



Psychometric Properties of the Persian Version of Informant Questionnaire on Cognitive Decline in the Elderly-Short Form (IQCODE-S)

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Abstract

Background: Dementia and cognitive decline mainly affect older people. Several instruments have been developed for screening and detection of cognitive impairments, among them is the short form of the informant questionnaire on cognitive decline in the elderly (IQCODE-S); however, there was no instrument to assess it in Persian language speakers. The purpose of the present study was to validate the Persian version of informant questionnaire on cognitive decline in the elderly-short form (IQCODE-S).

Methods: In this study, WHO's standard 'forward-backward' translation procedure was performed. Validity and reliability of the questionnaire were evaluated and it was administered in a sample of 373 inpatient Iranian elderlies. The convenient sampling was performed to include participants from family members care giving older patients with long diagnosed of dementia. Face and content validity were evaluated and reliability of the instrument was evaluated. Significant level was set at 0.05.

Results: The mean age of the participants was 71.08 ± 9.89 years. Cronbach's alpha coefficient was 0.82. Significant correlations were observed between cognitive status and age, marital status, education and hospitalized wards (P value < 0.05). Appropriate CVI and CVR were calculated as .85 and .7 respectively.

Conclusions: This study reports on translation and validation of Persian version of one of the most important screening tools for dementia. It reveals significant association between the elderlies' cognitive decline and their age, marital status, education, and hospitalized ward.

Keywords: Psychometrics, Ageing, Cognitive decline, Informant.

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prevention and early detection of this condition holds great importance.³

Several instruments have been developed for screening and detection of cognitive impairment. The short form of the informant questionnaire on cognitive decline in the elderly (IQCODE-S) is a worldwide-applied instrument for screening of dementia. Anthony F. Jorm first developed this questionnaire in 1994 with 98% correlation in its 26-item long version. Sensitivity, specificity, positive predictive value, and negative predictive value for the short version were 0.79, 0.82, 0.89, and 0.65, respectively.⁴ Unlike other similar instruments such as the mini-mental state examination (MMSE) or the abbreviated mental test score (AMTS), which evaluate the current cognitive function of the patients, the IQCODE has the advantage of exploring the changes in cognitive state of the patients over the past 10 years. The reason for selection of the 10-year period is that, according to epidemiologic evidence, survival after the onset of dementia is about 10 years or less.⁵ Therefore, detection and management of the condition at any stage would be beneficial. Another advantage of the IQCODE is that the questionnaire is completed by a so-called "informant" who is well familiar with the cognitive trend of the patient. Therefore, it is particularly useful for situations where direct cognitive testing of the patients is impossible due to acute illness, lack of cooperation, or death⁶ and for screening in populations with low levels of education and literacy⁷ and different languages and cultures.⁸

The IQCODE has been translated and validated in other languages, including Spanish,⁹ Chinese,⁷ French,¹⁰ Italian,¹¹ Dutch,¹² and Turkish.¹³

The short version of IQCODE, consisting of 16 items. Each item is rated in a scale of 1 (much improved) to 5 (much worse). The total score is calculated by averaging the ratings across the 16 questions (4). In this study, we used the MMSE (for literate subjects) or AMTS (for illiterate subjects) questionnaires to evaluate the subjects for dementia before inclusion in the study. The MMSE contains 30 items with a total score of 30 based on correct answers.¹⁴ The suggested cut-off score for identifying dementia is 24.¹⁵ The instrument is affected by level of education; therefore, it is more suitable for literate subjects. Its sensitivity and specificity have been reported to be 0.71 – 0.92 and 0.56 – 0.96, respectively.¹⁶ Ansari and colleagues validated the MMSE in a Persian in 2010 and reported a cut-off score of 23 (sensitivity: 0.98, specificity: 1.0).¹⁷ The other instrument used was the 10-item AMTS.¹⁸ The advantage of this instrument over its similar

Introduction

The phenomenon of cognitive decline (dementia) represents one of the important elderly health priorities. The world health organization defines dementia as an umbrella term for several diseases that significantly affects memory and other cognitive and behavioral abilities. About 50 million people worldwide live with dementia, which is now the 7th leading cause of death.¹ The number of people with dementia is predicted to increase to 82 million by 2030 and 152 million by 2050.² Dementia is a syndrome of chronic nature that mainly affects older people. Since cognitive decline negatively affects quality of life and the ability to perform everyday activities,

instruments such as MMSE, is that it is not affected by the individual's level of education.¹⁹ The instrument is reported to have a sensitivity of 100% and specificity of 53% at cut-off point of 7.²⁰ The Persian version of the questionnaire was validated by Bakhtiari et al. ($\alpha = 0.76$, sensitivity = 0.92, and specificity = 0.81²¹ which are appropriate figures for validation of an instrument.²²

To our best knowledge, the instrument has not been translated into Persian. The present study was designed to translate and validate the IQCODE into Persian.

Materials and Methods

In this study, standard procedure was followed for translation and validation of the questionnaire according to WHO's recommendation. First, the questionnaire was forward-translated by two translators whose first language was Persian. One of the translators was familiar with the objective of the questionnaire, but the other was not. Second, two other translators who were native English speakers and were fluent in Persian performed Persian-English back-translation. Then, a fifth translator, who was familiar with the context of the questionnaire, evaluated the translations and synthesized the final Persian version. The next step was the evaluation of psychometric properties, which was carried out in two steps. In the first step, face and content validity of the Persian version were evaluated. To evaluate content validity, a committee of 20 experts and 10 informants evaluated each item in terms of "necessity," "relevance," "clarity," and "simplicity," and then content validity ratios (CVR) and content validity index (CVI) were computed. In the second step, internal consistency and stability were assessed to evaluate the reliability of the questionnaire. The Cronbach's alpha coefficient was calculated for each item and for the whole questionnaire to assess the internal consistency. For assessment of the stability, the test-retest method was used, wherein the questionnaire was administered to 70 elderlies selected randomly on two occasions with 2 weeks' interval which is mostly recommended interval time for test-retest procedure.²³ Then, the correlation coefficients were calculated for each item and for the whole instrument.

In the second step, 373 elderly patients hospitalized in Imam-Hossein hospital were evaluated for eligibility for inclusion in the study. The inclusion criteria were being 60 years old and above with a care taker who has been familiar with the subject's cognitive status for the previous 10 years, speaking Persian, not being hospitalized in intensive care units, not having severe auditory or visual impairment or any acute illness preventing them from cooperation and suffering mild to severe cognitive impairment as approved by MMSE (literate subjects, score < 24) or AMTS (illiterate subjects, score < 7).

The study was conducted using the following instruments. Demographic questionnaire including subjects' and informants' ages, subjects' gender, subjects' and informant's educational level, subject's marital status, informants' relation to the subject, hospitalization unit, and place of living), dementia diagnosis criteria based on DSM-5, the MMSE, the AMTS, and the Persian version of 16-item IQCODE.

Statistical analysis was performed using IBM SPSS Statistics.²¹ Statistical methods used for analysis of data

included correlational methods (computing Cronbach's alpha, and Pearson's r), one-way analysis of variance (with Tukey post hoc test when indicated), and independent-samples t test. Cut-off points, specificity, and sensitivity values were determined using ROC analysis. Significance level for all tests was set at 0.05.

The study was approved by the ethics committee of Shahroud university of medical sciences (IR.SHMU.REC.1395.159). Informed written consent was obtained from all participants (informants) and include the name of the Shahroud university of medical sciences before enrolling them in the study. For the sake of anonymity, all datasheets were nameless and only the first researcher and the responder had access to the codes assigned to the participants.

Results

Demographic characteristics of the participants are summarized in table 1. Of all 373 elderlies in the hospital, 110 were excluded from the study based on the scores on the MMSE or AMTS. Of 263 eligible subjects, 151 (57.4%) were female and 112 (42.6%) male. The mean (SD) age of the participants was 71.08 (9.89) years (range: 60 – 100 years), and they had varying degrees of cognitive impairment.

The most important outcome of this study was the assessment of cognitive changes in the elderly. Therefore, individuals aged 60 years and older with varying degrees of cognitive impairment were included in the study, and changes in their cognitive status over the previous 10 years were evaluated using the short form of the IQCODE.

The IQCODE-S is one of the most commonly used instruments for prediction of dementia in the elderly. It has been adapted and validated for use in different countries.^{7,9-13} The present study aimed to validate the Persian version of the instrument to be used in Iran. We found that the translated version enjoys a good face and content validity for evaluation of cognitive impairments in a Persian-speaking community. The translated instrument also had a good internal consistency ($\alpha = 0.82$), and sensitivity, specificity, positive and negative predictive values were 73%, 73%, 86%, and 52%, respectively. Jorm et al. calculated the 3-day test-retest reliability of the instrument to be 0.96,²³ and in another study reported a 1-year test-retest reliability of 0.75, with sensitivity and specificity being 80% and 82%, respectively.²⁴ In another study, Jorm reported the Cronbach's coefficient alpha over a 4-week period to be 0.86,²⁵ which was close to that of our study. Meanwhile, Law and colleagues, in validation of the French version of the instrument in 1995, reported a cut-off point, sensitivity, and specificity of 3.6, 75%, and 95.6%, respectively, and found it more accurate than the MMSE in identifying patients with Alzheimer's.¹⁰ Jonghe and coworkers used the Dutch version of the IQCODE in 1997 to identify patients with dementia and to differentiate them from other types of mental disorders. The Cronbach's alpha and the cut-off point in their study was 0.95 and 3.9, respectively.¹² Similarly, Del-Ser et al. (1997) applied a shortened Spanish version of the IQCODE for diagnosis of dementia in a clinical setting and reported the sensitivity, specificity, positive and negative predictive values to be 79%, 73%, 88%, and 58%, respectively, suggesting a smaller diagnostic power compared with the MMSE and the complete

Table 1. Mean cognitive status of elderly based on informant according to demographic variables, Shahroud, Iran, 2017

Variables and sub groups	Mean \pm S.D	Pvalue	Pearson correlation coefficient
Age groups of elderly			
- 60-69	3.288 \pm 0.286	0.000	0.424
- 70-79	3.540 \pm 0.511		
- 80-89	3.677 \pm 0.554		
- > 90	4.161 \pm 0.573		
Informants' Age			
- 18-30	3.386 \pm 0.534	0.000	0.254
- >30	3.500 \pm 0.451		
Gender			
- Male	3.404 \pm 0.480	0.061	
- Female	3.516 \pm 0.472		
Gender of informant			
- Male	3.498 \pm 0.473	0.313	
- Female	3.438 \pm 0.483		
Living place			
- Urban area	3.432 \pm 0.538	0.312	
- Rural area	3.493 \pm 0.388		
Relation of informant with elderly			
- Husband	3.633 \pm 0.597	0.334	
- Child	3.496 \pm 0.448		
- Others...	3.420 \pm 0.517		
Hospital ward			
- Internal	3.481 \pm 0.608	0.007	
- Surgery	3.437 \pm 0.384		
- Infection	3.568 \pm 0.407		
- Urology	3.348 \pm 0.347		
- *Neurology	3.902 \pm 0.761		
- Orthopedic wad	3.463 \pm 0.374		
- Emergency ward	3.421 \pm 0.454		
- Heart ward	3.352 \pm 0.289		
- ENT	3.352 \pm 0.473		
- Lung ward	3.593 \pm 0.343		
Education of elderly			
- Illiterate	3.586 \pm 0.520	0.000	-0.325
- Literate	3.267 \pm 0.307		
Education of informant			
- Illiterate	3.669 \pm 0.511	0.023	-0.140
- Literate	3.465 \pm 0.478		
Marital status			
- Single	3.392 \pm 0.526	0.000	
- Married	3.393 \pm 0.385		
- Widowed	3.671 \pm 0.617		

*. The mean scores of cognitive status in the elderly had a significant correlation with the elderly's hospitalized ward. According to Tukey's posttest, the elderly hospitalized in the neurology ward had a worse cognitive status than the elderly admitted in other wards

Table 2. Cronbach's alpha coefficient of all questions

Items	Cronbach's alpha coefficient
Remembering things about family and friends	0.812
Remembering things that have happened recently.	0.823
Recalling conversations a few days later.	0.815
Remembering his/her address and telephone number.	0.805
Remembering what day and month it is.	0.813
Remembering where things are usually kept.	0.809
Remembering where to find things which have been put in a different place	0.811
Knowing how to work familiar machines around the house.	0.816
Learning to use a new gadget or machine around the house.	0.792
Learning new things in general.	0.788
Following a story in a book or on TV	0.825
Making decisions on everyday matters.	0.815
Handling money for shopping.	0.803
Handling financial matters e.g. the pension, dealing with the bank.	0.802
Handling other everyday arithmetic problems e.g. knowing how much food to buy, knowing how long between visits from family or friend.	0.807
Using his/her intelligence to understand what's going on	0.820

form of IQCODE.²⁶ Ozel-Kizil et al. (2010) conducted a Turkish adaptation of the questionnaire and evaluated its psychometric properties.¹³ They reported a high reliability ($\alpha = 0.95$), and the cut-off point, sensitivity, and specificity of the Turkish version in diagnosis of dementia were 3.4, 82%, and 70%, respectively. The results of the mentioned studies are close to the present one in terms of reliability. However, the cut-off point of 3.16 in our study is relatively small compared with the other studies. Considering the fact that the higher score on questionnaire is indicative of a greater degree of cognitive decline, the smaller cut-off point for our instrument suggests that, in a given cut-off point, Iranian elderly would have a more severe cognitive decline compared with their counterparts in above-mentioned countries. The observed smaller cut-off point in our study may be attributable to differences in demographic characteristics, particularly educational level.

The correlation between the scores on the Persian version of the IQCODE-S and the cognitive tests used (MMSE and AMTS) was moderate (-0.67) and statistically significant. Flicker et al. (1997), in a study on 78 Australian elderly (mean age: 80 years), reported a correlation of -0.65 between the IQCODE and MMSE, and -0.62 between the IQCODE and AMTS,²⁷ which are close to that we found in our study. However, there are studies that have reported smaller correlations. For example, Christensen (1992) found a correlation of -0.37 between the scores of the IQCODE and MMSE.²⁸

This study found a negative correlation between cognitive status and age. In line with this finding, Kennedi et al., reported that normal cognitive functioning is dependent on the function of various nervous systems and that age-associated degenerations in nervous system result in impaired brain function and, consequently, cognitive decline.²⁸ Similarly, Abolgasemi and colleagues found that older subjects²⁹ got more distracted, had poorer concentration, suffered greater memory loss, had more difficulty remembering names and events, and made more mistakes.³⁰

In the current study, male subjects had a better cognitive status compared with females, although the difference was not statistically significant (Pvalue = 0.061). This is in harmony with the results of Masoumi et al. who found that men had a better normal cognitive status than women. Similarly, the found that the difference was not significant (mean difference: 4.5%, Pvalue = 0.46).³¹ McGuire et al. studied 4077 American seniors. They also found no significant association between gender and cognitive decline.³² By contrast, Abolgasemi et al. reported that the mean cognitive decline score for elderly men was significantly greater than that for elderly women.³⁰

Researchers observed a direct significant correlation between cognitive status and level of education, with higher education corresponding to better cognition. This is supported by Shin et al. who also reported a significant association between education and cognitive health.³³ It can be argued that education contributes to better cognitive status by improving

different aspects of cognitive health, including attention, retention, and language skills.

In this study, cognitive status was significantly correlated with marital status, with married elderly enjoying a better cognitive status compared with widowed ones. The reason for this difference may be attributable to the fact that elderly couples have stronger verbal and behavioral interactions, especially with their wives, which in turn promotes the activation of nervous and mental functions. On the contrary, Masoumi et al. reported that cognitive decline in married couples was 1.29% more severe than in other groups (Pvalue = 0.002).³¹ Paul et al. also found cognitive impairments to be more severe in married and widowed elderly subjects compared with other groups.³⁴

This study found a correlation between cognitive status and the subjects' hospitalized. Subjects in neurology ward had greater cognitive declines compared with those hospitalized in other wards. It may seem intuitive, as people admitted to neurology ward are more likely to have already experienced nervous system damages. They also reported a longer history of Alzheimer's and other cognitive impairments. Salarvand et al. demonstrated a significant association between the hospitalization ward and cognitive decline severity; however, unlike our study, they found the greatest cognitive declines in patients hospitalized in general ward, followed by emergency department, CCU, and ENT wards.³⁵ This discrepancy might be due to the lack of neurology ward in the hospitals in that study.

There was no correlation between cognitive status of the subjects and the area where they were living (i.e., rural vs urban). This is consistent with Salarvand et al., who also compared the prevalence of cognitive decline in hospitalized elderly from rural and urban areas and found no difference.³⁵

Interestingly, we observed an inverse, significant correlation between patients' cognitive status and the informant age, with elderly with greater degrees of cognitive decline tending to have older informants. It might be attributable to the fact that younger informants are generally more involved with daily affairs of life and, through interaction with the older persons, keep them involved with everyday matters, which in turn can contribute to a better cognitive activity and health in the elderly. However, Jorm et al. did not find a significant effect of the informant age on the correlation between the IQCODE and MMSE.²³

Finally, cognitive status of the subjects was significantly correlated with educational level of the informant. Elderly with better cognitive status usually had informants with higher educational level. The reason for this observation might be that, in our study, patients with higher education often had a wife, child, or an informant with higher education, and less educated subjects tended to have less educated informants. Therefore, the better cognitive status in subjects with highly educated informants may actually be related to the subjects own educational level. In line with this finding, Fuh et al. stated that the IQCODE is not affected by the length and nature of the relation between the informant and the elderly, but is affected by the age and education of the informant,⁷ although Jorm et al.

reported that the questionnaire is not affected by age and education of the informant.³⁶

One of the possible limitations of the present study was the lack of suitable and reliable informant for some of the subjects, which led to their exclusion from the study. Given the increasing prevalence of cognitive disorders in the elderly, it is recommended that the Persian version of the IQCODE be put into use in research and clinical settings in Iran to help in prevention and early detection of these disorders.

Dementia is a common elderly health problem, affecting negatively not only the patient, but also his family, and the community. Therefore, early detection and treatment of people at risk, as well as people already affected by dementia, is of great importance.

Discussion

This study reports on translation and validation of Persian version of one of the most important screening tools for dementia. It reveals significant association between the elderly's cognitive status and their age, marital status, education, and hospitalization ward.

It is strongly suggested that the questionnaire be used in clinical settings to help in prevention or attenuation of cognitive impairments in the elderly. Considering the validity and reliability of the Persian version of the IQCODE in evaluation of cognitive status in the elderly, it can be used for cognitive screening of the elderly in Iran.

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Conflict of Interest

The authors declare that they have no conflict of interest.

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