

A Comparison between Subjective Memory Complaints and Objective Memory Deficits in Elderly Patients with Depression or Mild Cognitive Impairment



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SUMMARY

Objective: Since depression in the elderly is usually accompanied by memory complaints and may impair memory functions, differential diagnosis of cognitive impairment is quite difficult. This study aimed to investigate the discrepancy between subjective memory complaints (SMC) and objective memory deficits in elderly patients with major depressive disorder (MDD) and mild cognitive impairment (MCI).

Method: The study sample consisted of 30 elderly patients with a diagnosis of MCI (according to Petersen- Mayo criteria) and 29 with a diagnosis of DSM-IV-TR MDD who were treated at the outpatient geriatric psychiatry clinic. The control group consisted of 30 healthy elderly volunteers. Turkish versions of the Mini Mental State Examination (MMSE), Clock Drawing Test (CDT), ADAS-Cog, Subjective Memory Complaints Questionnaire (SMCQ) and Geriatric Depression Scale (GDS) were administered to all participants.

Results: The SMCQ scores of both the MDD and MCI group patients were higher than those of the healthy control (HC) group. However, there was no difference between the HC and MDD groups in terms of the MMSE, the CDT and the ADAS-Cog scores.

Conclusion: In elderly patients, subjective memory complaints do not seem to differentiate between depression and cognitive impairment. However, the discrepancy between SMC and cognitive performances suggests depression rather than cognitive impairment. Further longitudinal studies should investigate the role of SMC in cognitive impairment for elderly patients with depression.

Keywords: episodic memory, depression, mild cognitive impairment

INTRODUCTION

In Turkey, as well as throughout the world, the elderly population is increasing. According to the 2013 data of the Turkish Statistical Institute, the elderly constitute 7.7% of the general population in Turkey, and by 2050 this is expected to be 20.8% (Turkish Statistical Institute 2014). Together with an ageing population, memory complaints are observed more often and the frequency of dementia is increasing (Prince et al. 2013). Therefore, the evaluation of cognitive impairments in patients presenting with memory complaints and differential diagnosis has become increasingly important in daily clinical practice.

The concept of 'subjective memory complaints' (SMC) is defined as the complaint of forgetfulness and corresponds to situations where the memory performance, which is evaluated with neuropsychological tests, could either be preserved or impaired. In some studies, SMC has been evaluated with a single question (are you forgetful?), while in others evaluation has been attempted either with a group of questions or a scale. However, there is no consensus on how SMC should be measured and therefore it is not possible to compare the results obtained in different studies (Abdulrab and Heun 2008). The most frequently used way of evaluating SMC is the Subjective Memory Complaints Questionnaire, developed by Youn et al

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(2009) which can differentiate between individuals with or without dementia.

SMC is observed frequently in the geriatric population (Ponds et al. 1997; Mitchell, 2008; Balash et al. 2010). Besides SMC, cognitive impairments such as mild cognitive impairment (MCI) and depression may be seen in healthy elderly individuals (Mitchell, 2008). In previous epidemiological studies, SMC has been determined to be 40-80% in the community (Balash et al. 2010; Begum et al. 2012). Although SMC has often been reported in community studies, the rates of people seeking clinical help for these complaints have been reported to be between 18.6%-26.1% (Waldorff et al. 2008, Jorm et al. 2004, Begum et al. 2012).

SMC is significant as it could be an indicator of early stage cognitive disorder. However, when this symptom occurs at a later stage, it is debatable as to what extent this is a routine part of cognitive disorder (Begum et al. 2012). In addition, clinical meaning of SMC, whether or not it requires further evaluation and whether or not there are differentiating features, has not yet been fully revealed. In a study by Chin et al (2014), it was determined that in patients presenting with SMC with healthy memory performance, depressive symptoms and attention to themselves played a role in SMC. Lehrner et al (2014) showed that depressive symptoms increased SMC, regardless of the status of cognitive performance.

No definitive consensus has been reached yet on the extensive group which encompasses those between healthy ageing with MCI and early stage dementia (Kelley and Petersen, 2009). According to the scales used, there is a great variation, with prevalence of MCI previously reported at 4%-70% in the elderly population (Kochan et al. 2010). In a previous meta-analysis, the annual rate of MCI cases developing dementia was reported as 6.7%, and the total five-year transformation to dementia as 38.2% (Mitchell and Shiri-Feski, 2009).

For a diagnosis of MCI, it is recommended that mild impairment in standardized neuropsychological tests is confirmed by the patient's relatives as MCI if there is minimal or no impairment in daily life activities (O'Brien, 2008). According to the MCI diagnostic scale recommended by the Mayo Clinic Alzheimer's Disease Research Centre, for confirmation of forgetfulness by selected informed patients, there should be objective memory impairment according to age and education, protection of general cognitive functions, normal daily living activities and absence of dementia (Andreescu and Aizenstein, 2009). In the DSM-5 which was published in 2013, under the heading of "Mild Neurocognitive Impairment", MCI is defined as impairment in one or more cognitive fields at a level not affecting daily living activities (American Psychiatric Association 2013). Neuropsychological tests are not sufficient alone for the diagnosis of MCI, largely because of the effect of sociodemographic elements. The observation of psychiatric

disorders such as anxiety and depression in the course of MCI and since these disorders affect the clinical appearance, makes differential diagnosis more difficult (O'Brien, 2008).

Depressive symptoms are seen in 10%-15% of elderly individuals. According to the DSM-IV-TR criteria, the incidence of major depressive disorder (MDD) has been reported at 3% in the elderly (Baldwin 2008). Confusion in the clinical picture of objective memory deficits in depression in old age makes it difficult to differentiate between different clinical pictures in terms of treatment and prognosis (Lahr et al. 2007). However, as much as there may be objective cognitive defects in depression, no strong association has been observed between objective disorders in neuropsychological tests and SMC. Generally, SMC has been reported as severe and objective cognitive deficits as relatively mild (Lahr et al. 2007).

In this study, by comparing the samples of patients with MCI, MDD and healthy elderly individuals using a standardized evaluation tool for SMC, we aimed to determine the characteristics of SMC and evaluate its relationship with objective memory deficits. The main hypothesis of the study was that elderly patients with MDD would differ from the MCI group in that there would be no relationship between SMC and objective memory performance.

MATERIAL and METHODS

The study sample was comprised of a total of 59 patients over 60 years in age who were evaluated as outpatients with an accompanying relative at the Geriatric Psychiatric Unit of the university hospital and were diagnosed according to the DSM-IV-TR diagnostic criteria (American Psychiatric Association 2000) with MDD (n=29) or according to the Petersen-Mayo diagnostic criteria (Petersen 2004) with amnesic-type MCI (n=30). A control group consisted of 30 healthy (with no neurological or psychiatric disease) elderly volunteers from residential homes in the Ankara region. Any patients with hearing, visual, neurological or orthopedic disabilities, those with less than 5 years of education, and those with any other major neurological or psychiatric disease, which could inhibit the evaluation, were excluded from the study.

The MCI diagnosis was made by a detailed neuropsychiatric examination (including orientation, short-term memory, attention, verbal fluency, judgement, abstraction, resemblances, copying shapes, calculations, praxis, and language functions) which was applied by a physician working in the field of geriatric psychiatry. The patients diagnosed with MCI and MDD as a result of the neuropsychiatric evaluation and the healthy control subjects were administered the following tests by a psychologist; Standardized Mini Mental Test (SMMT), the ADAS-cog (Alzheimer's Disease Assessment Scale Cognitive subscore), the Clock Drawing Test (CDT), the Subjective

Memory Complaints Questionnaire (SMCQ) and the Geriatric Depression Scale (GDS).

The Scales

The Standardized Mini Mental Test (SMMT) is a scale of 30 items, which is useful in the evaluation of various cognitive functions such as orientation, long-term memory, recall, attention, calculation and language (Folstein et al. 2011). Low points indicate cognitive loss. Since it is a practical scale which can be applied in a short time, it is in widespread use as a scanning tool for dementia. Validity and reliability studies were applied by Güngen et al (2002) for the Turkish version of the form for educated patients.

The Clock Drawing Test (CDT) is a measurement scale with many different applications and forms of scoring, which is useful in the evaluation of several different cognitive functions such as attention, memory, motor functions and primarily visual and spatial functions (Cangöz et al. 2006). In the study by Can et al (2010), three evaluation methods were compared, and the scoring method developed by Shulman et al. was shown to have the highest sensitivity and specificity for dementia diagnosis. In this method, the participants are requested to place clock numbers and hands inside a circle to show ten minutes past 11:00 and scoring is ranges from 0 (uncertain) to 5 (perfect clock). In the current study, this afformentioned method of CDT was applied.

The Alzheimer's Disease Assessment Scale–Cognitive Subscore (ADAS-Cog) was developed by Rosen et al in 1984. The ADAS-Cog has 11 subtests including word recall, naming, commands, constructional praxis, ideational praxis, orientation, word recognition, language, comprehension, word finding difficulty and remembrance of test instructions (Mavioğlu et al. 2006). High points indicate cognitive impairment. Akca-Kalem et al (2003) reported descriptive statistical values of ADAS-Cog for healthy subjects.

The Turkish form has high internal consistency (Cronbach alpha =0.77), has shown a correlation with SMMT in accordance with theoretical expectations (between $r=0.27$ and $r=0.74$ and all at a significant level of $p<0.01$) and the correlation between the amount of total points and the ADAS-cog scale dimensions is again in accordance with theoretical expectations (between $r=0.17$ and $r=0.80$ and all at a significant level of $p<0.05$ or $p<0.01$). In Turkish validity and reliability studies by Mavioğlu et al (2006), the Turkish adaptation of ADAS-cog was reported to be mild to moderate in the differentiation between patients with Alzheimer's disease from those without dementia and to have a high degree of validity and reliability (Mavioğlu et al. 2006).

The Subjective Memory Complaints Questionnaire (SMCQ) is a short, valid and reliable questionnaire in the evaluation of subjective memory complaints (Youn et al. 2009). The

SMCQ consists of a total of 14 questions with Yes/No responses, four of which evaluate general memory and ten which evaluate daily memory functions. The total score of the questionnaire are calculated from the total of Yes responses. The first four questions measure general memory functions and the other ten questions measure daily memory functions. When 5.5 points was taken as the cut-off in the SMCQ, dementia was diagnosed with 77% accuracy.

In this study, the Cronbach alpha coefficient was found to be 0.864 and the internal consistency coefficient as 0.828 ($p<0.001$). Factor analysis confirmed the content of general memory and daily memory performances of the SMCQ. The questionnaire scores were able to differentiate the elderly subjects of this study with and without dementia (Youn et al. 2009). Reliability and validity study of the Turkish form of the questionnaire was performed by Özel-Kızıl et al (2013) on MCI and healthy elderly groups. The Cronbach alpha value of the SMCQ was determined to be 0.83 and in ROC analysis for MCI diagnosis (taking the cut-off value as 4.5) sensitivity was found to be 80% with of specificity 66% (Özel-Kızıl et al 2013).

The Geriatric Depression Scale (GDS) is a questionnaire in the form of 30 Yes/No questions. Total score range from 0-30, with high points indicating increasing severity of depressive symptoms. The psychometric features of the GDS were researched by Sağduyu (1997). The test-retest reliability was defined as high ($r=0.87$) and internal consistency was sufficient (Cronbach alpha =0.72). A high correlation was determined with the Hamilton Depression Scale, and it was able to differentiate elderly with depression. When the cut-off score of 13-14 points was taken, sensitivity of 0.90 and specificity of 0.97 were reported in the determination of depression (Sağduyu 1997).

Statistical Analysis

All statistical analyses were carried out by SPSS software. The continuous variables (age, education level, SMCQ, ADAS-cog, SMMT, CDT, and GDS) of the three groups in this study were compared using the One-Way ANOVA test. The LSD test was used for post hoc analysis.

RESULTS

The patients with major depressive disorder consisted of eighteen females and eleven males. The patients with mild cognitive impairment consisted of ten females and twenty males and the healthy control group was comprised of thirteen females and seventeen males. No statistically significant difference was found between the groups in respect of gender ($p>0.05$). The mean ages and education levels of the patients are shown in Table 1. No statistically significant difference was found between the groups in respect to age or educational level.

Table 1. Comparison of the groups according to age and education

	MCI	MDD	HE	Fp*
Age	71.5±6.02	69.2±4.8	71.4±7.2	F=1.33, p=0.27
Education (year)	8±3.6	6.9±3.1	8.9±3.5	F=2.80, p=0.06

MCI, Mild Cognitive Impairment; MDD, Major Depressive Disorder; HE, Healthy Elderly

*By One-way ANOVA, p<0.05

The total score of the ADAS-Cog, the mean scores of the subtests and statistical comparisons of the three groups are shown in Table 2. No statistically significant difference was found between the groups in respect to the subtest scores for commands, constructional praxis, remembrance of the instructions, language and comprehension. A statistically significant difference was found between the groups in respect to total ADAS-Cog scores and the mean points of the subtests of word recall, naming, ideational praxis, orientation, word recognition and word finding difficulty. In the post-hoc analyses, the total ADAS-Cog scores of the MCI group were statistically significantly higher than those of the control group and the MDD group (p<0.001, p=0.001). No statistically significant difference was found between the control group and the MDD group (p=0.25).

The comparison of the mean scores of the SMCQ, SMMT, CDT and GDS of the three groups is shown in Table 3. A statistically significant difference was found between the groups in respect to the mean scores of the SMCQ (p<0.001). In the post hoc analyses, the total SMCQ scores of the MCI group were statistically significantly higher than those of the control group (p<0.001), but no significant difference was found

with those of the MDD group (p=0.685). The scores of the MDD group were determined to be statistically significantly higher than those of the control group (p<0.001).

A statistically significant difference was found between the groups in respect to the SMMT scores (p=0.004). In the post hoc analyses, the SMMT points of the MCI group were statistically significantly lower than those of the control group (p=0.001). No statistically significant difference was found between the MDD group, the MCI group and the control group.

A statistically significant difference was found between the groups in respect to CDT points (p=0.016). In the post hoc analyses, the CDT points of the MCI group were statistically significantly lower than those of the control group and the MDD group (p=0.13, p=0.012). No statistically significant difference was found between the MDD group and the control group (p=0.977).

A statistically significant difference was found between the groups in respect to the total GDS scores (p<0.001). The total GDS scores of the MDD group were determined to be statistically significantly higher than those of the MCI group and the control group (p<0.001). The total scores of the MCI group were determined to be statistically significantly higher than those of the control group (p=0.004).

Taking the total GDS scores as a cofactor, when the SMCQ and ADAS-cog points were compared again, there continued to be a difference found between the three groups in the total SMCQ and ADAS-cog points (F=14.2, p<0.001; F=6.1, p=0.001). The interaction between the GDS and the SMCQ points was found to be significant (F=6.44, p=0.01), but

Table 2. Comparison of the groups according to the ADAS-Cog total and subtest mean scores

	MCI	MDD	HE	F	p
ADAS-Cog total score	12.8±4.16 (5.66-22.66)	9.59±3.8 (4.00-22.22)	8.47±2.91 (2.00-16.33)	11.29	<0.001*
Word recall	5.30±0.92	4.60±1.26	4.1±1.34	7.46	0.001*
Naming	0.43±0.63	0.10±0.31	0.13±0.35	4.86	0.010*
Commands	0.60±0.62	0.41±0.57	0.33±0.61	1.56	0.210
Constructional praxis	0.63±0.67	0.38±0.56	0.53±0.51	1.42	0.250
Ideational praxis	0.53±0.68	0.45±0.63	0.10±0.31	4.96	0.009*
Orientation	0.67±1.15	0.28±0.53	0.17±0.38	3.51	0.030*
Word Recognition	3.91±1.59	3.09±1.92	2.61±1.17	5.21	0.007*
Language	0.20±0.66	0.07±0.37	0.10±0.31	0.62	0.540
Comprehension	0.06±0.25	0.03±0.19	0.13±0.57	0.53	0.590
Word finding difficulty	0.37±0.56	0.03±0.19	0.10±0.40	5.40	0.006*
Remembrance of test instructions	0.17±0.38	0.14±0.35	0.13±0.35	0.08	0.930

MCI, Mild Cognitive Impairment; MDD, Major Depressive Disorder; HE, Healthy Elderly; ADAS-Cog, Alzheimer's Disease Assessment Scale- Cognitive Subscore

*By One-way ANOVA, p<0.05

Table 3. Comparison of the groups according to the mean scores of SMCQ, SMMT, CDT and GDS

	MCI	MDD	HE	F	p	Post hoc analyses
SMCQ	7.30±2.7	7.6±3.5	3.5±2.8	17.44	<0.001*	HBB=MDB>SY
SMMT	25.1±2.9	26.03±2.4	27.3±1.9	5.94	0.004*	HBB<SY, MDB=HBB, MDB=SY
CDT	3.4±1.1	4.1±1.05	4.1±0.8	4.34	0.016*	HBB< MDB=SY
GDS	10.4±7.04	19.1±3.9	6.4±4.2	43.51	<0.001*	MDB>HBB>SY

SMCQ, Subjective Memory Complaints Questionnaire; SMMT, Standardised Mini Mental Test; CDT, Clock Drawing Test; GDS, Geriatric Depression Scale; MCI, Mild Cognitive Impairment; MDD, Major Depressive Disorder; HE, Healthy Elderly

*By One-way ANOVA, $p<0.05$.

Table- 4. Percentages of “Yes” Responses of Groups to the SMCQ Items

	MCI	MDD	HE
SMCQ-1: ‘Do you think that you have a memory problem?’	93.3%	79.3%	50%
SMCQ-2: ‘Do you think that your memory is worse than 10 years ago?’	96.7%	93.1%	76.7%
SMCQ-3: ‘Do you think that your memory is poorer than that of other people at similar age?’	50%	31%	0%
SMCQ-4: ‘Do you think that your every day life is difficult due to memory decline?’	40%	58.6%	20%
SMCQ-5: ‘Do you have difficulty in remembering recent event?’	63.3%	65.5%	13.3%
SMCQ-6: ‘Do you have difficulty in remembering a conversation from a few days ago?’	66.7%	65.5%	26.7%
SMCQ-7: ‘Do you have difficulty in remembering an appointment made a few days ago?’	43.3%	44.8%	13.3%
SMCQ-8: ‘Do you have difficulty in recognizing familiar people?’	43.3%	44.8%	10%
SMCQ-9: ‘Do you have difficulties in remembering where you placed objects?’	63.3%	82.8%	36.7%
SMCQ-10: ‘Do you lose objects more than often you did previously?’	33.3%	55.2%	30%
SMCQ-11: ‘Have you become lost near your home?’	6.7%	0%	0%
SMCQ-12: ‘Do you have difficulty in remembering 2 or 3 items to buy when shopping?’	46.7%	62.1%	36.7%
SMCQ-13: ‘Do you have difficulty in remembering to turn off the gas or lights?’	33.3%	37.9%	10%
SMCQ-14: ‘Do you have difficulty in remembering the phone numbers of your own children?’	46.7%	41.4%	23.3%

MCI, Mild Cognitive Impairment; MDD, Major Depressive Disorder; HE, Healthy Elderly; SMCQ, Subjective Memory Complaints Questionnaire

the interaction with the ADAS-cog points was not ($F=0.05$, $p=0.81$).

The percentages of “Yes” responses of the three groups in relation to the 14 items of the SMCQ are shown in Table 4. It can be seen that apart from items one and two, the healthy control group subjects generally gave negative responses to the other items, and items three and eleven had no positive responses in this group. With the exception of item eleven, the responses of the MCI and MDD patients were seen to be similar to all the other items.

When evaluation was made with the Cronbach alpha coefficient for the 14 items of the SMCQ in the whole sample, the internal consistency was found to be high (0.829).

DISCUSSION

As a result of this study, as expected, the SMC measured with the SMCQ in the MCI patients was found to be similar to that of the MDD patients. A significantly greater level of

subjective memory complaints were found in both groups compared to the control group. In contrast to the ADAS-cog points used to evaluate objective memory deficits, the patients of the MCI group obtained significantly higher points than both the control group and the MDD, group thus demonstrating lower performance. In addition, no differences were observed between the control group and the MDD group in respect to the ADAS-cog points. In other words, although the subjective memory complaints of the MDD group were at the same level as those of the MCI patients, objective cognitive deficits were not determined. This can be explained by the conclusion previously reported by Lahr et al (2007), which says that, just as in other areas of their lives, patients with depression have a negative bias towards their own cognitive status.

The results obtained in this study of greater neuropsychological impairment of SMC in depression are similar to those indicated in previous studies (O’Connor et al. 1990; Dentone and Insua, 1997; Antikainen et al. 2001; Lahr et al. 2007).

On the other hand, the fact that no statistically significant difference was found in the current study between the MDD group and the control group in respect to objective cognitive deficits is in conflict with the results of studies which reported objective cognitive losses in MDD (Den Hartog et al. 2003; Butters et al. 2004; Elderkin-Thompson et al. 2011; Begum et al. 2012). Different results obtained in different studies may be due to the means of evaluation of objective memory deficit or differences in the severity of depression.

For example, contradictory results were obtained in the current study related to SMMT, as the SMMT scores in the MDD group were not significantly different from those of the other two groups. In addition, the psychomotor speed and executive functions, which are reported to be often impaired in depression, may not be able to be adequately evaluated by the ADAS-cog. However, there was no difference between the control group and the patients with depression in the CDT results, where executive functions are evaluated. It was also clearly shown in this study that objective memory functions did not overlap with SMC in elderly patients with depression. However, the fact that the SMMT and CDT as neuropsychological tests used for scanning purposes may not provide detailed information should be considered as a limitation of this study.

The SMCQ is a valid and reliable tool which can be used in the evaluation of SMC in the elderly, with the advantages being that it can be applied quickly and evaluation is simple (Özel-Kızıl et al. 2013). In all groups, the SMCQ-1 (do you think you have a memory problem?) and SMCQ-2 (do you think your memory is worse than ten years ago?) questions were observed to generally receive a response of Yes.

Scanning for the presence of SMC as a diagnosis of MCI is controversial (Roberts et al. 2009). SMC, which can be seen in old age and in psychiatric impairments such as depression, is far from specific for a diagnosis of MCI. Those within the MCI group who were not aware of a cognitive defect have been reported as a group showing a more rapid development of dementia and low self-awareness (Roberts et al. 2009). Therefore, the questioning of SMC may be necessary for a diagnosis of MCI. However, when the presence of MCI is considered in terms of risk of transformation to dementia, SMC should be evaluated with a standard tool such as SMCQ in every elderly person.

In this study, a statistically significant difference was found between the groups in respect to depressive symptoms measured with the GDS. In the MCI group, it was observable that the depressive symptoms were greater than in the control group. This finding is consistent with the studies of Feldman et al (2004) and Hwang et al (2004), which showed depressive symptoms accompanying to MCI. However, the effect of depressive symptoms in the current study, was statistically

controlled. In patients with major depressive disorders, neuropsychological evaluation during an episode is generally postponed until after treatment to remove the effect of depression. However, there have been studies that have reported that when a diagnosis of depression is made, there is a risk that the cognitive defects in the patient could predict Alzheimer's disease in the future (Chodosh et al. 2007). Therefore, in MDD patients, the evaluation of both SMC and objective cognitive defects should not be postponed and should be repeated in high risk patients after an episode. In this study, in the patients with depression no objective memory deficit was found, however as the patient number was low, it would be incorrect to draw any conclusions.

As there are no Turkish forms of neuropsychological tests which can be applied to the elderly and as there are no normal values of the existing forms, MCI diagnosis is made by clinical examination. Therefore, the fact that objective neuropsychological test results were not used in the formation of the groups is a significant limitation of this study. However, a difference was found between the control group, the MDD group and the MCI group when comparing the neuropsychological tests widely used in Turkey to support the clinical diagnoses of those who did not have normal values for age in the MMSE, CDT and ADAS-cog, which were applied later.

Only amnesic type MCI cases, and therefore probable pre-Alzheimer's patients, were included in the study, so these results can not be generalised for other MCI groups. In addition, as the study was cross-sectional, there could be criticism that it did not have sufficient validity for both MCI and depression. Therefore, it can be said that there is a need for further, similar prospective studies to be conducted on a geriatric population. For MDD diagnosis, future studies should also focus on features such as the duration of the episode, the severity, the resistance to treatment and repeatability, which could affect both objective and subjective cognitive deficits.

Variables such as personality features or the level of anxiety, which could affect SMC, were not taken into consideration in this study (Steinberg et al. 2013; Balash et al. 2013). In addition, since the control group subjects with no informants were included, cognitive evaluation tools applied to the informants (IQCODE etc) were not used and therefore the informing of the relatives could not be taken into account (Özel-Kızıl et al. 2010).

In conclusion, the results of this study have shown that there could be a relationship between SMC and depression. Depressive symptoms must be considered in individuals presenting subjective memory complaints. In patients with major depressive disorder, it is necessary to evaluate both SMC and objective cognitive deficits. As a lack of the awareness of the memory deficit aspect of SMC is associated with a poor prognosis for MCI and dementia, SMC scanning with a valid test will be taken into consideration for both treatment and prognosis.

REFERENCES

- Abdulrab K and Heun R (2008) Subjective Memory Impairment. A review of its definitions indicates need for a comprehensive set of standardised and validated criteria. *Eur Psychiatry* 23:321-30.
- Akça-Kalem Ş, Öktem Ö, Hanağası HA et al (2003) Alzheimer Hastalığını Değerlendirme Skalası- Kognitif Alt Skorunun (ADAS-cog) Betimsel İstatistik Değerlerinin Bir Normal Erişkin Türk Örnekleminde Saptanması. *Nöropsikiyatri Arşivi* 40:13-25.
- American Psychiatric Association (2000) DSM-IV-TR Diagnostic and Statistical Manual of Mental Disorders (4th ed., text revised), American Psychiatric Association, Washington DC
- American Psychiatric Association (2013) Diagnostic and Statistical Manual of Mental Disorders (5th ed.), American Psychiatric Publishing, Washington DC.
- Andresescu C, Aizenstein HJ (2009) Amnestic Disorders and Mild Cognitive Impairment. Kaplan & Sadock's Comprehensive Textbook of Psychiatry. 9th ed. Sadock BJ, Sadock BA, Ruiz P (Ed) Philadelphia. Lippincott Williams & Wilkins. p.1198-206.
- Antikainen R, Hanninen T, Honkalampi K et al (2001) Mood improvement reduces memory complaints in depressed patients. *Eur Arch Psychiatry Clin Neurosci* 251:6-11.
- Balash Y, Mordechovich M, Shabtai H et al (2010) Subjective memory decline in healthy community-dwelling elders. What does this complain mean? *Acta Neurol Scand* 121: 194-7.
- Balash Y, Mordechovich M, Shabtai H et al (2013) Subjective memory complaints in elders: depression, anxiety, or cognitive decline? *Acta Neurol Scand* 127:344-50.
- Baldwin R (2008) Mood Disorders: depressive disorders. Oxford Textbook of Old Age Psychiatry, 3th ed., Jacoby R, Oppenheimer C, Denning T, Thomas A(Ed) New York. Oxford University Press, p.529-6.
- Begum A, Morgan C, Chiu CC et al (2012) Subjective memory impairments in older adults: aetiology, salience and help seeking. *Int J Geriatr Psychiatry* 27:612-20.
- Butters MA, Bhalla RK, Mulsant BH et al (2004) Executive functioning, illness course, relapse/recurrence in continuation and maintenance treatment of late-life depression. Is there a relationship? *Am J Geriatr Psychiatry* 12:387-94
- Can SS, Özel-Kızıl ET, Varlı M et al (2010) Demans Hastalarında Üç Farklı Saat Çizme Testinin Türkçe Uyarlamalarının Psikometrik Özellikleri. *Nöropsikiyatri Arşivi* 47:91-5
- Cangöz B, Karakoç E, Seleklr K (2006) Saat Çizme Testi'nin 50 yaş ve üzeri Türk yetişkin ve yaşlı örneklemindeki norm belirleme ve geçerlik-güvenirlilik çalışmaları. *Türk Geriatri Derg* 9: 136-42
- Chin J, Oh KJ, Seo SW et al (2014) Are depressive symptomatology and self-focused attention associated with subjective memory impairment in older adults? *Int Psychogeriatr* 26: 573-80.
- Chodosh J, Kado DM, Seeman TE et al (2007) Depressive Symptoms as a Predictor of Cognitive Decline: MAArthur Studies of Successful Aging. *Am J Geriatr Psychiatry* 15:406-15.
- Den Hartog HM, Derix MM, van Bommel AL et al (2003) Cognitive functioning in young and middle-aged unmedicated outpatients with major depression: testing the effort and cognitive speed hypotheses. *Psychol Med* 33:1443-51.
- Dentone MJ and Insua AM (1997) Memory complaints and memory deficits in healthy and depressed elderly individuals. *Medicina* 57: 535-40.
- Elderkin-Thompson V, Moody T, Knowlton B et al (2011). Explicit and implicit memory in late-life depression. *Am J Geriatr Psychiatry* 19: 364-73.
- Feldman H, Scheltens P, Scarpini E et al (2004) Behavioral symptoms in mild cognitive impairment. *J Neurol* 251: 1199-201.
- Folstein M, Folstein S, Folstein J (2011) Chapter 27, The Mini-Mental State Examination: A Brief Cognitive Assessment. Principles and Practice of Geriatric Psychiatry, 3th ed., Abou-Saleh MT, Katona C, Kumar A (Ed), Chichester. John Wiley & Sons, p.145-6.
- Güngen C, Ertan T, Eker E et al (2002) Reliability and Validity of The Standardized Mini Mental State Examination in The Diagnosis of Mild Dementia in Turkish Population. *Türk Psikiyatri Derg* 13: 273-81.
- Hwang TJ, Masterman DL, Ortiz F et al (2004) Mild cognitive impairment is associated with characteristic neuropsychiatric symptoms. *Alzheimer Dis Assoc Disord* 18:17-21.
- Jorm AF, Butterworth P, Anstey KJ et al (2004) Memory complaints in a community sample aged 60-64 years: associations with cognitive functioning, psychiatric symptoms, medical conditions, APOE genotype, hippocampus and amygdala volumes, and white-matter hyperintensities. *Psychol Med* 34: 1495-506.
- Kelley BJ and Petersen RC (2009) Mild Cognitive Impairment. The Behavioral Neurology of Dementia. Miller BL ve Boeve BF (Ed), New York. Cambridge University Press p.172-87.
- Kochan NA, Slavin MJ, Crawford JD et al (2010) Effect of Different Impairment Criteria on Prevalence of 'Objective' Mild Cognitive Impairment in a Community Sample. *Am J Geriatr Psychiatry* 18:711-22
- Lahr D, Beblo T, Hartje W (2007) Cognitive Performance and Subjective Complaints Before and After Remission of Major Depression. *Cogn Neuropsychiatry* 12: 25-45.
- Lehrner J, Moser D, Klug S et al (2014) Subjective memory complaints, depressive symptoms and cognition in patients attending a memory outpatient clinic. *Int Psychogeriatr* 26:463-73.
- Mavioglu H, Gedizoglu M, Akyel S et al (2006) The Validity and Reliability of the Turkish version of Alzheimer's Disease Assessment Scale – Cognitive Subscale (ADAS-Cog) in patients with mild and moderate Alzheimer's disease and normal subjects. *Int J Geriatr Psychiatry* 21:259-65.
- Mitchell AJ (2008) The Clinical Significance of Subjective Memory Complaints in the diagnosis of mild cognitive impairment and dementia: a meta-analysis. *Int J Geriatr Psychiatry* 23: 1191-202.
- Mitchell AJ and Shiri-Feshki M (2009) Rate of Progression of Mild Cognitive Impairment to Dementia- Metanalysis of 41 Robust Inception Cohort Studies. *Acta Psychiatr Scand* 119: 252-65.
- O'Brien JT (2008) Mild Cognitive Impairment. Oxford Textbook of Old Age Psychiatry. Jacoby R, Oppenheimer C, Denning T, Thomas A(Ed), New York. Oxford University Press p.407-16.
- O'Connor DW, Pollit PA, Roth M et al (1990) Memory complaints and impairment in normal, depressed and demented elderly persons in a community survey. *Arch Gen Psychiatry* 47:224-7.
- Özel-Kızıl ET, Turan ED, Yılmaz E et al (2010) Discriminant validity and reliability of the Turkish version of Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE-T). *Arch Clin Neuropsychol* 25:139-45.
- Özel-Kızıl ET, Duman B, Altıntaş Ö et al (2013) Öznel Bellek Yakınlıkları Anketi Türkçe Formunun Psikometrik Özelliklerinin Değerlendirilmesi. *Türk Geriatri Derg* 16: 150-4.
- Petersen RC (2004) Mild cognitive impairment as a diagnostic entity. *J Intern Med*, 256:183-94.
- Ponds RW, Commissaris KJ, Jolles J (1997) Prevalance and covariates of subjective forgetfulness in a normal population in the Netherlands. *Int J Aging Hum Dev* 45:207-21.
- Prince M, Bryce R, Albanese E et al (2013) The global prevalence of dementia: a systematic review and metaanalysis. *Alzheimers Dement* 9:63-75.
- Roberts JL, Clare L, Woods RT (2009) Subjective memory complaints and awareness of memory functioning in mild cognitive impairment: a systematic review. *Dement Geriatr Cogn Disord* 28:95-109.
- Sağduyu A (1997) Yaşlılar için Depresyon Ölçeği: Hamilton Depresyon Ölçeği ile Karşılaştırmalı Güvenilirlik ve Geçerlilik Çalışması. *Türk Psikiyatri Derg* 8:3-8.
- Steinberg SI, Negash S, Sammel MD et al (2013) Subjective Memory Complaints, Cognitive Performance, and Psychological Factors in Healthy Older Adults. *Am J Alzheimers Dis Other Dement* 28:776-83.
- Turkish Statistical Institute (2013) Number: 16057. <http://www.tuik.gov.tr/PreHaberBultenleri.do?id=16057>
- Waldorff FB, Rishoj S, Waldemar G (2008) If you don't ask (about memory), they probably won't tell. *J Fam Pract* 57:41-4.
- Youn JC, Kim KW, Lee DY et al (2009) Development of the Subjective Memory Complaints Questionnaire. *Dement Geriatr Cogn Disord* 27:310-7.