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Short Communication

Subjective Cognitive Complaints, Cognitive Performance, Mood, and Anxiety in Older Adults without Dementia: 7 Months Follow-Up

Małgorzata Piskunowicz* and Alina Borkowska

Department of Health Sciences, Nicolaus Copernicus University in Torun, Poland

***Corresponding author**

Małgorzata Piskunowicz, Department of Health Sciences, Chair of Clinical Neuropsychology, Nicolaus Copernicus University in Torun, ul. M. Curie Skłodowskiej 9, 85-094 Bydgoszcz, Tel: 48 52 585 3703; Fax: 48 52 585 3703; Email: piskum@cm.umk.pl

Submitted: 09 May 2017

Accepted: 17 June 2017

Published: 20 June 2017

Keywords

- Subjective cognitive complaints
- Anxiety
- Depression
- Older adults
- MCI

Abstract

Subjective memory complaints (SMCs) by some definitions are required to recognize Mild Cognitive Impairment (MCI). Yet more studies demonstrate the association between SMCs and presence of depressive symptoms rather than objective cognitive impairment. The aim of this study was to evaluate the accuracy of self-reported cognitive difficulties in reference to objective cognitive performance and presence of depressive and anxiety symptoms in cognitively normal and MCI subjects with 7 months follow-up. Cognitive complaints did not differentiate MCI from CN subjects. Subjective complaints regarding various aspects of cognition were significantly associated with symptoms of anxiety and depression in the studied sample. However, in the total sample subjects who declared cognitive decline after 7 months did score lower on short-term memory span test. The results support the linkage between subjective cognitive complaints, anxiety, and depressive symptoms in aging population. At the same time we cannot entirely refute the utility SCCs in diagnosis of cognitive impairment.

ABBREVIATIONS

MCI: Mild Cognitive Impairment; SCCs: Subjective Cognitive Complaints; SMCs: Subjective Memory Complaints; SACs: Subjective Attention Complaints; SWACs: Subjective Word Actualization Complaints

INTRODUCTION

Subjective memory complaints (SMCs) are included as a criterion in some definitions of Mild Cognitive Impairment - a transitional condition between normal aging and dementia, that might be a prodromal state of dementia [1,2]. Growing body of evidence suggests that association between subjective cognitive complaints (SCCs) and objective cognitive difficulties in aging population is mediated by the mood. Some authors indicate that SCCs in cognitively normal aging subjects are mainly associated with sub-syndromal depression and anxiety [3,4]. Moreover, results of other research suggest that subjects with objective memory impairment in vast majority actually do not complain about memory problems and that SMCs do not differentiate normal and memory-impaired subjects [5]. Some researchers argue that SMC should be removed from diagnostic criteria for MCI as they make the diagnosis less reliable [6,4].

The aim of this study was to evaluate the utility of SCCs in differentiating cognitive performance and decline in cognitively normal and MCI subjects in relation to presence of depressive mood and anxiety symptoms with 7 months follow-up.

MATERIALS AND METHODS

Participants

86 Caucasian, Polish nationality, participants (age range 55-78, mean age 67,00 (SD 6,347); 58 women, 28 men, all in good general health and functionality were enrolled in the study. Participants were recruited by neurologist or geriatrist at outpatient care or at local senior centers. Exclusion criteria were: psychiatric and/or neurological disorders, functional dependence, substance abuse, MMSE score below 24 suggesting major cognitive impairment or dementia Lawton IADL scale score < 19. All subjects signed a written informed consent form and the study was approved by the University Bioethics Committee. All subjects had sufficient (or corrected) vision and hearing to complete cognitive tests.

Neuropsychological assessment

Neuropsychological assessment was comprised of: Digit Span

(DS) subtest from Wechsler Adult Intelligence Scale-Revised, 10 words Audio Verbal Learning Task (AVLT), Trial Making Test (TMT) part A and B, letter and category verbal fluency task. AVLT assumed 5 trials for memorizing list of 10 words followed by 20-min delayed recall, total acquisition score in trials 1 to 5 (AVLT∑1-5) was provided. DS and TMT A&B administration followed the original manual [7]. Forward DS score was used as a *measure* of auditory *short-term memory* and backward DS score as a measure of working memory. TMT A was used as a visual search and psychomotor speed measure and TMT B as a measure of working memory, attention, and mental flexibility. Verbal fluency tasks were used to evaluate executive aspect of verbal abilities [8]. Cognitive tests were readministered after approximately 7 months to assess the dynamics of cognitive performance in the studied sample. For AVLT two parallel versions of task were used in the first and the second assessment. At each assessment participants were screened for anxiety and depression symptoms using Hospital Anxiety and Depression Scale.

Subjective complaints assessment

Cognitive assessment was preceded by structured interview on subjectively perceived by participants cognitive difficulties regarding general cognition (SCCs), memory (SMCs), attention (SACs), and word actualization (SWACs). Participants were also asked to evaluate their cognitive functioning by comparing themselves to their peers. After approximately 7 months, before the second cognitive assessment participants were asked to evaluate their possible cognitive decline since the previous assessment. Participants were always asked to answer each question either "yes" or "no".

Statistical analysis

Statistical analyses were performed using SPSS (version 24). Descriptive continuous variables were expressed as mean and standard deviation (SD). Kolmogorov-Smirnov test was performed to analyze continuous variables' distribution in groups. Further comparisons of continuous variables were made using independent samples Student's t test or Mann-Whitney U test (MWU). In case of nominal variables $\chi 2$ test was used. When number of observations in compared groups was very small Exact Fisher's test was performed. For longitudinal data dependent t test was used.

RESULTS AND DISCUSSION

Results

62 subjects obtained score of 27 or more in MMSE and were considered cognitively normal (CN) (mean 28, 19, SD 1,006). 24 participants obtained raw score between 24 and 26 and were considered MCI (mean 25,46, SD 0,658). Groups did not differ significantly in matter of age and anxiety (HADSA) and depressive symptoms (HADSD). There was a difference in respect of years of education with CN (mean 13,71, SD 3,394) being more educated than MCI (11,38, SD 4,052) (MWU, p = 0,005). MCI subjects scored significantly lower comparing to CN on DS backwards (F = 0,216, p = 0,643, t = 2,633, p = 0,010), TMT A (F = 8,004, p = 0,006, t = -2,333, p = 0,028), TMT B (MWU, p = 0,009), category verbal fluency (MWU, p = 0,002), letter verbal fluency (F = 0,103, p = 0,749, t = 3,089, p = 0,003), and AVLT ∑1-5 (MWU, p = 0,002).

Among CN subjects 88,3% declared SCCs, and in MCI group 79,2% (Fisher's exact test, p = 0,310). When participants were asked about SMCs the difference was also statistically insignificant (Fisher's exact test, p = 0,752). No associations regarding SWACs (Chi-square = 0,035, p = 0,852) and SACs (Chi-square = 2,283, p = 0,131) in both groups were observed. Sex was not associated with any kind of cognitive complaints.

Subjects who declared SCCs scored significantly higher on HADSA (MWU, p = 0,018) and HADSD (MWU, p = 0,014). There were no differences between groups in respect of cognitive tests results (Table 1). Similar results were obtained for SMCs where the only significant differences were these of HADSA (WMU, p = 0,022), and HADSD (WMU, p = 0,007), no memory test result was significantly related to SMCs (Table 2). Similar results were obtained for SWACs where the only significant differences were these of HADSA (F = 0,229, p = 0,586, t = -2,416, p = 0,018) and

Table 1: Demographics and results of cognitive tests in the first assessment in subjects who did and did not report subjective cognitive complaints.

1st cognitive assessment	Subjective cognitive complaints	n	Mean	SD	p-value
Age	yes	72	66,86	6,416	0,229
	no	12	69,25	5,172	
Education (years)	yes	72	12,83	3,794	0,225
	no	12	14,08	3,175	
MMSE	yes	72	27,39	1,506	0,845
	no	12	27,50	1,834	
DS forward	yes	72	5,04	1,283	0,153
	no	12	5,42	,793	
DS backward	yes	72	4,51	1,414	0,578
	no	12	4,33	1,775	
TMTA [s]	yes	66	44,26	18,612	0,760
	no	11	45,36	24,829	
TMTB [s]	yes	64	108,45	53,683	0,569
	no	11	143,00	118,218	
AVLT delayed recall	yes	72	4,96	2,106	0,552
	no	12	5,17	2,552	
AVLT ∑ trials 1-5	yes	72	31,78	5,268	0,308
	no	12	33,58	4,033	
Verbal fluency (animals)	yes	71	17,11	5,525	0,533
	no	12	16,33	5,944	
Verbal fluency (letter K)	yes	71	14,72	5,161	0,225
	no	12	12,83	4,041	
HADSA	yes	70	8,03	3,852	0,018
	no	11	5,00	3,225	
HADSD	yes	70	5,90	3,664	0,014
	No	11	3,09	2,809	

Mann-Whitney U test

HADSD (WMU, p = 0,007, F = 0,052, p = 0,820, t = -2,059, p = 0,043), no verbal test was related to subjective complaints of this kind (Table 3). As to SACs subjects with such concerns scored higher on HADSA (F = 1,413, p = 0,238, t = -5,364, p = 0,000) and HADSD (F = 10,068, p = 0,002, t = -6,819, p = 0,000). When subjects with and without SACs were compared on cognitive tests no significant differences were found (Table 4).

Participants who perceived their cognitive functioning as worse comparing with their peers were significantly younger (F = 0,421, p = 0,518, t = 4,200, p = 0,000). These subjects actually scored better in TMT A (F = 2,823, p = 0,098, t = 2,195, p = 0,032). There were no significant differences in other cognitive tests or symptoms of anxiety and depression.

In the second assessment subjects who declared cognitive worsening since the first assessment had significantly higher HADSA (MWU, p = 0,008) and HADSD (MWU, p = 0,000) comparing with those who did not perceive such change. Yet subjects who declared such decline have actually scored significantly worse on DS forwards (F = 10,579, p = 0,002, t = 2,712, p = 0,008). There were no other differences with regard to cognitive performance (Table 5).

Comparing cognitive performance of the first and the second assessment in CN no differences were found. In MCI group there was a significant drop in AVLT delayed recall score (p = 0,019), but no other changes were observed.

Discussion

In our study cognitive complaints did not differentiate MCI from CN subjects. The results of this study support assumption that SCCs and SMCs are more likely to be related to symptoms of anxiety or depression than to objective cognitive performance which is in line with some earlier studies [3,4,9]. Yet the association remains unclear as subjective complaints regarding possible cognitive decline in over 6 months time actually overlapped with worse cognitive performance in test of audio verbal short-term memory span in the total sample.

We assume that relation between subjective and objective cognitive performance, mood, and anxiety is a complex one. Depressive mood can be followed be self-critical thinking and negative self-evaluation [4]. Depressive mood can also emerge as a reaction to cognitive decline awareness. At the same time older adults with depression are more likely to have concomitant cognitive deficits and are at higher risk of developing dementia [10,11]. Moreover, higher level of fear (including fear of negative evaluation) may deplete attention resources during cognitive examination. On the other hand it is also possible that cognitive tests are not sensitive enough to capture some subtle cognitive changes actually taking place. We suggest that both cognitive and mood examination should always be conducted when clinician is presented with subjective cognitive complaints.

This study is certainly limited by a small sample size. Another

Table 2: Demographics and results of cognitive tests in the first assessment in subjects who did and did not report subjective memory complaints.

1st cognitive assessment	Subjective memory complaints	n	Mean	SD	p-value
Age	yes	71	66,56	6,579	0,186
	no	15	69,07	4,758	
Education (years)	yes	71	12,90	3,855	0,320
	no	15	13,80	2,981	
MMSE	yes	71	27,32	1,452	0,169
	no	15	27,93	1,870	
DS forward	yes	71	5,03	1,287	0,103
	no	15	5,40	0,737	
DS backward	yes	71	4,51	1,330	0,935
	no	15	4,60	2,063	
TMTAs	yes	66	44,14	18,817	0,556
	no	13	43,77	23,030	
TMTBs	yes	64	108,55	53,675	0,870
	no	13	132,15	111,433	
AVLT delayed recall	yes	71	5,01	2,201	0,385
	no	15	5,33	2,320	
AVLT ∑ trials 1-5	yes	71	31,89	5,458	0,169
	no	15	34,07	4,096	
Verbal fluency (Animals)	yes	70	17,23	5,585	0,583
	no	15	16,60	5,514	
Verbal fluency (letter K)	yes	70	14,54	5,064	0,835
	no	15	14,20	4,754	
HADSA	yes	69	8,20	3,924	0,022
	no	14	5,50	3,299	
HADSD	yes	69	6,09	3,693	0,007
	no	14	3,21	2,517	

Mann-Whitney U test

Table 3: Demographics and results of cognitive tests in the first assessment in subjects who did and did not report subjective word actualization complaints.

1st cognitive assessment	Subjective word actualization complaints	n	Mean	SD	p-value
Age	yes	28	67,71	6,565	0,307
	no	52	66,19	6,180	
Education (years)	yes	28	13,18	4,000	0,647
	no	52	12,79	3,397	
MMSE	yes	28	27,29	1,487	0,340
	no	52	27,63	1,585	
DS forward	yes	28	5,07	1,303	0,932
	no	52	5,10	1,192	
DS backward	yes	28	4,68	1,467	0,570
	no	52	4,48	1,488	
TMTA [s]	yes	25	44,56	17,581	0,817
	no	48	43,42	21,083	
TMTB [s]	yes	25	111,88	61,479	0,674
	no	46	105,35	62,703	
AVLT delayed recall	yes	28	4,96	2,603	0,617
	no	52	5,23	2,064	
AVLT ∑ trias 1-5	yes	28	31,61	5,977	0,308
	no	52	32,88	4,926	
Verbal fluency	yes	28	16,96	5,146	0,632
(animals)	no	51	17,59	5,707	
Verbal fluency	yes	28	14,11	5,971	0,695
(letter k)	no	51	14,57	4,360	
HADSA	yes	26	9,35	3,846	0,018
	no	51	7,10	3,869	
HADSD	yes	26	6,88	3,756	0,043
	no	51	5,06	3,641	

Student's t-test

Table 4: Demographics and results of cognitive tests in the first assessment in subjects who did and did not report subjective attention complaints.

1st cognitive assessment	Subjective attention complaints	n	Mean	SD	p-value
Age	yes	49	65,47	6,634	0,026*
	no	34	68,88	5,284	
Education (years)	yes	49	12,63	3,468	0,374
	no	34	13,35	3,805	
MMSE	yes	49	27,49	1,431	0,956
	no	34	27,47	1,692	
DS forward	yes	49	5,10	1,342	0,955
	no	34	5,12	1,038	
DS backward	yes	49	4,67	1,375	0,294
	no	34	4,32	1,628	
TMTA [s]	yes	47	42,68	15,478	0,438
	no	30	46,27	24,951	
TMTB [s]	yes	47	102,55	39,815	0,400
	no	28	117,18	85,344	
AVLT delayed recall	yes	49	5,16	2,230	0,881
	no	34	5,09	2,234	
AVLT ∑ trials 1-5	yes	49	32,37	5,151	0,872
	no	34	32,56	5,489	
Verbal fluency (animals)	yes	49	17,88	5,700	0,165
	no	33	16,18	4,831	
Verbal fluency	yes	49	15,10	5,084	0,318
(letter K)	no	33	13,97	4,870	
HADSA	yes	48	9,42	3,797	0,000*
	no	32	5,22	2,779	
HADSD	yes	48	7,27	3,505	0,000*
	no	32	2,97	2,132	

Student's t-test
*Mann-Whitney U test

Table 5: Demographics and results of cognitive tests in the second assessment in subjects who did and did not report subjective cognitive worsening since the first assessment.

2nd cognitive assessment	Subjective cognitive worsening since the first assessment	N	Mean	SD	p value
Age	yes	28	67,21	6,238	0,864
	no	45	66,96	6,252	
Education (years)	yes	28	12,11	3,665	0,082
	no	45	13,64	3,600	
MMSE	yes	28	27,11	2,097	0,102
	no	42	27,81	1,452	
DS forward	yes	28	4,64	0,989	0,008
	no	44	5,48	1,621	
DS backward	yes	27	4,63	1,115	0,984
	no	44	4,64	1,480	
TMTA [s]	yes	28	47,25	17,390	0,702
	no	43	45,72	15,727	
TMTB [s]	yes	27	117,56	60,555	0,617
	no	42	109,55	67,184	
AVLT delayed recall	yes	28	4,86	2,384	0,800
	no	44	4,70	2,539	
AVLT ∑1-5	yes	28	31,25	5,892	0,122
	no	44	33,52	6,083	
Verbal fluency (animals)	yes	28	16,21	4,442	0,664
	no	44	16,77	5,758	
Verbal fluency (letter K)	yes	28	13,68	3,991	0,716
	no	44	14,07	4,648	
HADSA	yes	28	8,93	3,925	0,008*
	no	44	6,30	4,322	
HADSD	yes	28	7,75	3,797	0,000*
	no	44	4,20	3,414	

Student's t-test
*Mann-Whitney U test

drawback is the measurement of SCC only by six simple questions which makes the results difficult to compare to these obtained in other studies. However, in our opinion asking subjects simple questions on SCC is closer to clinical practice [12]. To summarize, despite the shortcomings, this study provides additional data on relation between SCC, mood, and cognitive performance in older adults which can be used in further analyses.

CONCLUSION

The results support the linkage between subjective cognitive complaints, anxiety, and depressive symptoms in aging population. At the same time we cannot entirely refute the utility SCCs in diagnosis of cognitive impairment. We suggest that both cognitive and mood examination should always be conducted when clinician is presented with subjective cognitive complaints.

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Cite this article

Piskunowicz M, Borkowska A (2017) Subjective Cognitive Complaints, Cognitive Performance, Mood, and Anxiety in Older Adults without Dementia: 7 Months Follow-Up. JSM Schizophr 2(2): 1012.