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BRIEF COMMUNICATION

Awareness of memory deficits is useful to distinguish between depression and mild cognitive impairment in the elderly

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Objective: To investigate whether the level of awareness of memory deficits is useful for discriminating between major depressive disorder (MDD) and mild cognitive impairment (MCI) in the elderly.
Methods: Sixty-three consecutively referred patients (38 women and 25 men) with memory concerns comprising three groups (clinical control, MDD and MCI) underwent a memory test (Rey Auditory Verbal Learning Test [RAVLT]) and completed the Memory Assessment Complaints-Questionnaire (MAC-Q). Level of awareness was estimated by the difference between the MAC-Q score and the score on the fifth presentation of the RAVLT. Memory performance, Mini-Mental State Examination (MMSE) and depressive symptoms (Geriatric Depression Scale [GDS]) were also assessed.
Results: The control (n=25), MDD (n=16), and MCI (n=22) groups were similar in age, educational level, and MMSE ($p > 0.05$). Among the groups, the MDD group had the most memory complaints, whereas the MCI group had the worst objective memory performance. Level of awareness was capable of discriminating between MDD and MCI ($p < 0.05$), but not between MDD and clinical controls ($p > 0.05$). MDD subjects tended to underestimate their memory functioning as compared to controls ($p < 0.05$).
Conclusion: Level of awareness of memory deficits was significantly useful to discriminate between MCI and MDD, which is a common difficulty faced by clinicians. Future studies with larger samples are needed to confirm these findings.

Keywords: Depression; mild cognitive impairment; level of awareness; memory complaints

Introduction

Disagreement among information sources is a major challenge for memory clinics. Multiple variables, such as patient characteristics and depression or anxiety symptoms, are involved in determining the most reliable source of information regarding cognitive status (i.e., the patient or a relative).[1] Cognitively healthy elderly persons may over/underestimate their own cognitive status, providing inaccurate reports.[2]

Mild cognitive impairment (MCI) is highly prevalent among elderly persons with depressive symptoms, and cognitive decline may persist even after pharmacological treatment of depression.[3] Despite the high comorbidity between MCI and depression, MCI diagnosis based on DSM-5 criteria requires clinicians to rule out other mental disorders, such as major depressive disorder (MDD), as the cause of cognitive deficits.[4]

The DSM-5 criteria for neurocognitive disorders involve the report of cognitive concerns by the patient, a close informant, or a clinician, as well as quantifiable decline documented by psychometric tests.[4] That is because cognitive concerns commonly relate to symptoms of depression and anxiety or to general health issues rather than to objective cognitive decline.[5] Also, cognitively healthy individuals may overestimate cognitive dysfunction.[2] Therefore, discriminating between cognitive complaints and cognitive decline due to MDD or Alzheimer's disease (AD) is crucial for determining prognosis and selecting appropriate interventions for specific patients.[6] However, most studies addressing this issue have proposed lengthy protocols that are not suitable for regular consultation in a clinical setting.

We sought to compare objective memory performance, the magnitude of memory complaints, and the level of awareness of memory deficits – defined as the level of agreement between self-reported memory appraisal and performance on objective memory tests[2] – in MDD and amnestic MCI patients. To mimic a clinical environment, we set up a control group including cognitively healthy elderly persons with memory concerns. We hypothesized that MDD individuals would have normal cognitive performance, more memory complaints, and a tendency to underestimate memory performance compared with controls. We had no hypothesis regarding memory awareness in MCI.

Methods

Sixty-three consecutive patients (38 women and 25 men), with age ranging from 61-86 years (mean: 71.97±6.25

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years) and a mean of 13.87±3.23 years of formal education participated in this study. All were seeking specialized evaluation because of memory concerns. Patients provided written informed consent to participate in this study, which was approved by the Ethics Committee of Instituto D'Or de Pesquisa e Ensino (IDOR), Rio de Janeiro, RJ, Brazil.

Diagnoses were determined by a senior board-certified psychiatrist (PM). Clinical magnetic resonance imaging (for assessment of brain vascular disease) and neuropsychological examinations were performed by a team of neurologists, neuropsychologists, and speech-language therapists. All patients underwent the same protocol. MDD diagnosis was based on DSM-5 criteria.[4] None of the MDD patients presented impairments resembling MCI. Although late-onset depression is commonly related to degenerative processes, we did not distinguish the onset of MDD because we aimed to reproduce common challenges faced in a clinical setting. Exclusion criteria were clinically diagnosed anxiety disorders and psychosis. MCI diagnosis followed the criteria of Winblad et al.[7]; we only included subjects with amnestic subtypes (single and multiple domains). All patients not diagnosed with MDD or MCI were included in a control group of cognitively healthy elderly persons with memory concerns.

Delayed recall on logical memory and visual reproduction tests indicated objective memory impairment (1.5 standard deviation below the age-adjusted population reference mean for the test), and direct questioning was applied to determine subjective memory complaints/concerns. The neuropsychological battery also addressed other cognitive functions and has been described elsewhere.[8]

Our clinical control, MDD, and MCI groups included 25, 16, and 22 individuals respectively. Half of the MCI patients were classified as multiple domain and half were classified as single domain subtype.

To estimate level of awareness (agreement between self-reported memory appraisal and performance on memory tests[2]), we calculated z scores for the total Memory Assessment Complaints-Questionnaire (MAC-Q)[9] and "A5" (total number of words recalled at the fifth presentation of the word list) scores in the Rey Auditory Verbal Learning Test (RAVLT).[10] Although this method has the limitation of defining awareness strictly on the basis of memory, it was adopted because it might be useful for everyday clinical practice. All participants were evaluated using the Geriatric Depression Scale (GDS)[11] and the Mini Mental State Examination (MMSE).

Statistical analysis

All variables were normally distributed according to the Kolmogorov-Smirnov test. One-way analysis of variance (ANOVA) was performed to compare demographic, neuropsychological, and self-reported variables among groups. Post-hoc Bonferroni analysis was conducted to assess the significance of group differences. Effect size was calculated using eta squared. A two-tailed significance threshold (α) of 0.05 was adopted for all statistical tests, performed using SPSS version 17.0.

Results

Age and years of formal education were similar in the three groups ($p > 0.05$). As expected, the MDD group had higher GDS scores than the other groups. The MCI and the control groups had similar GDS. The three groups had similar MMSE results, suggesting that specific cognitive differences were not related to general cognition.

Memory performance

We compared free recall, learning, and recognition among the groups based on recent findings by de Paula et al.[12] showing that depression patients have deficits in these measures. No differences were observed between the MDD and control groups ($p > 0.05$), and both performed better than the MCI group on all of these measures. Table 1 presents demographic data as well as the results of objective memory testing, self-reported memory complaints, and level of awareness in the three study groups.

Memory complaints

Similar MAC-Q scores were recorded for the control and MCI groups. The MDD group had higher scores than the control group, despite a similar performance on memory tests. The MDD group also had higher MAC-Q scores than the MCI group, with borderline significance ($p = 0.056$), despite a better performance on memory tests. The effect size for memory complaints was moderate (Table 1).

Level of awareness

The level of awareness did not differ between MCI subjects and controls. MDD subjects tended to underestimate their memory functioning ($p < 0.05$) compared with controls. The level of awareness was significantly different between MDD and MCI subjects; the former underestimated their memory functioning, whereas the latter tended to overestimate it. The effect size for level of awareness was large (Table 1).

Discussion

In the present study, which tried to reproduce the diagnostic challenges of everyday clinical practice, we observed similar memory complaints in controls and MCI subjects. MDD subjects had more complaints than controls, but not than MCI subjects. These findings suggest that self-report should be used with caution when establishing diagnoses.

The objective memory performance of MDD subjects and controls did not differ. This is not surprising, because the former group was composed of individuals without MCI criteria. Moreover, previous reports have suggested that executive function and processing speed, and not memory, might be the most affected cognitive abilities in depressed individuals.[13]

As predicted, MDD subjects tended to underestimate their performance compared with the other groups.

Table 1 Demographic data, objective memory, self-reported memory complaints, and level of awareness in elderly individuals with mild cognitive impairment, major depression disorder and controls (one-way ANOVA)

Variable/group	Clinical control (n=25)	MCI (n=22)	MDD (n=16)	F	p-value	η2	Difference
Age (years)	72.84 (7.42)	72.18 (4.39)	70.31 (6.48)	0.812	$p > 0.05$	-	-
Education (years)	14.24 (3.18)	13.18 (2.92)	14.25 (3.73)	0.768	$p > 0.05$	-	-
MMSE	27.36 (1.84)	26.23 (1.97)	26.63 (2.19)	1.978	$p > 0.05$	-	-
RAVLT A5	11.12 (2.16)	8.50 (1.89)	11.31 (2.27)	11.798	$p < 0.001$	0.282	Control > MCI†, MDD > MCI†
MAC-Q*	26.68 (4.28)	28.00 (3.77)	31.06 (3.19)	6.373	$p < 0.01$	0.175	Control < MDD†
Level of awareness	-0.02 (1.22)	-0.78 (1.39)	1.11 (1.37)	9.459	$p < 0.001$	0.240	Control > MDD‡, MCI > MDD§

Data presented as mean (standard deviation).
ANOVA = analysis of variance; MAC-Q = Memory Assessment Complaints-Questionnaire; MCI = mild cognitive impairment; MDD = major depressive disorder; MMSE = Mini-Mental State Examination; RAVLT = Rey Auditory Verbal Learning Test; SD = standard deviation.
* Scores may range from 7 to 35. Higher scores indicate higher memory complaints. Scores ⩾ 25 may indicate significant memory complaints.
† $p < 0.01$; ‡ $p < 0.05$; § $p < 0.001$.

Additionally, MCI subjects did not differ from controls in respect of level of awareness. Importantly, comparisons among the three groups revealed that the effect size for level of awareness was large, whereas that for memory complaints was moderate. Thus, level of awareness might be more relevant for clinical practice.

Lehrner et al.[2] have demonstrated that cognitively healthy and MCI patients differ in terms of memory awareness, with the latter group tending to overestimate their performance; moreover, they reported that depression symptoms were associated with more complaints and a lower level of awareness. This finding is similar to ours, with MDD subjects tending to underestimate their memory function, although we did not observe differences between our controls and MCI subjects.

This study has important clinical implications. The lack of differences between the MCI and MDD groups with respect to memory complaints and MMSE scores indicates that self-report and screening tests alone are insufficient to differentiate between MCI and MDD. Clinical evaluations usually include both self-report and screening tests such as the MMSE; however, in our study, neither of these approaches could differentiate among the examined groups. Evaluation using memory tests may be warranted to determine cognitive performance and to calculate level of awareness, which had a larger effect size than memory complaints alone.

In terms of limitations to our study, the small sample size restricts the generalization of our findings, and precluded analysis of MCI with/without executive functioning deficits, which can affect self-awareness. We did not investigate anxiety symptoms that could be associated with memory complaints. Our use of a clinical control group may have diminished the differences in level of awareness among the groups; however, the inclusion of this control group was important to reproduce a clinical setting. Further, we did not discriminate between early- and late-onset MDD.

In conclusion, our findings indicate that discriminating between MDD and MCI requires a careful investigation of memory performance. Determination of level of awareness significantly aided in differentiating between MCI and MDD, a common challenge faced by clinicians; the larger effect size of this measure compared with memory complaints supports this finding. We aimed to reproduce a clinical scenario in which individuals seek evaluation due to memory complaints. Future studies with additional clinical groups are needed to determine the profiles of complainers with preclinical AD and other conditions to support the choice of therapeutic strategy.

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Disclosure

The authors report no conflicts of interest.

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