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RESEARCH PAPER

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

MARTINA KROKAVCOVA^{1,2}, IVETA NAGYOVA², JITSE P. VAN DIJK^{2,3},
JAROSLAV ROSENBERGER^{2,4}, MIRIAM GAVELOVA⁵, BERRIE MIDDEL^{6,7},
JARMILA SZILASIOVA¹, ZUZANA GDOVINOVA¹ & JOHAN W. GROOTHOFF³

¹Department of Neurology, Faculty of Medicine, University of P. J. Safarik, Kosice, Slovakia, ²Kosice Institute for Society and Health, University of P. J. Safarik, Kosice, Slovakia, ³Department of Social Medicine, University Medical Center Groningen, University of Groningen, the Netherlands, ⁴I. Internal Clinic, Faculty of Medicine, University of P. J. Safarik, Kosice, Slovakia, ⁵Department of Neurology, Railways Hospital, Kosice, Slovakia, ⁶Department of Health Sciences, University Medical Center Groningen, University of Groningen, the Netherlands, and ⁷Department of Oral Health and Clinical Epidemiology, University Medical Center Groningen, University of Groningen, the Netherlands

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Abstract

Purpose. The aim is to explore the association between self-rated health and employment status in patients with multiple sclerosis (MS) when controlling for age, gender, functional disability, disease duration, anxiety and depression.

Method. One hundred eighty-four people with MS 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.

Results. Patients with MS who reported good self-rated health were 2.46 times more likely to be employed (95% confidence interval [CI]: 1.08–5.59). 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.

Conclusions. Patients with MS 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. Dependent on the findings of longitudinal studies unravelling the relevant causal pathways, self-rated health might be used as a quick and cheap prognostic marker, which could warn about the possible loss of employment, or changes in functional disability.

Keywords: *Employment, multiple sclerosis, anxiety and depression*

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 characterised 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. [7] investigated self-rated health as a predictive factor for the development of MS. The progression of the disease in an patient with MS, 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. Higher levels of functional disability and longer disease duration have negative consequences on the health of patients with MS [8,9]. Among the commonly described symptoms of MS measured in our study were a depressed mood and a feeling of anxiety. Patients with MS 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 characterisation 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 people with MS [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 [16,20,22].

Despite numerous studies on the ability of patients with MS 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 patients with MS. 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 patients with MS when controlling for age, gender, functional disability, disease duration and psychological well-being. We hypothesised that patients with MS with good self-rated health when controlling for age, gender, functional disability, disease duration, depression and anxiety are more likely to be employed.

Method

Study population

The sample consisted of patients with MS from the eastern part of Slovakia. Data were collected from the winter of 2003 to the winter of 2006. Patients with MS from neurological outpatient clinics and members of MS centres 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 2 weeks, a trained interviewer interviewed the patients with MS personally in a neurologic outpatient clinic. A single neurologist then carried out a physical examination of all patients. One additional call was made to those patients who did not come 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 patients with MS 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 [25,26]. Self-rated health was assessed on a 5-point scale from 1 (excellent) to 5 (bad). 'Excellent', 'very good' and 'good' health ratings were combined into one group, and 'fair' and 'bad' ratings were considered the second group in this study for comparative purpose. This item was similarly presented for the same purpose in a previous study where the outcome was categorised as 0 (excellent, very good, good) and 1 (fair and poor) to examine 'less than good health' [27].

Psychological well-being in patients with MS was assessed using the Hospital Anxiety and Depression Scale (HADS) [28]. 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) [28,29]. 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 patients with MS, with disability categories ranging from 1 (least severe) to 10 (most severe) [30].

Statistical analyses

First, the sociodemographic variables, clinical variables (EDSS, disease duration and clinical course), psychological well-being and self-rated health were described. Next, subgroups of patients with MS 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 patients with MS 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, Chicago, IL).

Results

Initially, 223 questionnaires were collected from patients with MS eligible to participate in this study. Of these participants, 80 patients (35.9%) were employed (29.6% full-time, 6.3% part-time, receiving a salary), and 104 patients (46.6%) were disabled due to MS (receiving full state disability pension). A further, 39 patients were excluded from the analyses because these patients were unemployed for reasons other than MS ($n = 16$, receiving state unemployment benefit), were full-time students ($n = 13$, financially supported by parents), were housewives or women on maternity leave ($n = 6$, receiving social benefits) or were on a retirement pension ($n = 4$, receiving old age pension) (Figure 1). The activities of these groups differ from the activities we evaluated as being employed, or non-employed due to MS.

Whereby the final study group consisted of 184 patients with MS (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 I ($n = 184$). The respondents with MS averaged 40.5 ± 9.7 years old and consisted of more women than men (66.3% female). 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 patients with MS, 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 I).

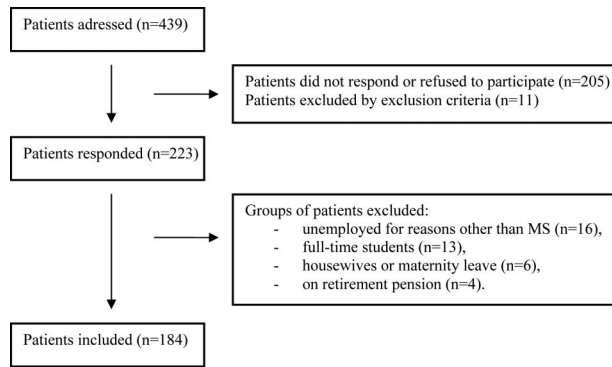


Figure 1. Process of patients exclusion from the study.

Table I. Description of the sample (n = 184).

Variable	N (%)	M	SD	Range
Age (years)	184	40.5	9.7	18–61
Gender				
Men	62 (33.7%)			
Women	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				
Full-time employed	35.9%			
Part-time employed	7.6%			
Non-employed/Disabled	56.5%			
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**

EDSS, Expanded Disability Status Scale.

*Good health: 1, excellent; 2, very good; 3, good.

**Fair health: 4, fair; 5, bad.

Regarding the overall response rate, 184 patients from the addressed 389 patients with MS represent a response rate of 47.3%. Older patients with MS in the study sample were slightly underrepresented, and non-respondents (44.9 ± 10.7 years) were significantly older than the participants (40.3 ± 9.5 years) ($p < 0.05$). However, there were no statistically significant differences between non-respondents and participants regarding gender.

Table II presents the differences in subgroups of patients with MS defined by employment status with the use of an independent samples *t*-test, where continuous variables were independent variables. Younger patients with MS ($p < 0.001$), 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 patients with MS. Elementary education was significantly associated with non-employment of patients with MS ($p < 0.001$), while university education was associated with employment of patients with MS ($p < 0.001$). Better self-rated health was reported by employed patients than by non-employed patients with MS ($p < 0.001$) (Table II).

Logistic regression analyses were used to examine the probability of good self-rated health in the employment status of patients with MS. 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 III.

Patients with MS who reported good self-rated health had a 2.46 times greater chance of being employed (95%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). Patients with MS 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 increased a patient's chance of being employed after the association of self-rated health, functional disability and anxiety with employment status had been accounted for (Table III).

Discussion

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

The results provide support for the hypothesis that patients with MS with good self-rated health were more likely to be employed than those who assessed their self-rated health as fair. Although logistic regression analyses showed less likelihood of good self-rated health with employment status when adjusted for functional disability and disease duration, self-rated health still remains associated with being unemployed. The results are similar to studies

Table II. 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 patients with MS ($n = 184$).

Variables [‡]	Employment status		<i>p</i> -Value*, 95% CI [†]
	Means (\pm SD) or <i>N</i> (%)		
	Employed [‡]	Non-employed [§]	
Age	37.8 (\pm 8.84)	42.6 (\pm 9.75)	0.001
Gender (%)			
Male	25 (31.2%)	37 (35.6%)	−9.4 to 18.0%
Female	55 (68.8%)	67 (64.4%)	
Marital status (%)			
Married/cohabitating	51 (63.8%)	75 (72.1%)	−22.0 to 5.3%
Living alone/single	29 (36.2%)	29 (27.9%)	
Education (%)			
Elementary	8 (10.8%)	40 (38.8%)	−39.8 to 16.2%
Secondary	38 (51.4%)	55 (53.4%)	−17.0 to 12.9%
University	28 (37.8%)	8 (7.8%)	17.9 to 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

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

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

[†]Difference of proportions test [31]; significant differences are in bold.

[‡]Employed, full-time or part-time employed patients with MS.

[§]Non-employed, not employed or disabled due to MS.

Table III. 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	<i>B</i>	Odds ratio	95% CI	<i>p</i> -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

EDSS, Expanded Disability Status Scale; CI, confidence intervals; *B*, unstandardised coefficient.

p-Value as an indicator of the likelihood making a type-1 error at:

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

p-Values without type-1 error are in bold.

*Good health: 1, excellent; 2, very good; 3, good.

**Fair health: 4, fair; 5, bad.

in which good health was associated with employment status in patients with MS [8,16,32]. 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 [32].

When comparing ORs, self-rated health showed a higher probability of being related to 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 [30]. 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 patients with MS and can be easily used by healthcare professionals.

A relationship between low level of depression and employment status was not evident, and there was no likelihood of depression and being employed. The absence of anxiety was related to a higher probability of 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 patients with MS [33]. Well-intentioned family members and employers advise patients 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 patients with MS 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. The observed results merely reflect associations therefore the outcomes of this cross-sectional study cannot be causally determined. Speculating about outcomes in a more causal way may imply that better self-rated health could have a more positive influence on the possibility of being employed than poor self-rated health. 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 patients with MS 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 people with MS, 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. Patients with MS 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].

There might be a possibility of response bias due to the high non-response. As a consequence, the results of this study may not be generalised to the entire MS population. Respondents did not differ statistically from non-respondents in gender, but the participating patients were significantly younger than the non-respondents, which can be considered as a limitation of this study. We may assume that older patients with MS in the MS population have fewer chances to be employed than younger patients with MS.

Regarding future research, other factors not analysed in this study, such as fatigue or cognitive dysfunctions, might also contribute to non-employment in patients with MS. Performing subgroup analyses in an attempt to determine factors other than clinical variables or depression and anxiety that could contribute to non-employment in people with MS 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, our results showed that patients with MS 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. It seems that not only the employment status associates with better health, but that the supportive connections with colleagues might be an important coping source for patients with MS as well, although this was not the subject of our study. Patients having MS with a lower score in the EDSS and without anxiety may have increased chances of working. If the results between measured variables are examined in a longitudinal study, we could take possible causal findings into account supporting the idea that self-rated health might be used as a quick and cheap prognostic marker which could warn about the possible loss of employment, or changes in functional disability, but for the moment this is mere speculation. This study supports to some extent existing evidence of the beneficial impact of good health on work ability in patients with MS. On the other hand, the direct perception of an employee with MS about the possible risk of non-employment might indicate decreasing self-rated health and worsening functional disability. Thus, this relationship could be reported the other way round. The need for a longitudinal study should be emphasised, as being employed might be shown to promote health in contrast to our results about the likelihood of good self-rated health with being employed. The importance of good health and maintaining employment status for patients suffering from MS could be therefore mutual.

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