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NURSES' ROLE IN IDENTIFYING MILD COGNITIVE IMPAIRMENT IN OLDER ADULTS

Amanda Floetke Elliott, PhD, ARNP¹, Ann L. Horgas, PhD, RN², and Michael Marsiske, PhD³

¹University of Alabama Center for Mental Health and Aging

²University of Florida College of Nursing

³University of Florida Department of Clinical and Health Psychology

Abstract

Mild Cognitive Impairment (MCI), a relatively new descriptive category, is believed to represent a stage between normal aging and early dementia. Nurse practitioners, who provide care for older adults across a variety of settings, are in a key position to detect early cognitive changes. The purpose of this study is to describe one approach to identifying MCI using a variety of measures and a consensus conference with neuropsychologists. The study was conducted in a sample of 130 elderly participants ($\bar{X}$ age = 82.5 yrs; 81% female) residing in nursing homes, assisted living facilities, and senior housing. A team of clinicians (neuropsychologists and nurses) reviewed cognitive, mental health, and demographic data in consensus conference and classified study participants into one of three groups: cognitively intact (50.8%), amnesic MCI (19.2%), or probable dementia (30%). Discriminant function analysis (DFA) was used to independently classify individuals into cognitive status groups based on test scores alone, and to compare quantitatively-determined groups with consensus conference evaluations. The results indicate that the DFA correctly classified 95% of the participants. Further, results revealed a pattern in which persons with amnesic MCI have subtle memory impairments (similar to persons with dementia) but that more general cognitive functioning remains high (similar to intact persons). Nurse practitioners' heightened awareness of subtle distinctions in the dimensions of cognitive status associated with MCI can enhance their practice and assist them in making more informed referrals for dementia evaluations.

Identifying Mild Cognitive Impairment

Nurse practitioners who work in a variety of practice settings commonly provide care to older adults with varying levels of cognitive ability. Although nurses are educated to recognize and provide care to patients with dementia, it is also important to recognize patients who are experiencing pre-dementia cognitive changes. As with many other diseases, early detection is essential for implementing treatment regimes in an effort to minimize the catastrophic effects of dementia. However, these subtle changes are often not detected through commonly used clinical screening tools for dementia, such as the Mini-Mental State Exam.¹ The term mild cognitive impairment (MCI) is most commonly used to describe this state between normal aging and early dementia, although several alternative labels have been used in the literature

Corresponding Author: Amanda Floetke Elliott, Address: University of Alabama Center for Mental Health and Aging, P.O. Box 870315, Tuscaloosa, AL 35487-0315, Phone: (205) 348-1497.

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[e.g., Age-associated Memory Impairment (AAMI), Cognitive Impairment Not Dementia (CIND), and Amnesic Mild Cognitive Impairment (AMCI)]. Research has shown that persons with MCI are at increased risk for developing dementia.^{2,3} Therefore, they may benefit from early initiation of treatment strategies to slow progression to dementia. This article summarizes the MCI concept for practitioners who may encounter the syndrome in their practice but may be unfamiliar with its detection, and demonstrates the procedures by which MCI was identified in a study of residentially heterogeneous older adults. The major focus of this study is to help make practitioners more aware of the continuum of cognitive functioning they may encounter, and to sensitize them to a broader set of tools (beyond simple mental status inventories) they may wish to incorporate into their practice.

Identifying MCI has not been an easy task, as there has been little agreement in the literature on definitions, classification, and measurement tools to identify persons in this state. As a result, most of the studies conducted to date have used varying classification criteria and measurements to assess MCI. This inconsistency has made it difficult to directly compare study results. For instance, across studies, the rate of MCI ranges from 1% to 26% in elderly, population-based samples.^{4–7} Obtaining precise estimates of MCI is further complicated by the fact that many investigators use statistical criteria in identifying MCI cases (e.g., cognitive functioning 1.5 standard deviations below normative means), which means that in a normally distributed sample about 7% of cases will be identified as having MCI.

Recently, researchers and clinicians have converged on methods of detecting MCI.^{8,9} The MCI working group of the European Consortium of AD¹⁰ has published updated criteria for identifying MCI.^{9,10} This working group has suggested that MCI should first be classified according to general criteria (see Table 1), and then according to specific subtypes of MCI that may be important for directing appropriate therapeutic strategies. For this purpose, three distinct subtypes of MCI have been identified: 1) amnesic (focal memory impairment, the subtype most frequently recognized as a precursor to AD); 2) multiple domain, slightly impaired (amnesic and non-amnesic, involving impairment in more than one cognitive domain); and 3) single, non-memory domain impaired (impairment in a single cognitive domain without memory impairment).^{10–12} In this paper, we focus on the detection of amnesic MCI.

In primary care, where all formal criteria and measures are typically not available, it is still possible to screen aging clients for probable MCI to aid in making referral decisions to neurologists, psychiatrists, or neuropsychologists for further evaluation. Indeed, in the current study, which was initially designed only to distinguish demented individuals (with primary memory impairment) from non-demented individuals, we identified a broad ‘middle group’ of elders with focal memory impairment, but who were otherwise quite cognitively normal. The nature of our sample, selected to study persistent pain, meant that almost 100% indicated some form of functional impairment. Thus, functional impairment was not a useful discriminator of persons in our sample. Moreover, given ambiguity in the literature regarding what degree of functional impairment is a feature of MCI, we chose to focus primarily on the cognitive features of the syndrome.

Additionally, we sought to identify differences between cognitive groups regarding demographic and residential characteristics. In previous research, the majority of studies have found individuals with MCI to be older and have the same or less education than cognitively normal controls.^{4,6,13–16} Women are typically classified with MCI at a higher rate than men,^{5,13,14} and persons with MCI perform lower on the Mini Mental State Exam (MMSE) than normal controls, although these scores are usually above the cutoff for dementia.^{13,14,16} Persons with MCI are also more likely to have greater functional deficits than normal controls (i.e., difficulty with toileting, mobility, bathing, and use of the telephone).^{16–18}

Early detection and increased accuracy in identifying MCI is important because it enables practitioners to (a) administer currently available treatments for cognitive impairment and to initiate new treatment strategies as they are developed, (b) provide counseling and recommend support services for patients and families, and (c) identify and treat reversible etiologies of cognitive impairment. Currently, most research in this area has been conducted in specialists' settings and resultant diagnostic algorithms haven't transferred well to the general practice setting. The majority of persons with MCI, however, will present initially to general practice clinicians (physicians and nurse practitioners), who will be primarily responsible for initiating pharmaceutical treatment.^{7,17} Evidence has suggested it is feasible for general practitioners to verify cognitive complaints and screen for MCI, since this screening has resulted in a high degree of accuracy using three tests of cognitive functioning (i.e. verbal fluency, visuospatial copying task, and recall of a short story) completed in 5–10 minutes.¹⁷

Purpose and Research Questions

The goal of this study was to demonstrate how persons of varying cognitive impairment levels might be identified using relatively simple screening tools available to nurses and other clinicians. Described in this study are the process of case identification, the cognitive and demographic characteristics that differentiate unimpaired from mildly impaired elders, mildly from fully impaired elders, and the relative importance of the tools used to identify individuals in each cognitive status group. In this study a more heterogeneous sample is used than in previous research, much of which has relied solely on community-dwelling or clinic-based samples of older adults. The present sample included residents in a mix of settings, including community-dwelling, assisted living, and long-term care facilities. The specific research aims were: 1) to identify the rate and characteristics of persons with amnesic MCI in participants across residential settings, 2) to identify specific cognitive differences between persons with amnesic MCI and those who were either cognitively intact or who had dementia, and 3) to examine the relative importance of the tools used to identify categories of cognitive functioning.

Methods

Sample and Setting

This study involved a sample of elderly adults who lived in nursing homes, assisted living facilities, and retirement communities in North Central Florida. Participants were recruited as part of a larger study of the effect of cognitive status on pain. The sample for this study consisted of 130 older adults (of the 158 enrolled participants) who had complete data on the full battery of cognitive measures. University institutional approval was obtained, and each participant and/or his/her legally authorized representative provided informed consent. See Table 2 for complete sample characteristics.

Procedures

Participants underwent an initial interview, lasting 1–2 hours, in which demographic, cognitive, and health data were collected. For each participant, demographic information and cognitive, depressive, and functional status data were compiled and presented at a consensus conference. All data collection was completed by either nurse practitioners or trained healthcare professionals. A team of three PhD-prepared neuropsychologists, one PhD-prepared nurse, one neuropsychology doctoral student, and three nurse-practitioners (also nursing doctoral students) reviewed each case and classified the individual as cognitively intact, amnesic MCI, or probable dementia based on the data profile. The consensus conference resulted in the classification of 50.8% of participants as cognitively intact, 30% of participants as cognitively impaired, and 19.2% of participants as amnesic MCI. In an effort to represent the consensus

conference experts' decision making process to a nursing practice audience, discriminant function analysis was performed to identify the relative importance of study variables in classifying cognitive status. Further analyses were conducted to compare cognitive status groups for differences in demographics and cognitive test performance in order to obtain a representative description of persons with MCI.

Measures

Demographic data and depression—Demographic data used for analyses included: age, education level (classified as less than high school, completed some or all high school, or some college or higher), sex, residential status (assisted living facility, nursing home, community dwelling), and marital status (coded as currently married or unmarried). Depression was measured with the Geriatric Depression Scale (GDS), a commonly used screening measure for depression in older adults.¹⁹ A score of 5 on the GDS is the cut-off for depression (scale range = 0 to 15).

Cognition—Participants underwent three cognitive tests: the Mini Mental State Exam (MMSE), the Dementia Rating Scale-2 (DRS-2),²⁰ and the Hopkin's Verbal Learning Test (HVLT).²¹ The tests were administered by trained research personnel. The MMSE was used solely as a cognitive screen for entry in the parent study and was not used as an MCI diagnostic test. The standard cutoff score of 24 was used to indicate that persons scoring 24 or above on this measure did not have dementia.²² The DRS-2 and HVLT were used as more sensitive measures of cognitive functioning that assessed specific aspects of cognitive performance. The DRS-2 tests several components of cognitive functioning (i.e. memory, construction, conceptualization, attention, and initiation/perseveration) and gives a score for each of these as well as a total score (total scores can range from 0 to 144). This measure has been well validated, having a correlation of .86 in persons with memory impairment on the Wechsler Adult Intelligence Scale, and alpha coefficients ranging from .75 to .95 for tool subscales for controls, patients with mild dementia, and moderately severe dementia groups.²³ The HVLT tests memory and consists of a list of 12 words read aloud to the individual, who is then assessed for immediate recall (three trials), delayed recall (after 20 minutes), and word recognition. This measure has been found to have high sensitivity (96%) and good specificity (80%) in detecting mild dementia.²⁴ Normative age and education adjusted t-scores were used in analyses for each of the subcomponents of the HVLT and DRS-2.¹⁴ The total time to complete these measures was on average 40–45 minutes.

Results

Demographic Differences between Cognitive Status Groups

The three cognitive status groups (cognitively intact, amnesic MCI, and impaired) demonstrated several statistically significant residential and demographic differences. Details are shown in Table 2. The majority (64%) of persons with amnesic MCI resided in assisted living facilities, while the majority (74%) of those with a suspected dementia lived in a nursing home. In this study, the cognitively intact elders were mostly split between community dwelling (35%) and assisted living (47%) status. In terms of education, the majority of cognitively intact and amnesic MCI participants had more than high school education (65% and 56%, respectively), whereas the majority of impaired persons had a high school education (54%). A significantly higher proportion of persons with amnesic MCI were not married (96%) than in either the cognitively intact or cognitively impaired groups (65% and 66%, respectively). The cognitive status groups did not differ in age or gender.

Cognitive Profile Differences between Cognitive Status Groups

We also examined how the specific cognitive profiles of the groups differed and whether these differences were statistically significant. As Table 2 shows, impaired participants performed significantly worse than the amnesic MCI or intact participants on the MMSE, an index of global cognitive functioning. Note that both amnesic MCI and intact groups had mean MMSE scores above the cut-off for dementia.

The HVLT included several indices of memory functioning. Congruent with common conceptualizations of amnesic MCI (i.e., focal memory loss but other cognitive functions remain intact), the total recall and total learning subscales of the HVLT showed the expected pattern related to impairment; intact persons performed significantly better than those with amnesic MCI who, in turn, performed significantly better than cognitively impaired persons. The other HVLT subtasks (delayed recall, retention percentage, and recognition discrimination) differed significantly between cognitively intact participants and all others, suggesting that both impaired groups had poorer memory ability, but did not differ from one another.

The DRS-2 was used to more broadly characterize cognitive losses in participants. Based on clinical guidelines, it was expected that non-memory measures would show impairment only in persons with probable dementia, but few differences should emerge on these non-memory measures between cognitively intact persons and those with amnesic MCI. This expectation was partially supported. As with the MMSE, the DRS-2 attention and construction subscales discriminated those with probable dementia from all others, but it did not further distinguish the amnesic MCI group from the cognitively intact group. In contrast, the DRS-2 initiation, conceptualization, and memory subscales all showed a more expected impairment pattern, such that persons with amnesic MCI performed significantly worse than intact elders, and cognitively impaired persons performed significantly worse than persons with amnesic MCI.

Factors related to participant classification

Consensus conferences rely on expert judgment, implicit decision algorithms, and the availability of teams of neuropsychologists. To evaluate the classification decisions and to see if the test scores alone could be used to identify amnesic MCI, we conducted a discriminant function analysis (DFA). In DFA, a set of classification instruments (here, the cognitive measures from the MMSE, DRS-2, and HVLT) is used to predict some previously defined classification (here, the three-leveled cognitive status variable from the consensus conference).

We used DFA to answer two questions. First, how well did a classification function replicate the classifications made by experts in a consensus conference? If there was high agreement between the expert classifications and DFA results, this would suggest that the cognitive test scores alone could correctly classify individuals' cognitive status. Second, what variables differentiate cognitive status groups? DFA provides pattern coefficients (similar to regression weights), which present an index of the relative importance of each instrument or tool for explaining the classification decisions. Table 3 presents these pattern coefficients in the current sample. The coefficients show the relative importance of each cognitive and demographic variable for distinguishing persons with amnesic MCI from those who are cognitively intact and cognitively impaired. Scores above 0.33 (representing approximately 10% of the variance; shown in bold) are considered interpretable predictors.²⁵

Two functions, required to classify participants optimally, correctly classified 95.2% of the sample (98.4% of cognitively intact participants, 95.8% of participants with amnesic MCI, and 89.5% of participants with probable dementia), indicating a high degree of agreement with the experts' consensus conference judgments.

The first function primarily distinguished the cognitively intact from the cognitively impaired (i.e., those with probable dementia who were more globally impaired). The second function distinguished those with amnesic MCI from all others. The results in Table 3 show that the first function had positive coefficients above .33 for both the HVLTL (primarily memory tests) and DRS-2 (tests of more generalized cognition). Positive coefficients indicate that individuals with intact cognition scored better than impaired participants on these variables. This finding is consistent with the generalized nature of dementia such that impaired individuals demonstrate impairment across multiple domains of cognitive functioning. In contrast, function 2 was defined specifically by memory measures, indicating the disproportionate memory loss that characterizes persons with amnesic MCI.

Discussion

In this sample of older adults, 19.2% were classified as having amnesic MCI when experts at a consensus conference applied the criteria described above. This rate is higher than those previously found for amnesic MCI, which range from 2%–6%.^{11,15} The rate of amnesic MCI in the present sample was more similar to the overall rate of all three subtypes of MCI, which have ranged from 17%–34% in previous studies.^{11,26,27}

Demographic Differences between Cognitive Status Groups

Several demographic differences were noted between the three classifications of cognitive groups (i.e., intact, amnesic MCI, and impaired). Groups differed overall in terms of residential status, education level, and marital status but did not differ significantly in terms of age, sex, or rate of depression. Persons with cognitive impairment were most likely to reside in nursing homes. Overall, 65% of cognitively intact persons resided in a care facility (ALF or NH) as compared with 88% of those with MCI and 90% of cognitively impaired persons. However, this finding is not surprising given that the majority of participants in the parent pain assessment study were recruited from NHs or ALFs.

Educational levels between persons with amnesic MCI and cognitively intact persons were similar, and both of these groups had significantly higher educational levels than cognitively impaired persons. This finding suggests the possibility that persons with higher levels of education may progress toward dementia more slowly than those with lower levels of education and are therefore more likely to have cognitive declines identified in the MCI phase. This belief reflects the greater cognitive reserve hypothesis that supports the notion that persons with higher levels of education and brain activity are better able to maintain high levels of cognitive function.

Relative Importance of Measures that Distinguished Cognitive Status Groups

Discriminant function analysis correctly classified 95.2% of the participants in agreement with classifications of the consensus conference. This high agreement provides empirical support for the usefulness of the study measures (e.g., DRS-2 and HVLTL) in identifying amnesic MCI. These two measures can be administered in a clinic or primary care setting with relatively minimal training and appear to provide important information in detecting subtle cognitive changes associated with amnesic MCI.

As expected, older adults with intact cognitive functioning performed better on the memory testing HVLTL and the memory and concentration subscales of the DRS than those with intact or mildly impaired cognition. In contrast, individuals identified as having amnesic MCI performed worse on memory tests (e.g., recall and retention subscales of the HVLTL) than intact persons, but had higher scores on the MMSE and DRS-2 attention/construction subscales than persons with dementia. This finding is not surprising given previous research findings that

persons with MCI had mean MMSE scores above the cutoff for dementia.^{13,14,16} This finding highlights the limitations of the MMSE in detecting the subtle, memory-specific cognitive losses associated with amnestic MCI.

As could be expected based on typical MCI testing batteries, the cognitive test scores were the only significant variables that contributed to classification of cognitive status in the discriminant function analysis. Age, education, and depression scores were not salient predictors. These findings provide support for the concept of amnestic MCI as a unique diagnostic category characterized by deficits in the recall and retention domains of memory. While experts' classifications of cognitive status remain the diagnostic gold standard, the discriminant function algorithm in the present study provides evidence for a set of tests that can be used to detect amnestic MCI in elderly adults.

Limitations

The present study explored the rate of amnestic MCI in a convenience sample from a parent study not specifically designed for this purpose and the cognitive measures used were biased toward memory and simple screening and are not representative of a comprehensive MCI test battery. However, we were able to accurately classify persons with amnestic MCI using this much shorter battery of tests than the traditional batteries. Therefore, it is encouraging that amnestic MCI could be identified using the screening measures in the present study. Future studies whose primary goal is to distinguish rates and sub-types of MCI, should include a broader cognitive battery and have memory and physical function complaints corroborated by an informant.

Finally, the label of *amnestic MCI* is used here as a descriptive category, not a medical diagnosis. Formal neurological follow-up is necessary to establish a diagnosis of MCI. Again, our study identified persons with amnestic MCI, one subtype of MCI. This finding can be attributed to several causes: (a) we specifically recruited older adults with pain and memory problems, (b) we have more detail in our memory measures than in our non-memory measures, and (c) at the time the study and consensus conference were done, amnestic MCI was the most commonly discussed variant of MCI. Thus, sample selection factors and measure selection factors may have reduced our sensitivity to non-amnestic variants of MCI.

Implications

The results of this study support the feasibility of primary care providers in detecting MCI in their clinical population; regardless of setting. It is our goal to aid clinicians in understanding the broader range of cognitive impairments that exist and are identifiable. In this study, amnestic MCI was easily detectable using simple tools that were administered by advanced registered nurse practitioners and trained healthcare professionals which demonstrates that these methods can be used and implemented into the standard of care for older adult clients. The choice of measurement tools to use is ultimately up to each clinician's own judgment and expertise. However, results from this study suggest that clinicians move beyond the traditional use of the MMSE, as it was only able to discriminate persons with dementia from all others and was not useful in discriminating persons with MCI from cognitively intact persons.

Presently, there are no "quick" testing batteries for identifying MCI, suggesting that this is an area in which practitioners need to increase their focus and time with patients. The measures used in this study took on average 40–45 minutes to complete, which is a substantially shorter time period than traditional MCI testing batteries which can last up to 4 hours. However, a 40-minute screening inventory is not feasible for a typical health care appointment, which highlights the need for more practitioners to get involved with developing quicker screening methods for MCI, similar to the MMSE which has transformed screenings for dementia into

easily administered tests during routine care. As sets of useful measures are discovered, they can be incorporated into nursing assessment classes for nurses in school or in-service training sessions for nurses in the workforce. Ideally, screenings for MCI should be completed with greater frequency (i.e. every 3 months) in clients to monitor discrete changes in cognitive functioning.

Researchers have begun to develop quicker ways to detect MCI in older adults. Artero and Ritchie¹⁷ have had the best success (sensitivity 99%, specificity 73%) in identifying MCI in a general practice setting using computerized-based tests of delayed auditory verbal recall, verbal fluency, and visuospatial construction; requiring 10–15 minutes to complete the tests. Others have found preliminary success with the Telephone Interview of Cognitive Status-modified (TICS-m) which also requires only 10-minutes to complete and can be given over the telephone.^{28,29} Graff-Radford and colleagues (2006)²⁸ found a sensitivity of 86% and a specificity of 63% for the TICS-m when using a cutoff score of 29. Cook, Marsiske, and McCoy (under review)²⁹ found the TICS-m to have a sensitivity of 82.4% and a specificity of 87.0% in detecting amnesic-MCI in their sample of older adults. While there is preliminary evidence for utilizing these quicker methods, it remains the role of primary care providers to ask their clients about cognitive changes, to verify these complaints with the MCI screening method of their choice, and to corroborate evidence of cognitive change with a proxy informant. The clinician should explore cognitive and functional changes in the last year and should repeat this assessment in six months and one year to minimize false negative reports.¹⁷

Although there are no treatments specifically developed to treat MCI, there are important implications for early identification of cognitive changes. There are pharmacological treatment options for dementia³⁰ that may delay the progression of dementia when initiated early in the disease process. Additionally, behavioral and cognitive training could be initiated as previous researchers have found these methods can improve cognitive functioning in persons with MCI.^{31,32} Delaying the onset of dementia has large economic implications; if its onset could be delayed five years through these treatment strategies, the prevalence of dementia would drop by 50%.³⁰ Early identification of cognitive changes can also benefit individuals and their families by allowing them additional time to engage in planning financial matters, creating advanced directives, and organizing support for future care needs.

Finally, the high rate of amnesic MCI found in this sample is important to consider clinically, as healthcare providers may encounter increasing numbers of persons with MCI and should thus be equipped with the tools to gather more information regarding the cognitive status of their clients. It is important for healthcare professionals to become part of the team in identifying MCI as they hold specific knowledge of their clients' cognitive abilities through interacting with and educating them. Nurse practitioners are in a position to administer tests to evaluate the characteristics of MCI and refer clients demonstrating cognitive changes to receive more thorough cognitive evaluations.

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Table 1Full criteria for identifying MCI¹⁰

- cognitive complaints reported by the patient or their family
- patient or informant report of a decline in cognition and/or functional performances as compared to previous abilities
- cognitive disorder evidenced by clinical evaluation (impairment in memory or other cognitive domain)
- absence of major repercussions on daily life (although may have difficulties with complex day-to-day activities)
- no evidence of dementia

Table 2
Description of Overall Sample and Cognitive Classification Groups (Intact, MCI, and Impaired)

Variable	Full sample N=130 n(%)	By Cognitive Status Group			Statistic	P
		Intact (n=66) n(%)	MCI (n=25) n (%)	Impaired (n=39) n(%)		
Residential Status:	53 (41%)	31 (47.0)	16 (64.0)	6 (15.4)	χ^2 (df= 4) = 40.8	.000
	47 (36%)	12 (18.2)	6 (24.0)	29 (74.4)		
Education:	30 (23%)	23 (34.8)	3 (12.0)	4 (10.3)		
	<8 th grade	4 (6.1)	1 (4.0)	7 (17.9)	χ^2 (df= 4) = 15.2	.004
	9 – 12 th grade	50 (39%)	10 (40.0)	21 (53.8)		
	Some college or more	68 (52%)	43 (65.2)	11 (28.2)		
Sex:	24 (19%)	11 (16.7)	8 (32.0)	5 (12.8)		
	Male	55 (83.3)	17 (68.0)	34 (87.2)		
	Female	93 (71%)	43 (65.2)	21 (65.8)	χ^2 (df= 2) = 9.2	.010
Marital Status:	37 (29%)	23 (34.8)	1 (4.00)	13 (34.2)		
	Unmarried	82.3	84.0	81.8	F (df= 2) = 0.7	.503
	Married	24.7	26.2	18.0	F (df= 2) = 121.2	.000
Age ($\bar{X}$) (Range = 65–97)	3.9	3.5	4.0	4.5	F (df= 2) = 1.0	.362
MMSE ($\bar{X}$) (Range =9–30) ^a						
Depression($\bar{X}$) (Range =0–15)						
Hopkins Verbal Learning Test ($\bar{X}$):						
	Total learning ^b	23.3	16.1	8.9	F (df= 2) = 101.8	.000
	Total recall ^b	50.3	36.8	25.5	F (df= 2) = 104.5	.000
	Delayed recall ^c	50.2	27.2	25.5	F (df= 2) = 176.2	.000
	Retention ^c	50.8	25.9	28.9	F (df= 2) = 79.1	.000
	Recognition ^c	48.4	30.0	26.4	F (df= 2) = 54.4	.000
Dementia Rating Scale-2 ($\bar{X}$):						
	Initiation ^b	48.1	40.8	27.4	F (df= 2) = 65.7	.000
	Conceptualization ^b	52.6	48.1	32.0	F (df= 2) = 108.3	.000
	Memory ^b	53.0	38.0	26.6	F (df= 2) = 129.1	.000
	Attention ^a	57.5	57.5	40.2	F (df= 2) = 67.8	.000
	Construction ^a	49.5	49.3	36.3	F (df= 2) = 48.4	.000

^a Post-hoc bonferroni tests indicate impaired group significantly different from other two groups [Impaired < (intact and MCI)].

^b Post-hoc bonferroni tests indicate monotonic pattern with each group significantly different from the others [Impaired < MCI < Intact].

^c Post-hoc bonferroni tests indicate intact group was significantly different from other two groups [(MCI and impaired) < intact]

Table 3

Factors related to identifying persons with MCI (loading matrix of correlations between cognitive and demographic variables and the Discriminant Function)

Characteristics	Function 1 ^a Pattern Coefficients	Function 2 ^b Pattern Coefficients
Cognitive Variables		
MMSE	.06	.72
HVLT Total Learning	-.61	-.62
HVLT Total Recall	.43	.66
HVLT Delayed Recall	.68	-.81
HVLT Retention	.01	-.20
HVLT Recognition	-.21	.07
DRS Initiation	.27	.16
DRS Conceptualization	.36	.24
DRS Memory	.49	-.23
DRS Attention	.14	.24
DRS Construction	.22	.02
Age	.05	.09
Education	-.20	.21
Depression	-.04	-.05

^aFactor differentiating intact persons from all others (MCI and impaired)

^bFactor differentiating persons with MCI from all others (intact and impaired)