

SHORT COMMUNICATION

MEMORY SELF-EFFICACY AND PSYCHOSOCIAL FACTORS IN STROKE

Laurien Aben, MSc¹, Jan J. V. Busschbach, PhD², Rudolf W. H. M. Ponds, PhD³ and Gerard M. Ribbers, MD, PhD^{1,4}

From the ¹Department of Rehabilitation Medicine and ²Department of Medical Psychology and Psychotherapy, Erasmus Medical Centre, Rotterdam ³Department of Psychiatry and Psychology, University Hospital Maastricht and Mondriaan Centre for Mental Health, Maastricht, and ⁴Rijndam Rehabilitation Centre, Rotterdam, The Netherlands

Objective: To explore whether Memory Self-efficacy is related to depression, neuroticism and coping in patients after stroke, as it is in healthy elderly subjects.

Design: A cross-sectional design. The relation between Memory Self-efficacy and psychosocial factors was analysed using a Mann-Whitney *U* test and non-parametric Spearman correlations.

Patients: Seventeen male and 6 female patients after stroke from an inpatient rehabilitation setting were included.

Methods: Memory Self-efficacy, depression, neuroticism and coping were assessed with validated questionnaires. Patients with severe aphasia, subarachnoidal haemorrhage or subdural haematomas were excluded.

Results: As in healthy elderly subjects, higher depression ratings are significantly related to lower Memory Self-efficacy ratings ($Z=-2.13$; $p=0.033$). Lower Memory Self-efficacy seems related to higher neuroticism ratings and a more passive coping style score ($Z=-1.54$; $p=0.123$; $Z=-1.42$; $p=0.155$, respectively). The Spearman correlations confirm these findings ($p<0.10$).

Conclusion: This study replicated the relationships between Memory Self-efficacy and depression and neuroticism found in a healthy population, in an inpatient stroke population. Future research on Memory Self-efficacy in patients after stroke should focus on other potential determinants such as awareness and, ultimately, on the effectiveness and efficacy of interventions aimed at Memory Self-efficacy to improve participation and quality of life.

Key words: metamemory, depression, coping, neuroticism, stroke, rehabilitation.

J Rehabil Med 2008; 40: 681–683

Correspondence address: Laurien Aben, Erasmus Medical Centre, Department of Rehabilitation Medicine, PO Box 2040, NL-3000 CA Rotterdam, The Netherlands. E-mail: l.aben@erasmusmc.nl

Submitted November 23, 2007; accepted April 2, 2008

INTRODUCTION

Metamemory is broadly defined as “cognitions about memory” (1) and can be divided into 4 dimensions (2). One of these dimensions is Memory Self-efficacy (MSE), defined as one’s sense of mastery and capability to use memory effectively in memory demanding situations.

Several studies have shown MSE to be related to psychosocial factors such as depression, neuroticism and coping, rather than to actual memory functioning and it may affect social participation and quality of life in elderly subjects (3, 4). Several studies on healthy elderly subjects established the importance of including MSE in memory training programmes (5, 6). MSE improves memory test performance in healthy subjects (7). In a study by Valentijn et al. (7), an intervention aimed to improve MSE in healthy elderly subjects, was shown to improve memory performance without traditional memory training.

MSE has rarely been studied in patients after stroke (8) and the relation between MSE and memory functioning in patients after stroke has been established only in preliminary data (9). Approximately 60% of patients after stroke complain about forgetfulness 9 months post-stroke (10). Thus there is a need for effective interventions to enhance MSE in patients after stroke. To successfully integrate MSE concepts in memory training programmes for patients after stroke, the underlying psychosocial determinants first need to be studied. Therefore, this study aims to explore whether the relations between MSE and depression, coping and neuroticism as established in healthy subjects (4) also apply in patients after stroke. Based on the results in healthy elderly subjects, we presume that higher ratings of MSE are correlated with less depressive symptoms and lower levels of neuroticism. In addition, lower ratings of MSE are expected to be correlated with a less active coping style.

METHODS

After informed consent, 23 consecutive patients after stroke admitted to the inpatient stroke department of Rijndam Rehabilitation Center, Rotterdam, The Netherlands, were included. Inclusion criteria were between 18 and 75 years of age, time post-onset 6 weeks or less and subjective memory complaints. Subarachnoidal haemorrhage, subdural haematoma and clinically observed severe aphasia were considered as exclusion criteria. Memory disorders were objectified using the Rivermead Behavioural Memory Test (11). Level of education is listed using the 7-level system of Saan & Deelman (12). During the study, all patients received regular and individually tailored multidisciplinary treatment suitable for severely impaired patients after stroke.

MSE was assessed using the Metamemory-in-Adulthood questionnaire (MIA, 13). This questionnaire consists of 68 questions relating to 7 factors of metamemory. Of these 7 factors of metamemory, Change, Capacity and Anxiety form the higher order factor MSE. The ques-

tionnaire is validated for a Dutch population and frequently used in metamemory research in elderly subjects (13, 14).

Coping is measured using the validated Dutch Utrecht CopingLijst (UCL), which consists of 47 questions, relating to different kinds of coping styles rated on a 4-point scale (15, 16). In the present study, active and passive coping are used as determinants. Neuroticism is measured using the Symptom Checklist 90 (SCL90), a questionnaire designed to measure psychological and psychosomatic change (17). Psycho-neuroticism is an overall score of the SCL-90 and is used as an indication for neuroticism. Depression is measured using the Beck Depression Inventory (BDI; 18). Patients completed the questionnaires during 2 supervised sessions of 1 h. The sessions were held on consecutive days. Due to a small number of subjects and the use of ordinal measures, non-parametric tests are used to analyse the correlation between psychosocial factors and MSE. The Mann-Whitney *U* test is applied to determine the relation between "High" or "Low" MSE and psychosocial factors. Spearman's correlations are used to determine similarities with studies in healthy subjects. A significance level of 0.1 2-sided is used, in anticipation of the relatively modest number of subjects and the confirmative aim of this research, to replicate previous results in large studies in other populations (4).

RESULTS

Seventeen males and 6 females, with a mean age of 55 years, participated in this study. Mean time post-onset was 50 days. Six patients were diagnosed with left hemispheric lesions, 14 with right hemispheric lesions and in 3 cases, lesions occurred in the brainstem area. In 5 cases a haemorrhagic stroke was diagnosed, all other cases were ischaemic. Level of education was comparable to the average of the Dutch population. The "Low" MSE group ($n=11$) has significantly higher scores on depression in comparison with the "High" MSE group ($Z=-2.13$; $p=0.033$). On average, patients in the "Low" MSE group have a score of 15 on the BDI in comparison to a mean score of 9 in the "High" MSE group. Also, neuroticism is higher in a "Low" MSE group in comparison with a "High" MSE group ($Z=-1.54$; $p=0.123$), though non-significant. An active coping style is not related to a "High" MSE group in this sample ($Z=-0.773$; $p=0.440$). Patients in the "Low" MSE group tend to have a higher mean ranking on passive coping style in comparison with patients in the "High" MSE group ($Z=-1.421$; $p=0.155$).

As can be expected, when more powerful statistical measures of correlation are used, these findings are confirmed at lower *p*-values (Table I).

Table I. Correlation matrix

	MSE	Depression	Active coping	Passive coping	Neuroticism
MSE					
Depression	-0.557†				
Active coping	-0.045	-0.233			
Passive coping	-0.383	0.659†	-0.277		
Neuroticism	-0.467*	0.735†	-0.025	0.705†	

*Correlation is significant at the 0.05 level (2-tailed).

†Correlation is significant at the 0.01 level (2-tailed).

MSE: Memory Self-efficacy.

DISCUSSION

This study confirms that MSE in patients after stroke is similarly related to depression and, to a lesser degree, to neuroticism and coping, as in a healthy elderly population. Based on this study, depression is negatively correlated with MSE in patients after stroke. Neuroticism and, to a lesser degree, passive coping style also seem to be correlated with low MSE ratings, although results only show a trend, probably due to small sample size. This opens the venue of interventions on MSE in stroke, as integration of MSE concepts in memory training programmes has been demonstrated effective in healthy elderly, decreasing anxiety and perceived memory deficits and enhancing social participation (19).

However, there are a number of limitations to our findings. The external validity of the study is limited as only 10% of all patients after stroke are transferred to a rehabilitation clinic in the Netherlands. Furthermore, due to the low number of patients included, only a limited number of determinants of MSE could be evaluated. Due to the already small sample size, patients not meeting the "6 weeks or less" criterion were included. Although the sample therefore has a large spread regarding time post-onset, this was not correlated with any of the outcome measures (data not presented). Finally, this cross-sectional design does not provide evidence that depression is causally related to MSE.

In conclusion, our study is the first to identify depression and neuroticism as determinants of MSE in patients after stroke. Effectiveness studies investigating whether these psychosocial factors indeed change MSE and memory functions when incorporated in memory training programmes should be performed.

REFERENCES

1. Flavell JH, Wellman HM. Metamemory. In: Kail RVJR, Hagen JW, editors. Perspectives on the development of memory and cognition. Hillsdale NJ: Lawrence Erlbaum Associates; 1977, p. 3-33.
2. Hultsch DF, Hertzog C, Dixon RA, Davidson H. Memory self-knowledge and self-efficacy in the aged. In: Howe ML, Brainerd CJ, editors. Cognitive development in Adulthood: progress in cognitive development research. New York: Springer; 1988, p. 65-92.
3. Cipolli C, Neri M, De Vreese LP, Pinelli M, Rubichi S, Lalla M. The influence of depression on memory and metamemory in the elderly. Arch Geront Geriat 1996; 23: 111-127.
4. Ponds RW, editor. Forgetfulness and cognitive aging: prevalence, characteristics, and determinants [dissertation]. Maastricht: Neuro-psy Publishers Maastricht; 1998.
5. Bandura A, editor. Self-efficacy: the exercise of control. New York: WH Freeman and Co.; 1997.
6. McDonald-Miszczak L, Gould ON, Tychynski D. Metamemory predictors of prospective and retrospective memory performance. J Gen Psych 1992; 47: 293-299.
7. Valentijn SA, Hill RD, Van Hooren SA, Bosma H, Van Boxtel MP, Jolles J, et al. Memory Self-Efficacy predicts memory performance: results from a 6-year follow-up study. Psychol Aging 2006; 21: 165-172.
8. Pannu JK, Kaszniak AW. Metamemory experiments in neurological populations: a review. Neuropsychol Review 2005; 15: 105-127.

9. Lincoln NB, Tinson DJ. The relation between subjective and objective memory impairment after stroke. *Br J Clin Psychol* 1989; 28: 61–66.
10. Hochstenbach JBH, editor. The cognitive, emotional and behavioural consequences of stroke [dissertation]. Nijmegen: Catholic University Nijmegen; 1999.
11. Wilson BA, Cockburn J, Baddeley AD, editor. The Rivermead Behavioural Memory Test. Titchfield, UK: Thames Valley Test Co.; 1985.
12. Saan RJ, Deelman BG. Nieuwe 15-Woordentest A en B (15WT-A en 15WT-B). In: A Bouma J Mulder J Lindeboom, editors. *Neuropsychologische diagnostiek: handboek* [Neuropsychological diagnostics: handbook]. Lisse, NL: Swets & Zeitlinger 1986, p. C II 13–28 (in Dutch).
13. Dixon RA, Hultsch DF, Hertzog C. The metamemory in adulthood (MIA) questionnaire. *Psychopharmacol Bull* 1988; 24: 671–688.
14. Ponds RW, Jolles J. The abridged Dutch Metamemory in Adulthood (MIA) questionnaire: structure, and effects of age, sex, and education. *Psychol Aging* 1996; 11: 324–332.
15. Schreurs PJG, van Willige G, Tellegen B, Brosschot JF, Graus GMH, editors. *De Utrechtse Coping Lijst (UCL)* [The Utrecht Coping List (UCL)]. Lisse: Swets & Zeitlinger; 1993 (in Dutch).
16. Van Baalen B, Ribbers GM, Medema-Meulenpas D, Pas MS, Odding E, Stam HJ. Being restricted in participation after a traumatic brain injury is negatively associated with passive coping style of the caregiver. *Brain Inj* 2007; 21: 925–931.
17. Arrindell WA, Ettema JHM, editors. *SCL-90. Een multidimensionele psychopathologie indicator* [The SCL-90. A multidimensional instrument for the assessment of psychopathology]. Lisse, The Netherlands: Swets & Zeitlinger; 1986 (in Dutch).
18. Beck AT, Steer RA, Brown GK, editors. *Beck Depression Inventory – Second Edition (BDI-II)*. San Antonio, TX: Psychol Corp; 1996.
19. Valentijn SA, editors. *Successful cognitive aging: memory, determinants and interventions* [dissertation]. Maastricht: Neuropsych Publishers Maastricht; 2004.