

University of Groningen

Perceived health status in multiple sclerosis patients

Krokavcova, Martina

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version

Publisher's PDF, also known as Version of record

Publication date:

2009

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Krokavcova, M. (2009). *Perceived health status in multiple sclerosis patients*. s.n.

Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.

Self-rated health and employment status in patients with multiple sclerosis²

Krokavcova M, Nagyova I, van Dijk JP, Rosenberger J, Gavelova M, Middel B, Szilasiova J, Gdovinova Z, Groothoff JW

²Submitted

Abstract

The aim is to explore the association between self-rated health and employment status in multiple sclerosis (MS) patients when controlling for age, gender, functional status, disease duration, anxiety and depression. 184 MS patients completed a sociodemographic questionnaire that included questions on employment status, the first item of the Short Form-36 Health Survey and the Hospital Anxiety and Depression Scale. Functional disability was assessed using the Expanded Disability Status Scale. The probability of good self-rated health in employed persons was investigated using stepwise logistic regression analyses. MS patients who reported good self-rated health were 2.46 times more likely to be employed (95% confidence interval [CI] 1.08-5.59). MS patients without anxiety were 2.64 times more likely to be employed (95%CI 1.23-5.67). Patients with higher EDSS scores were 0.49 times less likely to be employed (95%CI 0.33-0.70). Age, gender, disease duration and the presence of depression did not show an increased chance of patient employment. Patients with good self-rated health are more likely to be employed, even after adjusting for age, gender, education, functional disability, disease duration, depression and anxiety.

Introduction

Self-rated health, a subjective assessment of health status, helps predict potential poor health outcomes, mainly in the elderly and in patients with chronic diseases. Several studies have shown the predictive effect of self-rated health on mortality or survival time (1, 2). One large prospective study of healthy individuals showed that self-rated health may be an independent significant predictor for the development of coronary heart disease (3).

Multiple Sclerosis (MS) is a chronic disease with an unpredictable course characterized by recurrent periods of inflammation in the central nervous system, which are followed by diffused changes in the white and grey matter, the breakdown of myelin and damage to axons (4, 5). It is the most common cause of neurological disability in young adults. Symptoms begin between the ages 20 and 50 years in 90% of cases, and the disease strikes individuals during the peak years of their education, career development and family life, significantly impacting their ability to remain in the workforce (4, 6). A study by Nortvedt et al (2000) investigated self-rated health as a predictive factor for the development of MS. The progression of the disease in an MS patient, as measured by the Expanded Disability Status Scale, can be assessed using self-rated health determined by one question from the SF-36 and by evaluating the

change in disability at the baseline measured by EDSS one year later. Since self-rated health is a subjective measure of disease activity, it provides important additional information apart from MRI, EDSS and the relapse rate of clinical course (7).

Measures of functional disability, disease duration and clinical course all reflect health status. A higher level of functional disability and longer disease duration have negative consequences on the health of MS patients (8, 9). Among the commonly described symptoms of MS measured in our study were a depressed mood and a feeling of anxiety. MS patients may develop depression as an understandable reaction to learning that they suffer from a chronic disease and will have to live with its consequences (10, 11). Anxiety, along with a high level of distress, occurs mostly in the first years of diagnosis (12).

Chronic diseases have an enormous impact on the ability to work (13). The relationship between health and employment status has been described in a considerable number of studies, and self-rated health appears to be strongly related to employment status in patients with lower back pain, coronary heart disease and HIV (13-17). A different characterization of job loss due to chronic diseases can be found in the literature. "Unemployment status" and "non-employment status" may have two different meanings. Unemployed people are those who are not active in paid work, but who are looking for jobs and are available for work (18, 19). In contrast, non-employed people are those who are jobless and have the intention to work, but who are unable to work because of serious impairments or disabilities (18, 19).

Numerous factors may be considered when determining the ability to work among individuals with MS. The physical and cognitive functional limitations associated with MS are presumably the primary determinants of employment status in MS patients (20). With each point of increase in the functional disability score, the probability of being employed decreased by 7% when controlling for a large number of sociodemographic variables (21). Disease progression varies between disease courses in ways that could influence employment. Although there is a significant overlap of symptoms between the current clinical courses, the ability to work may vary considerably between them. Study participants with the relapsing-remitting course were found to have a higher frequency of employment than those having the primary-progressive course. An increased degree of disability is typical among individuals with the progressive course of MS (14, 20, 22).

Despite numerous studies on the ability of MS patients to work, it is still not clear whether self-rated health, as the first question in the SF-36 measure, is associated with employment status in MS patients. The direct relationship between disease variables and employment status are well known in MS (23). A similar question can then arise: Does self-rated

health play an important role in relationship to employment status? The aim of this study was to explore the association between self-rated health and employment status in MS patients when controlling for age, gender, functional status, disease duration and psychological well-being. We hypothesized that MS patients with good self-rated health are more likely to be employed when controlling for age, gender, functional disability, disease duration, depression and anxiety.

Methods

Study population

The sample consisted of MS patients from the eastern part of Slovakia. Data were collected from the winter of 2003 to the winter of 2006. MS patients from neurological outpatient clinics and members of MS clubs were included in the study. Patients underwent an interview and a physical examination. They completed several self-reported questionnaires on a voluntary and anonymous basis focusing on sociodemographic data, family life, health-related behaviour and disease history.

The procedure started by sending the questionnaires, invitation letters and a written informed consent form to the participants' homes by postal mail. After two weeks, a trained interviewer interviewed the MS patients personally in a neurologic outpatient clinic. A single neurologist then carried out a physical examination of all the patients. One additional call was made to those patients who did not come in order to arrange another examination. Exclusion criteria included: cognitive impairment determined by a Mini-Mental State Examination (MMSE) score of <24 (24); a history of psychiatric or medical conditions affecting the outcomes of the study; pregnancy; non-Slovak speaking patients.

The local Ethics Committee approved the study before its start. Each patient provided a signed informed consent form to participate in this study.

Measures

Age, gender, marital status (living alone/single or married/cohabiting), education (elementary, secondary and university) and employment status were the variables ascertained from the self-reported questionnaire. Employment status was divided into four groups: 1) employed: full time or part-time, 2) non-employed: not employed or disabled due to MS, 3) unemployed for other reasons than MS, and 4) a group consisting of students, housewives, those on maternity leave and retired persons. The study focused on the first two groups.

Self-rated health was measured using the Short Form-36 Health Survey (SF-36), which was originally designed as a generic indicator of health status for use in population surveys. The SF-36 includes eight multi-item scales used to measure the following eight dimensions: physical functioning, role limitation due to physical health, bodily pain, social functioning, general mental health (covering psychological distress and well-being), role limitations due to emotional problems, vitality and general health perceptions. In addition, one question covers the change in health status over the past year. The reason for only reporting the first item instead of a broader description of perceived health status in MS patients is that self-rated health has been widely used in health studies as an indicator of general health status because it is generally accepted as a good predictor of mortality and morbidity. Self-rated health was assessed on a 5-point scale from 1 (excellent) to 5 (bad). The score was dichotomised into "good health" (excellent, very good, and good) and "fair health" (fair and bad health) (25, 26).

Psychological well-being in MS patients was assessed using the Hospital Anxiety and Depression Scale (HADS) (27). The scale consists of 14 items, 7 of which are related to depression and 7 to anxiety. Patients responded on a 4-point scale (0=absent and 3=definitely present/severe). The scores ranged from 0 to 21, with a higher score implying that depression or anxiety is present to a larger extent. The score identifies non-cases (a score of 7 or smaller), doubtful cases (a score of 8-10), and definitive cases (a score of 11 and higher) (27, 28). Cronbach's alpha was 0.79 for depression and 0.80 for anxiety in this study.

The duration of MS, its clinical course (relapsing-remitting, secondary-progressive and primary-progressive) and functional disability (EDSS) were the MS variables obtained by the same neurologist. The Kurtzke Expanded Disability Status Scale (EDSS) is the most frequently-used measure of disability in MS patients, with disability categories ranging from 1 (least severe) to 10 (most severe) (29).

Statistical Analyses

Firstly, the sociodemographic variables, clinical variables (EDSS, disease duration, and clinical course), psychological well-being and self-rated health were described. Next, subgroups of MS patients with good and fair self-rated health were compared in sociodemographic variables, clinical variables and psychological well-being using an independent *t*-test. Finally, stepwise logistic regression analyses were used to examine the relative effect of self-rated health on employment status in MS patients when adjusting for age, gender, EDSS, disease duration and psychological well-being. Age, gender, self-rated health, EDSS, disease duration, depression and anxiety were independent variables, while employment status was

the dependent variable in these analyses. The results are reported as odds ratios, with 95% confidence intervals (95% CI).

Data were analysed using the Statistical Package for the Social Sciences, v.14.0 (SPSS; SPSS Inc., Chicago, Illinois, USA).

Results

At first, the study included 223 questionnaires, which represents a response rate of 52.0%. Older MS patients in the study sample were slightly underrepresented, and non-respondents (45.1 ± 10.5 years) were significantly older than the participants (40.5 ± 9.7 years) ($p < 0.05$). However, there were no statistically significant differences between non-respondents and participants regarding gender.

Data for 39 MS patients were not included in the analyses because the patients were unemployed for reasons other than MS ($n=16$), were full-time students ($n=13$), were housewives or women on maternity leave ($n=6$) or were on a retirement pension ($n=4$). The activities of these groups differ from the activities we evaluated as being employed, or non-employed due to MS. The study group therefore consisted of 184 MS patients (33.7% male, 66.3% female) who were employed (patients working full-time or part-time due to MS) or non-employed (not employed and disabled due to MS).

A basic description of the sample is given in Table 1 ($n=184$). The MS respondents averaged 40.5 ± 9.7 years old and consisted of more women than men (66.3% female). Of all the participants, 35.9% were employed (29.6% full time), 46.6% were not employed and disabled due to MS, and 17.5% belonged to the excluded groups. The mean EDSS score was 3.2 ± 1.4 , with a mean disease duration of 6.4 ± 5.2 years. The majority of the patients belonged to the relapsing-remitting clinical course (68.0%). Of the sample of MS patients, 78.1% (score ≤ 7) reported no depression, 48.6% (score ≤ 7) reported no anxiety, and the mean score for fair self-rated health was 3.8 ± 0.9 (Table 1).

Table 1 Description of the sample (n=184)

Variables	N (%)	M	SD	Range
Age (years)	184	40.5	9.7	18 - 61
Gender				
Male	62 (33.7%)			
Female	122 (66.3%)			
Marital status				
Living alone/single	31.5%			
Married/cohabiting	68.5%			
Education				
Elementary	27.2%			
Secondary	52.5%			
University	20.3%			
Employment status (n=223)				
Full-time employed	29.6%			
Part-time employed	6.3%			
Student	5.8%			
Housewives/maternity	2.7%			
Unemployed	7.2%			
Retired	1.8%			
Disabled	46.6%			
EDSS		3.2	1.4	1.0 - 8.5
Disease duration (years)		6.4	5.2	0.5 - 37.0
Clinical course				
Relapsing-remitting	68.0%			
Secondary-progressive	14.9%			
Primary-progressive	17.1%			
Depression		4.5	3.5	0 - 18
Not depressed ≤ 7	78.1%			
Depressed > 7	21.9%			
Anxiety		7.8	2.8	2 - 16
Not anxious ≤ 7	48.6%			
Anxious > 7	51.4%			
Self-rated health		3.8	0.9	1 - 5
Good	35.2%			1 - 3*
Fair	64.8%			4 - 5**

Note:

*Good health, 1-excellent, 2-very good, 3-good; **Fair health, 4-fair, 5-bad

EDSS, Expanded Disability Status Scale

Table 2 presents the differences in subgroups of MS patients defined by employment status with the use of an independent samples *t*-test, where continuous variables were independent variables. Younger MS patients ($p<0.001$), with lower EDSS scores ($p<0.001$), shorter disease duration ($p<0.001$), less depression ($p<0.002$) and less anxiety ($p<0.004$) were employed compared to non-employed MS patients. Elementary education was significantly associated with non-employment of MS patients ($p<0.001$), while university education was associated with employment of MS patients ($p<0.001$). Better self-rated health was reported by employed patients than by non-employed MS patients ($p<0.001$) (Table 2).

Table 2 Means and standard deviations of age, clinical variables, depression, anxiety and self-rated health differences, and numbers and percentages of sociodemographic variables by employed and non-employed MS patients (n=184)

Variables	Employment status		p - value ^a 95% CI ^b
	Employed* Means (\pm SD) or N (%)	Non-employed** Means (\pm SD) or N (%)	
Age	37.8 (\pm 8.84)	42.6 (\pm 9.75)	0.001
Gender (%)			
Male	25 (31.2%)	37 (35.6%)	-9.4 - 18.0%
Female	55 (68.8%)	67 (64.4%)	
Marital status (%)			
Married/cohabitating	51 (63.8%)	75 (72.1%)	-22.0 - 5.3%
Living alone/single	29 (36.2%)	29 (27.9%)	
Education (%)			
Elementary	8 (10.8%)	40 (38.8%)	-39.8 - 16.2%
Secondary	38 (51.4%)	55 (53.4%)	-17.0 - 12.9%
University	28 (37.8%)	8 (7.8%)	17.9 - 42.3%
EDSS	2.4 (\pm 1.07)	3.8 (\pm 1.35)	0.001
Disease duration (in years)	4.6 (\pm 4.07)	7.8 (\pm 5.65)	0.001
Depression	3.6 (\pm 3.14)	5.2 (\pm 3.70)	0.002
Anxiety	7.2 (\pm 2.80)	8.4 (\pm 2.65)	0.004
Self-rated health	1.4 (\pm 0.50)	1.8 (\pm 0.38)	0.001

Note:

EDSS, Expanded Disability Status Scale; Self-rated health, 1(excellent) to 5(bad)

^a For testing significant differences between subgroups of employed and non-employed MS patients the independent sample *t*-test was used where means for each variable are displayed; significant differences are in bold

^b Difference of proportions test (30); significant differences are in bold

* Employed, full-time or part-time employed MS patients; **Non-employed, not employed or disabled due to MS

Logistic regression analyses were used to examine the probability of good self-rated health in the employment status of MS patients. The outcomes of the stepwise logistic regression models indicated that good self-rated health was more likely to be related to employment status when adjusted for age, gender, EDSS, disease duration, depression, and anxiety. The results are presented in Table 3.

MS patients who reported good self-rated health had a 2.46 times greater chance of being employed (95% confidence interval [CI] 1.08-5.59), while patients with higher EDSS scores were less likely to be employed. The odds ratio (OR) of EDSS for employment status was 0.49 (95%CI 0.33-0.70). MS patients without anxiety had a 2.64 times greater chance of being employed (95%CI 1.23-5.67). The results of logistic regression analyses did not show that age, gender, disease duration, nor the presence of depression, increase a patient's chance of being employed (Table 3).

Table 3 The effect of self-rated health on employment status when adjusted for age, gender, functional disability, disease duration, depression and anxiety (the final table of the stepwise logistic regression)

Variables	B	Odds ratio	95% CI	p-value
Age	-0.001	1.00	0.96-1.04	0.962
Gender				
Male	-0.12	0.89	0.40-1.97	0.766
Female		1		
Self-rated health				
Good health*	0.900	2.46	1.08-5.59	0.031
Fair health**		1		
EDSS	-0.724	0.49	0.33-0.70	0.001
Disease duration	-0.076	0.93	0.84-1.02	0.112
Depression				
Depressed		1		
Not depressed	0.618	1.85	0.73-4.69	0.192
Anxiety				
Anxious		1		
Not anxious	0.972	2.64	1.23-5.67	0.012

Note:

Results were significant at: *p<.05; **p<.01; ***p<.001

Significant p-values are in bold

*Good health, 1-excellent, 2-very good, 3-good; **Fair health, 4-fair, 5-bad

EDSS, Expanded Disability Status Scale

CI, confidence intervals; B, unstandardized coefficient

Discussion

MS is accompanied by important physical, psychological and social consequences. The present study explores the relationships between self-rated health and employment status according to age, clinical variables and psychological well-being in MS patients.

The results provide support for the hypothesis that good self-rated health was significantly associated with employment status in the MS patients surveyed. The correlation coefficients between the main variables showed that low age, university education, low functional disability, short disease duration, no anxiety, no depression and good self-rated health were all related to employment status in MS patients. MS patients with good self-rated health were more likely to be employed than those who assessed their self-rated health as fair. In this sample, MS patients showed the desire to be employed, but they were not able to work because of the worsened disability caused by MS. Disorders of strength, sensation, coordination and balance, as well as visual, cognitive and effective deficits may lead to severe progressive limitations of functioning in daily life, employment status included (31). Our results are in line with the study by Rietberg et al, which showed that MS patients cannot work when they report poor self-rated health (31).

Although logistic regression analyses showed less significant associations between good self-rated health and employment status when adjusted for functional disability and disease duration, self-rated health still remains a significant indicator for being employed. The results are consistent with studies in which good health was associated with employment status in MS patients (9, 14, 32).

Following the results, self-rated health showed to be a variable more strongly associated with employment status than functional disability. Functional disability caused by MS is measured on a continuum of 0 (normal neurologic examination) to 10 (death due to MS) according to Kurtzke's EDSS score (29). It is reflected in individual physical symptoms, which may vary from patient to patient, and can be compared with outcomes of perceived health status as measured using the SF-36 questionnaire. The SF-36, with its physical and mental summary components, appears to be an appropriate means of measuring the progression of disease and functional abilities in MS patients and can be easily used by healthcare professionals.

The effect of a low level of depression on employment status was weak and was not found to be significant in our study. The absence of anxiety was associated with being employed. The risk factor of major anxiety on low work capability could be demonstrated with its negative impact on work, social and family concerns in MS patients (33). Well-

intentioned family members and employers advise people with MS to leave employment as a way of dealing with the issues of fatigue, pain and stress. Considering the consequences of premature retirement and reduced participation in general, with respect to financial security, the social network, health status and psychological well-being, it may be far more beneficial to assist MS patients who wish to continue employment by following up with coping strategies than to advise them to leave employment (34).

Since this study is based on cross-sectional data, it cannot be determined with certainty whether poor self-rated health is the reason for the inability to work. Therefore, the role of self-rated health as a predictor of employment status in a longitudinal study may be noteworthy and warrant discussion. As several studies have shown a predictive effect of self-rated health on mortality or survival time in chronic diseases (1, 2), it would be worth assessing the role of good self-rated health in predicting the future working ability in MS patients in a longitudinal study. This seems to be useful not only for the patients themselves, but also for their entire families in terms of economic status. Data gathered from MS patients, as well as family members and employers, could provide a great deal of information about the types of work accommodations that are useful and effective for employment status. MS patients with progressive clinical courses may not be able to work when poor health, low functional status and the presence of depression and anxiety could affect work and family life (20, 35). On the contrary, employment status may be a major factor for social support because of its social network supporting adaptation to physical illness. Positive social interaction is associated with better health (36).

The participating MS patients were significantly younger than the non-respondents, which can be considered as a limitation of this study. We may assume that a smaller proportion of the oldest group, probably the group with the longest disease duration, or the most affected group, did not participate. One possible consequence of this might be that outcomes regarding employment status are more related to younger MS patients than to older ones, and that the results cannot be extended and generalized to the whole MS population. MS patients in the study sample were significantly more likely to be working than older patients. We may assume then that older MS patients in the MS population have fewer chances to be employed than younger MS patients.

Regarding future research, other factors not analysed in this study, such as fatigue or cognitive dysfunctions, might also contribute to non-employment in MS patients. Performing subgroup analyses in an attempt to determine factors other than clinical variables or depression and anxiety that could contribute to non-employment in MS patients would be helpful. Furthermore, outcomes concerning the summary scales of the

SF-36, like the summary physical and summary mental scales, or even on a more detailed level the dimensions of the SF-36, such as role physical, role emotional, general mental health, etc., would be interesting to study. Scores ranging from 0 to 100 will be available that should provide the basis for further analysis.

In conclusion, this study supports to some extent existing evidence of the beneficial impact of good health on work ability in patients with MS. Our results showed that MS patients with good self-rated health are more likely to be employed, even after adjusting for age, gender, education, functional disability, disease duration, depression and anxiety. Taking these findings into account, self-rated health may be used as a quick and cheap prognostic marker which can warn about the possible loss of employment, or changes in functional disability. However, these results should be proven in a study that is longitudinal in design. MS patients without anxiety may have increased chances for working. It can be assumed that not only does the employment rate decline with worsening health related to the progression of disease, but that the network of supportive people from work needed for coping decreases as well, although this was not subject of our study. The importance of good health and maintaining employment status for patients suffering from MS could be therefore mutual.

Acknowledgements

This work was supported by the Science and Technology Assistance Agency under contract No. APVV-20-038305.

We wish to thank the people with multiple sclerosis and their neurologists who participated in this study and the interviewers for their assistance with data collection.

References

1. Idler EL, Benyamini Y (1997) Self-rated health and mortality: a review of twenty-seven community studies. *Journal of Health and Social Behavior* 38:21-37
2. Nagyova I (2005) Self-Rated Health and Quality of Life in Slovak Rheumatoid Arthritis Patients. Dissertation for the University of Groningen. Groningen, The Netherlands
3. Moller L, Kristensen TS, Hollnagel H (1996) Self rated health as a predictor of coronary heart disease in Copenhagen, Denmark. *Journal of Epidemiology and Community Health* 50:423-428

4. McKeown LP, Porter-Armstrong AP, Baxter GD (2003) The needs and experiences of caregivers of individuals with multiple sclerosis: a systematic review. *Clinical Rehabilitation* 17:234-248
5. Murray TJ (2006) Diagnosis and treatment of multiple sclerosis. *British Medical Journal* 332:525-527
6. Rudick RA (1998) A 29-year-old man with multiple sclerosis. *JAMA: Journal of the American Medical Association* 280:1432-1439
7. Nortvedt MW, Riise T, Myhr KM, Nyland HI (2000) Quality of life as a predictor for change in disability in MS. *Neurology* 55:51-54
8. Solari A, Radice D (2001) Health status of people with multiple sclerosis: a community mail survey. *Neurological Sciences* 22:307-315
9. Patti F, Cacopardo M, Palermo F, Ciancio MR, Lopes R, Restivo D, Reggio A (2003) Health-related quality of life and depression in an Italian sample of multiple sclerosis patients. *Journal of the Neurological Sciences* 211:55-62
10. Sadovnick AD, Remick RA, Allen J, Swartz E, Yee IML, Eisen K, Farquhar R, Hashimoto SA, Hooge J, Kastrukoff LF, Morrison W, Nelson J, Oger J, Paty DW (1996) Depression and multiple sclerosis. *Neurology* 46:628-632
11. Lamberg L (2001) Psychiatric symptoms common in neurological disorders. *JAMA: Journal of the American Medical Association* 286:154-156
12. Janssens C, Buljevac D, van Doorn PA, van der Meche FG, Polman CH, Passchier J, Hintzen RQ (2006) Prediction of anxiety and distress following diagnosis of multiple sclerosis: a two-year longitudinal study. *Multiple Sclerosis* 12:794-801
13. Stanton A, Revenson T, Tennen H (2007) Health psychology: psychological adjustment to chronic disease. *Annual Review of Psychology* 58:565-592
14. Verdier-Taillefer H, Sazdovitch V, Borgel F, Cesaro P, Kurtz A, Millet M, Rouillet E, Marteau R (1995) Occupational environment as risk factor for unemployment in multiple sclerosis. *Acta Neurologica Scandinavica* 92:59-62
15. Fogarty AS, Zablotska I, Rawstorne P, Prestage G, Kippax SC (2007) Factors distinguishing employed from unemployed people in the Positive Health Study. *AIDS* 21:S37-42
16. Nishi N, Makino K, Fukuda H, Tatara K (2004) Effects of socioeconomic indicators on coronary risk factors, self-rated health and psychological well-being among urban Japanese civil servants. *Social Science and Medicine* 58:1159-1170
17. Wynne-Jones G, Dunn KM, Main CJ (2008) The impact of low back pain on work: A study in primary care consultants. *European Journal of Pain* 12:180-188

18. Sleskova M (2006) Unemployment and health. Dissertation for the University of Groningen. Groningen, The Netherlands
19. Thomas C, Benzeval M, Stansfeld S (2007) Psychological distress after employment transitions: the role of subjective financial position as a mediator. *Journal of Epidemiology and Community Health* 61:48-52
20. Pompeii LA, Moon SD, McCrory DC (2005) Measures of physical and cognitive function and work status among individuals with multiple sclerosis: a review of the literature. *Journal of Occupational Rehabilitation* 15:69-84
21. Larocca N, Kalb R, Scheinberg L, Kendall P (1985) Factors associated with unemployment of patients with multiple sclerosis. *Journal of Chronic Diseases* 38:203-210
22. Jacobs LD, Wende KE, Brownscheidle CM, Apatoff B, Coyle PK, Goodman A, Gottesman MH, Granger CV, Greenberg SJ, Herbert J, Krupp L, Lava NS, Mihai C, Miller AE, Perel A, Smith CR, Snyder DH (1999) A profile of multiple sclerosis: the New York State Multiple Sclerosis Consortium. *Multiple Sclerosis* 5:369-376
23. Roessler R, Rumrill P, Fitzgerald S (2004) Predictors of Employment Status for People with Multiple Sclerosis. *Rehabilitation Counseling Bulletin* 47:96-103
24. Folstein M, Folstein SE, McHugh PR (1975) „Mini-mental state“. A practical method for grading the cognitive state of patients for the clinician. *Journal of Psychiatric Research* 12:189-198
25. Gruenewald A, Higginson I, Vivat B, Edmonds P, Burman R (2004) Quality of life measures for the palliative care of people severely affected by multiple sclerosis: a systematic review. *Multiple Sclerosis* 10:690-704
26. Ware JE, Snow KK, Kosinski M, Gandek M (1993) SF-36 Health Survey: Manual and Interpretation Guide. New England Medical Center, Boston, The Health Institute
27. Zigmond S, Snaith R (1983) The hospital anxiety and depression scale. *Acta Psychiatrica Scandinavica* 67:361-370
28. Hakim EA, Bakheit AMO, Bryant TN, Roberts MWH, McIntosh-Michaelis SA, Spackman AJ, Martin JP, McLellan DL (2000) The social impact of multiple sclerosis-a study of 305 patients and their relatives. *Disability and Rehabilitation* 22:288-293
29. Kurtzke JF (1983) Rating neurologic impairment in multiple sclerosis: an expanded disability status scale (EDSS). *Neurology* 33:1444-1452
30. Newcombe RG, Altman DG (2005) Proportions and their differences. In *Statistics with confidence*. Altman DG, Machin D, Bryant TN, Gardner MJ eds, Bristol, British Medical Journal:45-56
31. Rietberg MB, Brooks D, Uitdehaag BMJ, Kwakkel G (2005) Exercise therapy for multiple sclerosis. *Cochrane Database of Systematic Review* 1

32. Miller A, Dishon S (2006) Health-related quality of life in multiple sclerosis: The impact of disability, gender and employment status. *Quality of Life Research* 15:259-271
33. Thornton EW, Tedman S, Rigby S, Bashforth H, Young C (2006) Worries and concerns of patients with multiple sclerosis: development of an assessment scale. *Multiple Sclerosis* 12:196-203
34. Johnson KL, Amtmann D, Yorkston KM, Klasner ER, Kuehn CM (2004) Medical, psychological, social, and programmatic barriers to employment for people with multiple sclerosis. *Journal of Rehabilitation* 70:38-49
35. Patti F, Pozzilli C, Montanari E, Pappalardo A, Piazza L, Levi A, Onesti E, Pesci I (2007) Effects of education level and employment status on HRQoL in early relapsing-remitting multiple sclerosis. *Multiple Sclerosis* 13:783-791
36. Cohen S, Wills T (1985) Stress, Social Support, and The Buffering Hypothesis. *Psychological Bulletin* 98:310-357

