Effect of self-rated health on cognitive performance in community dwelling elderly

Jelicic, M; Kempen, GIJM

Published in:
Educational Gerontology

Publication date:
1999

EFFECT OF SELF-RATED HEALTH ON COGNITIVE PERFORMANCE IN COMMUNITY DWELLING ELDERLY

Marko Jelicic
Gertrudis I. J. M. Kempen
Northern Centre for Healthcare Research and Department of Health Sciences, School of Medicine, University of Groningen,The Netherlands

The objective of this study was to examine the effect of self-reported health on cognitive function in community dwelling elderly (N = 4,528). Research participants were divided into four groups with regard to self-rated health. Statistically controlling for the effects of depression, age, and education, participants with poor self-reported health had lower scores on the Mini-Mental Status Examination than those who believed themselves to be in good health. Our results show that cognitive performance in older adults is influenced by health factors.

There is controversy as to whether self-reported health affects cognitive function among older adults. Salthouse, Kausler, and Saults (1990) found no significant effect of self-reported health on cognitive performance in both young and older research participants, whereas Hultsch, Hammer, and Small (1993) and Emery, Huppert, and Schein (1995) did find self-rated health to be predictive of cognitive functioning in the elderly. Emery et al. (1995) argued that these conflicting results could be explained by either differences in the assessment of cognitive skills or sampling technique. Salthouse et al. (1990) used a few selected tests of speed and memory, whereas Hutsch et al. (1993)

The research reported here is part of the Groningen Longitudinal Aging Study (GLAS). GLAS is conducted by the Northern Centre for Health Care Research and various departments of the University of Groningen. The primary departments involved are Health Sciences (Dr. G. I. J. M. Kempen and Prof. Dr. W. J. A. van den Heuvel), Family Medicine (Prof. Dr. B. Meyboom-de Jong), Psychiatry (Prof. Dr. J. Ormel), Sociology (Prof. Dr. S. Lindenberg), and Human Movement Sciences (Prof. Dr. P. Rispens). The director of GLAS is Prof. Dr. J. Ormel (Health Sciences and Psychiatry). GLAS and its substudies are financially supported by the Dutch Government (through NESTOR [Netherlands Stimulation Programme on Aging Research]) the University of Groningen, the School of Medicine, the Dutch Cancer Foundation, and the Netherlands Organisation for Scientific Research.

Address correspondence to Dr. Marko Jelicic, Department of Psychiatry and Neuropsychology, Neuropsychology Section, Faculty of Medicine, Maastricht University, P.O. Box 616, 6200 MD Maastricht, The Netherlands. E-mail: m.jelicic@np.unimass.nl

Educational Gerontology, 25: 13–17, 1999

0360-1277/99 $12.00 + .00

and Emery et al. (1995) used more comprehensive test batteries to assess cognitive functioning. Also, Salthouse et al. (1990) studied aquaintances and friends, whereas Hultsch et al. (1993) recruited research participants through advertisements in the public media, and Emery et al. (1995) used participants randomly selected from an electoral register.

Cognitive impairments have frequently been observed in depressive patients (cf. Poon, 1992). Unfortunately, none of the three abovementioned studies controlled for the effect of depression on cognitive function. Given the association between physical disease and depression (e.g., Zeiss, Lewinsohn, Rohde, & Seeley, 1996), an effect of self-reported health on cognitive performance may have been found in some studies, because participants with poor health had more depressive symptoms than more healthy seniors. For this reason, we used data from the Groningen Longitudinal Aging Study (GLAS) to examine the relationship between self-reported health and cognitive function—while controlling for depression.

METHOD

GLAS is a population-based prospective follow-up study of the determinants of health-related quality of life (Kempen, Ormel, Brilman, & Relyveld, 1997).

Research Participants

The source population consists of older adults, living independently or in adapted housing for elderly people, in the northern parts of The Netherlands. The study population was comprised of 8,723 persons aged 57 and over on January 1 1993, who were in the patient panels of the 27 family physicians (FPs) participating in a morbidity registration network. In The Netherlands, virtually all community dwelling elderly are on an FPs panel. A total of 3,214 persons refused to participate in the study, 152 had passed away or left the practice by the time the contact was initiated, and 78 individuals were excluded because of severe cognitive impairments at the baseline interview. Thus, useful data were obtained for 5,279 research participants (62%; 5,279 out of [8723 − 152]). Because of financial constraints, 487 participants were interviewed by telephone and were not administered the Mini-Mental Status Examination (MMSE). Another 264 participants were excluded from the MMSE analysis because of missing data on at least one item of the MMSE. Hence, data from 4,528 par-

ticipants (mean age 69.9 years; 2,554 females) were available for analysis.

Dependent Measure

Cognitive function was assessed with the MMSE (Folstein, Folstein, & McHugh, 1975). The MMSE is a widely used method for assessing mental status in both clinical practice and in research (Tombaugh & McIntyre, 1992). It consists of 20 items measuring orientation, registration, attention and calculation, recall, and language. Scores range from 0 to 30.

Independent Measures

Self-rated health was assessed by asking the participants "Would you say your health in general is excellent, very good, good, fair, or poor?". The potential confounding variable, depression, was measured with the Depression scale of the Hospital Anxiety and Depression Scale (Zigmond & Snaith, 1983). This scale contains seven items pertaining to depressive symptoms. Scores range from 0 to 21. Because age and education also affect cognitive performance in the elderly (Tombaugh & McIntyre, 1992), these two variables were also treated as confounders.

Data Analysis

Based on self-rated health judgments, we created four groups of participants. Group I consisted of participants who thought their health was excellent or very good, Group II believed their health was good, Group III thought their health was fair, and Group IV believed their health was poor. Because "excellent" and "very good" are almost synonymous, the first group contained both participants with excellent and very good self-rated health. Analysis of variance (ANOVA), controlling for depression as well as age and education, was used to find out whether there were differences between the four groups with respect to MMSE score. In case of (borderline) significant differences, separate ANOVAs would be used, again controlling for depression, age, and education, to see which groups differ from each other. Because of the large sample size, $p < .001$ was considered significant, and $.001 \leq p < .005$ was regarded as "borderline" significant.

RESULTS

Mean MMSE scores of the four groups—adjusted for depression, age, and education—are presented in Table 1.

TABLE 1 Mean Mini-Mental Status Examination (MMSE) Scores of Older Adults Differing in Self-Reported Health (Adjusted for Depression, Age, and Education)[a]

	Self-reported health			
	Excellent/very good ($N = 1176$)	Good ($N = 1760$)	Fair ($N = 1311$)	Poor ($N = 101$)
MMSE	27.40	27.43	27.28	26.25

Note. Because of missing data, the *N*s of the participants do not add up to 4,528.

[a] $F(3,4341) = 5.296, p = .001$

Table 1 shows that there were borderline significant differences between the four groups with respect to MMSE scores. (Depression, age, and education all had a significant effect on MMSE score [all $ps < .001$].) Post hoc comparisons, using ANOVA (controlling for depression, age, and education), revealed that research participants who reported to be in good health had higher MMSE scores than those who rated their health as poor ($p < .001$). The other comparisons did not yield any significant differences.

DISCUSSION

Participants with poor self-rated health had lower MMSE scores than those with good self-reported health. Hence, our results indicate that health factors influence cognitive function in the elderly even after controlling for depression. Note that we used the MMSE to assess cognitive performance in older adults. Several researchers (e.g., Dijkstra, 1997) have argued that the MMSE is a rather crude instrument to examine neuropsychological dysfunction. Possibly, more sensitive cognitive measures would have shown more pronounced differences between the four study groups.

Our findings, as well as those reported by Hultsch et al. (1993) and Emery et al. (1995), lend support to the idea that cognitive dysfunction in the elderly may be mediated by changes in physical health associated with aging, rather than by age per se. Houx, Vreeling, and Jolles (1991) argued that cognitive decline in older people is—to a considerable extent—due to biological life events such as medication, head injury, and surgical interventions under general anesthesia. An accumulation of these biological life events would lead to neuropsychological problems in old age.

It is not clear what underlies reduced cognitive function in individuals with poor self-reported health. Age-related structural and func-

tional changes in the brain have been well documented (Scheibel, 1996). It may be that these changes in the brain are greater in older adults with poor self-rated health than in more healthy seniors. Therefore, it would be interesting to use modern neuroimaging techniques (e.g., Magnetic Resonance Imaging) in research on health factors and cognition.

REFERENCES

Dijkstra, J. B. (1997). *An operation under general anaesthesia and cognitive ageing*. Maastricht, The Netherlands: Neuropsych Publishers.

Emery, C. F., Huppert, F. A., & Schein, R. L. (1995). Relationships among age, exercise, health, and cognitive function in a British sample. *The Gerontologist*, *35*, 378–385.

Folstein, M. F., Folstein, S. E., & McHugh, P. R. (1975). 'Mini-Mental State': A practical method for grading the cognitive state of patients for the clinician. *Journal of Psychiatry Research*, *12*, 189–198.

Houx, P. J., Vreeling, F. W., & Jolles, J. (1991). Age-associated cognitive decline is related to biological life events. In K. Iqbal, D. R. C. McLachlan, B. Winblad, & H. M. Wisniewski (Eds.), *Alzheimer's disease: Basic mechanisms, diagnosis and therapeutic strategies* (pp. 353–359). Chichester, England: John Wiley.

Hultsch, D. F., Hammer, M., & Small, B. J. (1993). Age differences in cognitive performance in later life: Relationships to self-reported health and activity life style. *Journal of Gerontology*, *48*, P1–11.

Kempen, G. I. J. M., Ormel, J., Brilman, E. I., & Relyveld, J. (1997). Adaptive responses to chronic medical conditions: A comparative analysis of eight older patient groups. *American Journal of Public Health*, *87*, 38–44.

Poon, L. W. (1992). Toward an understanding of congitive functioning in geriatric depression. *International Psychogeriatrics*, *4*(*Suppl. 2*), 241–266.

Salthouse, T. A., Kausler, D. H., & Saults, J. S. (1990). Age, self-assessed health status, and cognition. *Journal of Gerontology*, *45*, P156–160.

Scheibel, A. B. (1996). Structural and functional changes in the aging brain. In J. E. Birren & K. W. Schaie (Eds.), *Handbook of the psychology of aging, fourth edition* (pp. 105–128). San Diego, CA: Academic Press.

Tombaugh, T. N., & McIntyre, N. J. (1992). The Mini-Mental State Examination: A comprehensive review. *Journal of the American Geriatrics Society*, *40*, 922–935.

Zeiss, A. M., Lewinsohn, P. M., Rohde, P., & Seeley, J. R. (1996). Relationship of physical disease and functional impairment to depression in older people. *Psychology and Aging*, *11*, 572–581.

Zigmond, A. S., & Snaith, R. P. (1983). The Hospital Anxiety and Depression Scale. *Acta Psychiatrica Scandinavica*, *67*, 361–370.