of short IQCODE could be used for screening cognitive decline among elderly by community level workers, which will be a great step in early identification of cognitive decline among general population through informants.

Key words: Cognitive decline, Cognitive Decline in the Elderly, Vayomithram

Old age, also called senescence, in human beings, is the final stage of the normal life span. Old age is the phase of life cycle characterised by its own developmental issues, many of which are concerned with loss of physical agility and cognitive acuity. There is a finely graded inverse association between age and cognitive performance, but the age at which cognitive decline becomes evident remains unclear. A recent review of the literature concluded that cognitive decline was evident in the middle age itself (Manoux et al, 2012).

As the elderly population of India continues to grow, the issues of screening for cognitive impairment and early detection of dementia are becoming increasingly important for the benefits of both patients and care providers. Although dementia is an important public mental health problem, there is at present no agreement about dementia screening in the elderly.

Screening tools for cognitive decline still have low accuracy for dementia especially in cases of mild dementia (Ren et al, 2018). Despite its significant limitations such as difficulty to identify mild cognitive impairment, difficulty in recording changes in cases of severe dementia and the scores being affected by age, education, cultural and socioeconomic background of the patients, the Folstein Mini Mental State Exam (MMSE) remains the most frequently used cognitive screening instrument. Its best value in the community and primary care appears to be for the purpose of ruling out a diagnosis of dementia (Ismail et al, 2010).

Search for a tool to assess the cognitive decline, which can overcome the limitations of MMSE has been ongoing. While assessing cognitive impairment and dementia, clinicians often seek inputs from informants to complement the findings from

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cognitive tests. This key area was further explored and the authors landed up with the Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE), which is a brief screening instrument designed to assess cognitive change in older populations based on informant reports. The IQCODE was developed by Anthony Jorm and Jacomb in 1989 and consists of 26 questions.4 Available evidence suggests that the IQCODE can be used in situations where retrospective assessment of cognitive change is needed and an informant is available (Tip Sheet 5).

As per the published literature, the cognitive impairment was three times more prevalent among elderly participants when compared to the age group of below 60 years in south India (Krishnamoorthy et al, 2019). When used in Africa, the IQCODE showed excellent psychometric properties to screen for dementia in the community as well as in nursing homes (Phung et al, 2015). A study from Pakistan showed a significant negative correlation between the scores of MMSE and IQCODE. It also concluded that to provide better screening, cognitive tests can be combined with informant-based tool (Kashif et al, 2016).

Objective

The aim of the study was to identify cognitive decline among elderly family members as reported by service utilisers of Vayomithram clinics with a view to establish psychometric properties of short Informant Questionnaire on Cognitive Decline in Elderly. Authors assumed that family members can report cognitive decline among elderly.

Methodology

A non-experimental design with descriptive survey was conducted among 215 purposively selected service utilisers (informants) of Vayomithram clinics of Thrissur district, Kerala who have an elderly family member aged 60 years or more. Vayomithram clinics are mobile clinics run by Kerala Social Security Mission to provide medical support to elderly people above the age of 65 years residing at Corporation/ Municipal areas in the state. After obtaining consent and ensuring privacy, the informants were screened with Community Screening Instrument for Dementia (CSI-D) Brief and those with dementia were excluded. Socio-demographic variables of both the informant and the elderly were collected. The cognitive status of the elderly family member was explored from the informants using Malayalam version of Short IQCODE (Chronbach alpha 0.83). Subsequently, the investigator met the elderly family member at home or clinic and assessed their cognitive status using adapted version of Mini Mental State Examination in Malayalam (reliability score 0.9). All data were collected using face to face interview. The scores of both the tools were correlated. A pilot study was conducted among 20 samples ahead of data collection and no major changes were indicated.

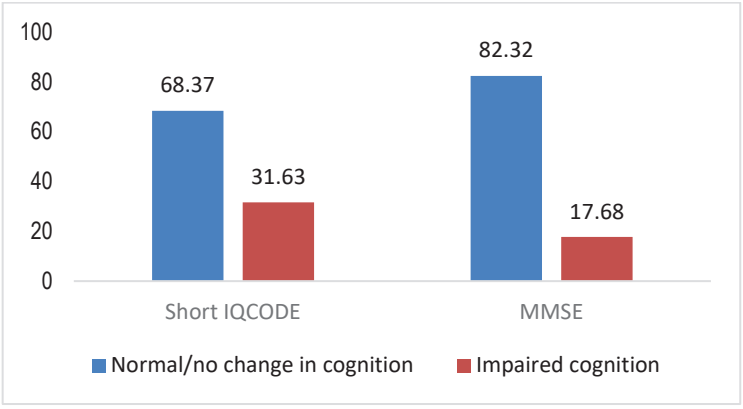

Fig 1: Percentage cognitive status of elderly at home.

Results

The mean age of service utilisers of Vayomithram clinics (informants) was 70.24 (SD 5.08); 53.5 percent of the informants were females; 50.9 percent had primary education and 3.7 percent had no formal education. The mean age of elderly family members at home was 70.67 years (SD 6.85); 51.2 percent of elderly were males. 52.09 percent had primary education and 08.3 percent had no formal education. 61.86 percent of elderly at home belonged to Above Poverty Line as per ration card.

Most prevalent medical disorders among elderly were cardiovascular (31.55%) and endocrine (26.74%).

Figure 1 shows that 68.37 percent of elderly have no change in cognition and 31.63 percent had impaired cognition as per short IQCODE while 82.32 percent had normal cognition and 17.68 per-

Table 1: Sensitivity, specificity, positive predictive value and negative predictive value of short IQCODE at cut off score 3

	MMSE positive	MMSE negative	Sensitivity	Specificity	Positive predictive value	Negative predictive value
Short IQCODE positive	29	39	76.31%	77.96%	42.64%	93.87%
Short IQCODE negative	9	138				

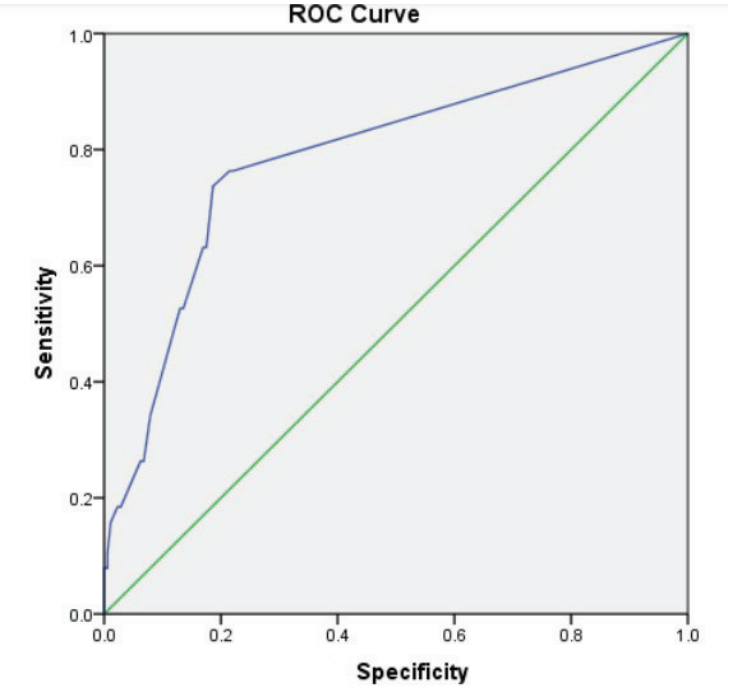

Fig 2: Receiver operating characteristic curve for short IQCODE at cut-off score 3.

cent had impaired cognition as per MMSE. Short IQCODE had 76.31 percent ability to correctly identify those with the disease and 77.96 percent ability to identify those without the disease (Table 1).

The Karl Pearson correlation coefficient between the scores of short IQCODE and MMSE was -0.486 ($p<0.001$) which showed moderate negative correlation.

In Receiver Operating Characteristic Curve (ROC) analysis, the area under the curve was 0.78. Since AUROC is greater than 0.5, the IQCODE is found accurate and discriminative (Fig 2).

Ethical considerations: The study was approved by the Institutional Ethics Committee of Govt. College of Nursing, Thrissur (Kerala). Informed written consent was obtained from both the informants and the elderly. Privacy of the participants and confidentiality of the data were ensured.

Discussion

The present study used short IQCODE, a brief screening instrument designed to assess cognitive decline in older population based on informant report. Since the tool is new to the present setting, its psychometric properties were also measured. Similar validation studies were conducted earlier to measure the psychometric properties of Informant Questionnaire on cognitive decline in the elderly. Adapted version of IQCODE was produced in many languages and short versions are also available in Spanish, Chinese, Portuguese and some other languages. In the present study, psychometric properties of Malayalam version of short IQCODE were assessed in a Malayalam speaking setting.

The prevalence rate of cognitive decline among elderly varies widely in different studies. In a study conducted in Rural China, the prevalence rate was found to be 32.4 percent among 1171 samples (Ding et al, 2018), while in southern Brazil, it was found that incidence rate per 1000 persons-year for mild cognitive impairment was 13.2 percent (Chaves et al, 2009). In the current study, it was found that 31.63 percent of samples had cognitive decline as per the score of short IQCODE which was similar to a study in southern India which revealed a prevalence rate of 31 percent. The MMSE findings revealed a prevalence rate of 17.68 percent cognitive impairment among the sample.

In the present study, as per the cut-off score 3, the sensitivity of short IQCODE was 76.31percent, which means that short IQCODE had 76.31 percent ability to correctly identify those with cognitive decline. Also, specificity, the ability of short IQCODE to correctly identify those without the disease was 77.96 percent in the current study. In Brazilian Portuguese version of the IQCODE, sensitivity was 84.6 percent and specificity was 81.2 percent at cut-off score of 3.22 (Carrabba et al, 2015). In Persian version, both sensitivity and specificity were 73 percent at cut-off score 3.16 (Azarnivand et al, 2019).

The investigator also identified that the short IQCODE has a positive predictive value of 42.64 percent. It means there is 42.64 percent probability and subjects with a positive screening test truly have the disease. The negative predictive value is 93.87 percent which means the tool has 93.87 percent probability and subjects with a negative screening test truly did not have the disease. In the study conducted among Arabic population, at cut off score >3.34, the positive and negative predictive values were 91.5 percent and 95.1 percent respectively (Phung et al, 2015).

ROC curve analysis was done in the present study and the area under the curve for short IQCODE was found to be 0.78 where the ideal value for a valid tool is anywhere above 0.5. This indicates that short IQCODE is an accurate tool for screening of dementia. Area Under the ROC (AUROC) curve was 0.96 for IQCODE in a study from Africa (Phung et al, 2015).

In the current study, 29.30 percent had slight decline in cognitive function as per short IQCODE while as per MMSE, 11.63 percent had mild cognitive impairment. Short IQCODE contains items which are more related to daily life which may be the possible reason for this difference. The finding suggests that short IQCODE is more efficient to

detect mild cognitive impairment when compared to MMSE.

Authors recommend that psychometric properties of short IQCODE can be further confirmed by comparing it with diagnostic and neuro-physiological examinations other than MMSE.

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Conclusion

Malayalam version of short IQCODE is a brief tool which can be easily administered to community people or clinical population for screening of cognitive impairment. The short IQCODE can be used as a complementary tool along with MMSE for more accurate diagnosis of cognitive impairment. It can be particularly utilised to detect mild cognitive impairment among the elderly.

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