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Cognitive impairment in medical inpatients. I: Screening for dementia–is history better than mental state?

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Abstract

Background: evaluation of the short version of the Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE) and the Abbreviated Mental Test (AMT) as screening tools for dementia in medical inpatients.
Methods: 201 patients over 65 were assessed. Assessment included administration of the AMT, a delirium screening instrument and a brief psychiatric interview. Relatives were interviewed and the IQCODE administered. Diagnostic and Statistical Manual (DSM) IIIR diagnoses of various causes of cognitive impairment were made. Sensitivity and specificity values of the screening tests for a DSM IIIR diagnosis of dementia were calculated.
Results: our study suggests that the IQCODE is more accurate than the AMT as a screening instrument for dementia. Using a cut-off point of >3.44, sensitivity and specificity of the IQCODE for diagnosing dementia were 100 and 86% respectively. Equivalent values for the AMT (cut-off point <8) were 96 and 73%. It was possible to use the IQCODE in eight of the 10 patients unable to complete the AMT.
Conclusion: using both the IQCODE and a brief cognitive function test when screening for dementia in medical inpatients will maximize the number of patients who can be screened.

Keywords: *cognitive impairment, dementia, detection, IQCODE, medical inpatients*

Introduction

Cognitive impairment is common in elderly medical inpatients. A recent survey found 38% of patients in a hospital geriatric unit to have delirium or dementia [1]. Such patients have an increased mortality during their hospitalization [2, 3] and often have long hospital stays [2, 4, 5]. Early recognition of dementia might expedite earlier referral for appropriate community support, leading to shorter hospital stays and a lower rate of re-admission.

However, there is evidence that delirium and dementia are often *not* recognized by hospital physicians [1, 6]. Several authors [6, 7] have advocated the routine use of a brief cognitive screening tool such as the Abbreviated Mental Test (AMT) [8, 9] to improve the detection of cognitive impairment in medical inpatients. Such screening is not without problems. First, severely ill and dysphasic patients may be untestable using a verbal test like the AMT [9]. Second, cognitive tests have poor cross-cultural portability and may reflect low educational level or intelligence rather than cognitive decline [10]. Third, the results of a single test do not provide the longitudinal perspective of cognitive function required to establish the diagnosis of dementia.

The Informant Questionnaire on Cognitive Decline (IQCODE) is a screening tool for dementia designed to overcome some of these problems. It has been evaluated in community and psychogeriatric samples [11, 12]. Completed by an informant (close relative or friend of the subject), it can be used in the assessment of dysphasic and physically ill patients. Its short form [13] consists of 16 questions on cognitive *decline* rather than current functioning, thus providing a longitudinal perspective of cognitive functioning. (The short form of the IQCODE is printed in full in the Appendix to this paper.) It can be used at face-to-face interview, over the phone, or by post [10]. These features make it a potentially useful screening tool for dementia in medical inpatients. We sought to evaluate its performance in such a setting.

The aims of the study were to determine: (i) the prevalence of cognitive impairment in elderly

patients admitted to an acute medical unit in a teaching hospital; (ii) whether the routine administration of the short form of the IQCODE improves the detection of dementia in these patients; and (iii) how the performance of the short form of the IQCODE as a screening tool for dementia compares with that of a standard brief cognitive screening test, the AMT.

Methods

A random sample of patients over 65 admitted urgently to a teaching hospital general medical unit during a 4 month period (February–June 1995) was studied. Subjects were identified in the following way. Every day a list of people over 65 who had been admitted under the physicians in the preceding 24 h was obtained from the admissions office. Each admission was given a number and each number written on an separate card. Half the cards were then selected randomly. The cards drawn indicated the patients for inclusion in the study. All consenting patients underwent a brief psychiatric and cognitive assessment performed by one of the investigators (D.H.). In cases where a patient was unconscious or too ill to participate in the study, assessment was deferred until the patient's condition improved; otherwise, patients were assessed within 48 h of admission. The following structured assessments were administered: the Confusion Assessment Method (a screening instrument to detect delirium) [14], the AMT and the (16-question) version of the IQCODE (referred to from here onwards as the 'IQCODE'). In the case of the IQCODE, where a face-to-face interview with an informant was not possible, the interview was either carried out over the telephone or the questionnaire was posted to the informant.

Further standard psychiatric assessment was carried out. This assessment included further cognitive assessment, obtaining a history from the informant and/or nursing staff and scrutinizing clinical notes. All patients with some evidence of abnormal cognitive function—either a positive screening test or a note indicating abnormal cognitive status in the clinical records—were assigned a DSM IIIR diagnosis or, if not meeting DSM criteria, a clinical diagnosis, of their cognitive impairment. DSM IIIR rather than DSM IV criteria were chosen because the Confusion Assessment Method (our delirium screening method) is based on DSM IIIR criteria for delirium.

We calculated the prevalence of DSM IIIR and other diagnoses of cognitive impairment in the study sample and evaluated the performance of the AMT and IQCODE. Sensitivity and specificity values for the detection of patients with DSM IIIR diagnoses of delirium or dementia were calculated for different cut-off points of the test scores.

Results

Two hundred and twenty-three patients were identified as potential subjects. Thirteen subjects either died before assessment could take place or remained too ill to participate; seven did not wish to take part; and two were unable to be examined within 48 h of admission because of their absence from the ward while undergoing investigations. This left 201 patients who were included in the study. Of these, 102 (51%) were female. The average age of the study sample was 76 years (range 65–97).

Prevalence of cognitive impairment

Forty-five patients (22.5% of sample) were found to have a DSM IIIR diagnosis of cognitive impairment. A further 67 (33.5%) did not meet DSM IIIR criteria but had some evidence of cognitive impairment (either a positive screening test or a note indicating abnormal cognitive status in the clinical notes). These patients

Table 1. Diagnosis of cognitive impairment in study sample

Group	Diagnosis	Total number (% of sample)
DSM IIIR diagnosis		
1	Delirium	14 (7)
2	Dementia	21 (10.5)
3	Delirium + dementia	5 (2.5)
4	Depression (with cognitive impairment)	5 (2.5)
Other cognitive impairment		
5	Mild delirium	21 (10.5)
6	Mild cognitive impairment	29 (14.5)
7	Mild delirium and mild cognitive impairment	13 (6.5)
8	Low IQ/poor education	3 (1.5)
9	Transient global amnesia	1 (0.5)
No cognitive impairment		89 (44.5)
Totals		201 (100)

Table 2. Sensitivity and specificity values for AMT for detection of patients with a DSM IIIR diagnosis involving cognitive impairment

	AMT score cut-off point	Sensitivity (%)	Specificity (%)
Delirium or dementia			
	<7	87.5	89
	<8	97	78
Dementia only			
	<7	83	83
	<8	96	73

were assigned a clinical diagnosis by the investigator. Eighty-nine patients (44.5%) were cognitively intact. Table 1 displays a breakdown by diagnosis of the study sample.

Performance of AMT and IQCODE

The AMT was administered to 191 (95%) of the study subjects; dysphasia, physical illness or poor concentration prevented its use in the remaining 10 patients.

The IQCODE was administered to a carer in 177 (88%) of study subjects. Eleven subjects declined to consent to the IQCODE being administered to a relative, 12 lacked an appropriate or contactable informant and one subject died before an informant could be contacted.

Seventy-nine interviews (45%) were performed face-to-face, 84 (42%) were completed over the phone and 14 (8%) were completed by post.

Sensitivity and specificity values for the detection of patients with DSM IIIR diagnoses of delirium and dementia, using the most discriminating cut-off points of the AMT and IQCODE scores, are shown in Tables 2 and 3.

Discussion

Prevalence of cognitive impairment

This study confirmed the high frequency of cognitive impairment in elderly medical inpatients [see, e.g., 1, 6]. The 22.5% prevalence of a DSM IIIR diagnosis involving cognitive impairment is similar to the 18% found by Ardern and colleagues in a comparable sample from the same hospital as used in this study, about 12 years earlier [6].

Table 3. Sensitivity and specificity values for IQCODE for detection of patients with a DSM IIIR diagnosis of dementia

IQCODE score cut-off point	Sensitivity (%)	Specificity (%)
>3.31	100	78
>3.38	100	84
>3.44	100	86
>3.56	96	88
>3.63	92	90
>3.75	92	93
>4.00	88	95

In total 33.5% of the sample had cognitive impairment not fulfilling DSM IIIR criteria. Our study included only a single formal assessment. Given the fluctuating course of delirium, it is likely that if the administration of the delirium screening tool (Confusion Assessment Method) had been repeated, some of the cases in the 'mild delirium' group might have been reclassified as DSM IIIR cases of delirium. Nevertheless, it seems likely that DSM IIIR criteria are over-restrictive and exclude several cases which most clinicians would consider to be delirium. The 14.5% of subjects with 'mild cognitive impairment' formed a more heterogeneous group, but clearly a number may have had early dementia (see the companion to this paper [15]).

Performance of the AMT and IQCODE

AMT

Only 10 patients (5% of the sample) were unable to complete the AMT. However, of these 10, seven had DSM IIIR diagnoses of delirium or dementia, highlighting an important drawback of the AMT: that a sizeable minority of people with cognitive impairment are untestable. However, the AMT could be administered to 22 of the 24 patients for whom the IQCODE was not completed.

Like Jitapunkul [9], we found the two most discriminating cut-off points of the AMT to be 7 and 8. Jitapunkul advocated the use of the higher cut-off point (8) to minimize the risk of missing cases of cognitive impairment. Using this cut-off point, our results confirm that the AMT is a sensitive tool for detecting both dementia and cognitive impairment in general (Table 2) with sensitivity values of 96 and 97% respectively. The specificities are somewhat lower at 73 and 78% ; the higher number of 'false positives' being a pay-off for the high sensitivity associated with the higher cut-off point. The specificity of the AMT for

diagnosing dementia is lower than the specificity of the IQCODE at an equivalent cut-off point. This would be expected, given that the AMT, unlike the IQCODE, was not designed as a specific screening instrument for dementia.

IQCODE

As with the AMT, in a substantial minority (12%) of our study sample it was not possible to complete the IQCODE. Two of these 24 patients had a DSM IIIR diagnosis of delirium or dementia. However, the IQCODE *was* completed for eight of the 10 patients who were unable to complete an AMT. Only four patients (2%) had neither test performed. Our results suggest that combining the two tests as a screening approach will minimize the number of patients unable to be screened.

Jorm [12] showed a cut-off point of 3.31/3.38 to have maximum discriminatory power for differentiating between patients with and patients without dementia in a predominantly community-based sample. Our results suggest that 3.44 (any value greater than 3.44 indicating dementia) is the optimum cut-off point for a medical inpatient population, although three other cut-off points (3.31, 3.38 and 3.56) had a similar accuracy.

The IQCODE, like the AMT, emerged as a sensitive tool for detecting dementia, with a sensitivity of 100% and specificity of 86% at the optimum cut-off point of 3.44. Many of the 'false positives' had clear histories of cognitive decline but did not fulfil the DSM IIIR criteria for dementia. Some researchers have suggested that over half of such people with mild cognitive impairment will develop dementia if followed up over 1-5 years [16]. Clearly, if this is confirmed, the IQCODE might have an important role in detecting cases of early dementia. We intend to follow up our group of IQCODE 'false positives' to clarify this issue.

In summary, our study suggests that in those to whom it can be administered, a brief standardized history of cognitive function, the IQCODE, is more accurate than the AMT as a screening instrument for dementia. If used in conjunction with the AMT as a screening instrument in medical inpatients it will increase the number of patients who can be tested and provide useful information on changes from premorbid cognitive function in ill or dysphasic patients unable to undergo cognitive testing.

Furthermore, the IQCODE identifies a group of patients with mild cognitive impairment, but who do not fulfil DSM IIIR criteria for dementia. It is possible that a significant proportion of this group will go on to develop dementia. Follow-up of the cohort of patients studied here may clarify this issue.

The IQCODE is a simple and accurate screening tool which has potential for incorporation into the admitting nurse's interview with relatives of older patients. Further research needs to focus on whether such administration of the IQCODE by clinical staff results in the increased detection of dementia and whether this improved detection alters patient outcomes such as length of hospital stay, placement and re-admission rate.

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Key points

- The IQCODE is more accurate than the AMT as a screening instrument for dementia in medical patients: it was possible to use the IQCODE in eight of the 10 patients unable to complete the AMT.
- Using both the IQCODE and a brief cognitive function test when screening for dementia in medical inpatients will maximize the number of patients who can be screened.

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Appendix

The Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE), short form

Now we want you to remember what your friend or relative was like 10 years ago and to compare it with what he/she is like now. Ten years ago was in 1985. Below are situations where this person has to use his/her memory or intelligence and we want you to indicate whether this has improved, stayed the same or got worse in that situation over the past 10 years.

Note the importance of comparing his/her present performance with 10 years ago. So if 10 years ago this person always forgot where he/she has left things, and he/she still does, then this would be considered 'Hasn't changed much'. Please indicate the changes you have observed by circling the appropriate answer.

Compared with 10 years ago how is this person at:

	Score[a]				
	1	2	3	4	5
1. Remembering things about family and friends, e.g. occupations, birthdays, addresses	Much improved	A bit improved	Not much change	A bit worse	Much worse
2. Remembering things that have happened recently	Much improved	A bit improved	Not much change	A bit worse	Much worse
3. Recalling conversations a few days later	Much improved	A bit improved	Not much change	A bit worse	Much worse
4. Remembering his/her address and telephone number	Much improved	A bit improved	Not much change	A bit worse	Much worse
5. Remembering what day and month it is	Much improved	A bit improved	Not much change	A bit worse	Much worse
6. Remembering where things are usually kept	Much improved	A bit improved	Not much change	A bit worse	Much worse
7. Remembering where to find things which have been put in a different place from usual	Much improved	A bit improved	Not much change	A bit worse	Much worse
8. Knowing how to work familiar machines around the house	Much improved	A bit improved	Not much change	A bit worse	Much worse
9. Learning to use a new gadget or machine around the house	Much improved	A bit improved	Not much change	A bit worse	Much worse
10. Learning new things in general	Much improved	A bit improved	Not much change	A bit worse	Much worse
11. Following a story in a book or on TV	Much improved	A bit improved	Not much change	A bit worse	Much worse
12. Making decisions on everyday matters	Much improved	A bit improved	Not much change	A bit worse	Much worse
13. Handling money for shopping	Much improved	A bit improved	Not much change	A bit worse	Much worse
14. Handling financial matters, e.g. their pension, dealing with the bank	Much improved	A bit improved	Not much change	A bit worse	Much worse
15. Handling other everyday arithmetic problems, e.g. knowing how much food to buy, knowing how long between visits from family or friends	Much improved	A bit improved	Not much change	A bit worse	Much worse
16. Using his/her intelligence to understand what's going on and to reason things through	Much improved	A bit improved	Not much change	A bit worse	Much worse

[a] IQCODE score is the average score of the 16 questions.

Photograph: Sam Tanner.