



# Vocational activity for patients with multiple sclerosis

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## ABSTRACT

**Introduction.** Multiple sclerosis (MS) usually occurs in young adults and, due to its long-lasting course and variety of symptoms, can affect their vocational activity. Our study aimed to evaluate employment status and working activity for persons with MS with regard to disease-related factors, quality of life, and depression.

**Material and methods.** 250 subjects with MS (62 men, 188 women, aged 19–71 years, mean 42.2) responded to a survey into various aspects of their employment. Relationships were sought between work-related issues and disease-related variables [MS type and duration, major symptoms, disability level on the Expanded Disability Status Scale (EDSS)], quality of life (WHOQOL-BREF, World Health Organisation Quality of Life brief questionnaire) and depression (BDI, Beck Depression Inventory). Statistical analysis included Mann-Whitney U, Student's t, and Pearson's chi-squared tests.

**Results.** 71.2% of the patients were employed, and 49.1% perceived an impact of the disease upon their working activity (i.e. job loss, problems with finding a new one, and/or forced change of type and/or character of employment). Unemployed subjects had higher EDSS scores (4.05 vs. 2.34,  $p < 0.001$ ) and longer disease durations (13.6 vs. 9.4,  $p < 0.001$ ) than employed ones. They also scored higher on BDI (15.4 vs. 9.05,  $p < 0.001$ ) and lower in all domains of WHOQOL-BREF ( $p < 0.001$ ).

**Conclusions.** The consequences of MS negatively influence many work-related factors. Unemployment is associated with a higher frequency of depression and a lower quality of life in MS patients.

**Key words:** multiple sclerosis, disability, employment, quality of life, depression

(*Neurol Neurochir Pol* 2022; 56 (5): 435–440)

## Introduction

Multiple sclerosis (MS) is a chronic, immune-mediated disease of the central nervous system, which causes multifocal damage and accumulating disability. Due to a usual young age at onset, its long-lasting and often unpredictable course, and its variety of symptoms (motor, sensory, autonomic, cognitive etc.) [1], MS profoundly affects patients' quality of life, and has a considerable impact upon their social functioning. These issues have already been considered as a substantial outcome of the disease's management.

Among the aspects of social functioning, vocational activity is especially noteworthy. Employment provides economic stability, which determines the standard of living (including healthcare opportunities and lifestyle choices). Moreover, it is a source of satisfaction and self-esteem [2–6].

The impact of MS upon vocational issues includes absenteeism, reduced working hours, change in responsibilities, transitions of employment status, earlier retirement, and ultimately loss of work [7, 8]. Due to the disease's specificity, the percentage of people with MS who are employed is lower than for other chronic disorders [9].

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Received: 01.05.2022 Accepted: 16.08.2022

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## Clinical rationale for study

The purpose of this study was to evaluate the employment status and vocational activity of persons with MS and their relationships with disease-related factors, quality of life, and depression.

## Material and methods

The patients recruited for our study remained under the care of the Department of Neurology, University Clinical Hospital or the MS outpatient clinic in the Regional Specialist Hospital and attended follow-up visits in February, March and April 2019. Inclusion criteria comprised a diagnosis of MS (according to the McDonald criteria [10]) and a complete history of the disease documented in medical records. From a group of 302 consecutive patients, after excluding those patients with cognitive impairment who were not able to complete the questionnaire (n = 11), and after eliminating incomplete responses to the survey (n = 41), 250 MS subjects (62 men, 188 women, aged 19–71 years, mean 42.2) were included in the study.

All participants answered a self-administered questionnaire on demographic data, various aspects of employment, job characteristics, and the disease’s influence upon these. The latter section included: the subjective perception of MS as a handicap to their current job performance or the search for a new one, disclosure of the disease to the respondent’s supervisor/employer, and the availability of any work facilitation due to the disease. The World Health Organisation Quality of Life brief questionnaire (WHOQOL-BREF) [11] was used to evaluate the quality of life, and the Beck Depression Inventory (BDI) [12] was used to assess symptoms of depression. Disease-related variables (MS type and duration, major symptoms and signs, degree of disability on the Expanded

Disability Status Scale (EDSS)) [13] were established on the basis of medical records.

The local Bioethical Committee approved the study, and all the subjects provided their informed consent to participate.

MS-related variables, and the results of BDI and WHOQOL-BREF, were compared between the employed and unemployed subjects, and between those who admitted and those who denied an impact of the disease upon their working activity.

Statistical analysis included Mann-Whitney U, Student’s t, and Pearson’s chi-squared tests. The analyses were performed using Statistica ver. 13.3 (StatSoft Inc., Tulsa, OK, USA).

## Results

### Clinical and demographic characteristics

227 (90.7%) patients had relapsing-remitting and 23 (9.27%) had secondary progressive MS. The mean EDSS score was 2.84 (SD = 1.63). The most debilitating symptoms of MS reported by the patients were fatigue (73.6% of responders) and balance problems (56.8%); the detailed data is set out in Supplementary Table 1.

The main group had a university education (44.8%); detailed educational status is set out in Supplementary Table 2. 75 (30%) respondents lived in rural areas, 86 (34.4%) in towns, and 89 (35.6%) in cities.

### Employment status

178 (71.2%) patients were employed and 72 (28.8%) were not; detailed information about employment status is set out in Table 1.

Almost half of the respondents (49.1%) stated that MS and/or its treatment had had a significant impact on their working activity. Fifty subjects claimed that the disease made it difficult to find a job. Thirty-one respondents declared that

**Table 1.** Characteristics of employment in study group of MS patients

Employment status		
	Employed (n = 178)	Full time (n = 147; 82%) Part time (n = 17; 9.60%) Self-employed (n = 14; 7.70%)
	Not employed (n = 72)	Disability pension (n = 45; 62.5%) Retirement pension (n = 6; 8.3%) Unemployment (n = 20; 27.7%) Student (n = 1; 1.3%)
Duration of employment	Overall	16.6 ± 10.1 years
	After diagnosis	8.71 ± 5.81 years
Type of employment	White -collar	109 responders (61.1% of working patients)
	Manual work	33 responders (18.5% of working patients)
	Mixed work	34 responders (19.1% of working patients)
Change of workplace during last two years	Change of workplace/employer	22 responders (12.4% of working patients)
	Change of type of job	9 responders (5.1% of working patients)
	Promotion	5 responders (2.8% of working patients)

**Table 2.** Incidence of most debilitating MS symptoms with regard to perceived disease impact upon working activity

Most debilitating symptoms of MS		Do symptoms of disease or treatment influence your working activity?		$\chi^2$	$\phi$
		Yes <sup>1</sup>	No <sup>2</sup>		
Mobility problems	Yes	46.6%	18.9%	18.3**	0.30
	No	53.4%	81.1%		
Fatigue	Yes	84.5%	64.2%	11.3**	0.23
	No	15.5%	35.9%		
Pain	Yes	42.2%	22.6%	9.59 <sup>†</sup>	0.21
	No	57.8%	77.4%		
Urinary and/or bowel incontinence	Yes	20.9%	6.60%	8.55 <sup>†</sup>	0.20
	No	79.6%	93.4%		
Balance impairment	Yes	66.0%	46.2%	8.3 <sup>†</sup>	0.20
	No	34.0%	53.8%		
Speech disturbances	Yes	14.6%	6.60%	3.51	0.13
	No	85.4%	93.4%		
Tremor	Yes	21.4%	13.2%	2.43	0.11
	No	78.6%	86.8%		
Visual deficit	Yes	45.63%	37.74%	1.34	0.080
	No	54.37%	62.26%		

<sup>1</sup>N = 106; <sup>2</sup>N = 103;  $\chi^2$  — result of chi-squared test;  $\phi$  — phi coefficient; <sup>†</sup>p < 0.05; \*\*p < 0.001

the disease had forced them to change the type of job they did, and 40 (22%) said it had required them to reduce their working hours.

Out of the 36 MS subjects who had recently lost their jobs, 21 (58.3%) claimed this had been due to the disease's symptoms. MS was declared as the reason for a disability pension or unemployment by 62 subjects (82.67% of those not employed).

128 respondents (71.9% of all those employed) disclosed their disease to their employer/supervisor and 112 (67.1%) to co-workers. Among these, 63 were allowed some facilitation in their workplace (in 35 cases flexibility of work schedule, in 15 a home-office option, in 21 adaptation of the workplace to account for their disability, and in two cases, other forms of facilitation).

### Employment status and MS-related factors

Unemployed patients, compared to the employed ones, had higher EDSS scores (4.05 vs. 2.34, p < 0.001,  $\eta^2 = 0.21$ ) and longer disease durations (13.6 vs. 9.4, p < 0.001,  $\eta^2 = 0.05$ ). Those who perceived an influence of the disease on their work activity, compared to those who did not, had higher EDSS scores (2.96 vs. 2.30, p = 0.002, d = -0.44). These two subgroups also differed in the frequency of the most debilitating MS symptoms (Tab. 2).

### Employment and quality of life

Unemployed subjects, compared to employed ones, scored lower in all four domains of WHOQOL-BREF,

reaching statistical significance in all of them: physical domain (p < 0.001,  $\eta^2 = 0.14$ ), psychological domain (p < 0.001,  $\eta^2 = 0.06$ ), social relationships (p < 0.001,  $\eta^2 = 0.07$ ), and environmental domain (p < 0.005,  $\eta^2 = 0.04$ ).

Within the employed subgroup, lower scores in all WHO-QOL-BREF domains were found for those who declared an influence of the disease on their work than in those who did not (physical domain: 50.0 vs. 64.7, p < 0.001, d = 0.89; psychological domain: 61.5 vs. 71.8, p < 0.001, d = 0.61; social relationships: 64.6 vs. 72.8, p = 0.007, d = 0.38; and environmental domain: 62.8 vs. 72.0, p < 0.001, d = 0.62).

### Employment and depression

The Beck Depression Inventory results in the study group ranged from 0 to 39 (mean 10.8, SD 8.55). 19.6% of respondents were classified as having mild depression, and 25.6% as having moderate or severe depression (Tab. 3).

**Table 3.** Results of Beck Depression Inventory (BDI) in study group of MS patients

Results of BDI (pts)	Number of cases	%	
No depression	≤ 9	125	50.00
Mild depression	(9–5)	49	19.60
Moderate depression	(15–23)	45	18.00
Severe depression	> 23	19	7.60
Incomplete data		12	4.00

Unemployed patients had higher mean BDI scores than employed ones (15.4 vs. 9.05,  $p < 0.001$ ,  $\eta^2 = 0.09$ ), and the patients who declared the disease's influence on their work had higher scores than those who did not (13.0 vs. 7.53,  $p < 0.001$ ,  $d = -0.66$ ).

## Discussion

More than 70% of respondents to our survey were employed, which is a surprisingly high rate. However, the participants were recruited from regular hospital-based settings in the major cities of two regions. Employment rates in regional MS populations obtained in similar European studies have ranged from 40–80% [7, 14–17]. Data from large multicentre MS cohorts show employment rates at ca. 40% in the USA [18, 19] and over 60% in Europe [3, 20]. In a recent study based on MS registers from Poland, Germany, Sweden and the UK [21], lower employment chances were reported for Polish patients compared to the others. Inequalities and differences across countries have to be taken into account, including legal aspects, welfare benefits, social support programmes, as well as gender differences and the cultural background associated with work participation [16, 20–22]. Furthermore, the lower employment rates seen in older studies indicate recent progress in the management of MS, which allows the impact of the disease upon patients' functioning to be diminished, and also the development of socio-occupational issues with better integration of disabled people [20].

The relatively young age and high education level in the study group may be assumed to have contributed to the high employment rate [14, 19, 23]. As many as 60% of the study group reported having non-manual jobs. Although the type of job seems less relevant to the employment of MS patients than does the level of education [16], with increasing disease duration such patients tend to be employed in non-manual jobs, thus reducing the risk of losing their job [24]. Interestingly, in a Swedish MS cohort [8], most transitions of employment status were observed shortly after the diagnosis. This was supposedly due to the arrangements of the country's welfare system. In longitudinal observation of these newly diagnosed patients, there was also a trend to re-enter the labour market after ca. 4 years of follow-up, which can be attributed to young adults having completed their education and undertaking their first job [8]. Thus, relationships between MS subjects' vocational status and level of education should be considered in multiple aspects.

According to the responses from our study group, the disease not only contributed to the loss of a job or finding a new one, it also infrequently forced a change of employer, or the type of work. The main problems within the workplace environment perceived by MS patients include transport/mobility issues, architectural barriers, and temperature [2, 3]. These obstacles can often be controlled and adapted to the needs of employees, but awareness and the accessibility of the necessary

tools is often insufficient [19, 20]. Anticipated discrimination may also prevent people with MS from disclosing their disease in the workplace. However, disclosure of an MS diagnosis often turns out to be helpful in maintaining employment and accessing adequate support [9, 15, 25]. Psychosocial well-being (including self-confidence and self-efficacy) has been shown to affect substantially work productivity, and this association has been found to be even stronger for those who disclosed MS diagnosis at their workplace [26].

Around 70% of the employed respondents to our survey had disclosed their disease to an employer and/or co-workers, and half of them had indeed been provided with some amenities. These findings indicate the need to develop effective communication in this field, based on an awareness of disease specificity and psychological work-related issues [26].

Workplace-related factors are considered less relevant for vocational activity than are the consequences of the disease [9]. Unemployed MS subjects in the study group had a longer duration of disease and a higher disability level. Both factors have been considered as important and independent predictors of employment [5, 16, 25, 27, 28]. Patients with progressive types of MS are usually regarded as less likely to participate in work than those with relapsing-remitting course [5, 7, 16, 19, 24]. The vast majority of our MS subjects had RRMS, so a comparison of vocational issues between particular disease types was not possible.

Some authors [19, 25] have claimed that ineffective management of particular MS-related symptoms has a more relevant impact upon work than general disability measures. Impairment of mobility, hand dexterity, vision, balance and bladder function have indeed been considered to have a substantial impact upon work performance [3, 9, 17, 19, 29]. Our findings have shown more frequent complaints of ambulation problems, disturbed balance, pain and bladder dysfunction among those subjects who perceived an influence of the disease upon their professional activity. These symptoms belonged to those most frequently reported in the whole study group.

However, other leading complaints — fatigue and visual deficit — showed no significant relationship with the perception of MS burden at work. Fatigue and cognitive decline have been highlighted as relevant predictors of reduction in working hours, limitations to the work schedule, and earlier retirement [2, 3, 5, 7, 15, 16, 28]. The complex links between vocational status, fatigue and cognition can create what is known as a 'vicious circle' [4, 29]. This also concerns mental health issues (e.g. anxiety and depression), which either independently influence vocational activities or add to the burden of MS-related disability; but may also develop due to loss of work. Some studies [14] have reported more depressive symptoms in early retired or unemployed MS patients, while others dispute such a relationship [5]. In our study group, unemployed persons and those who observed a negative impact of MS upon their work scored higher on BDI.

Similar observations emerged from the assessment of WHOQOL-BREF results in our MS group. There is consistent evidence that work participation by MS subjects significantly affects various aspects of their quality of life. Unemployed or early retired patients score lower in general or MS-dedicated QoL scales [2, 5]. The impact of work-related issues upon quality of life has been suggested by some authors [15] as being independent of MS duration and degree of disability. Although no such multidimensional analysis was conducted in our study, this would be worth considering in a future investigation. Quality of life may be also associated with the individual situation of the MS patient, e.g. benefits from administrative status in those early retired may outweigh fear of stigmatisation or frustration in the workplace [6, 9].

Overall, evaluation of the patients' perspective on their vocational activity seems necessary if we are to take a holistic approach to disease management and outcome measures [21].

The limitations of this study are mainly associated with selection bias. The participants represented hospital-based centres from two regions, so the findings cannot be generalised for the overall Polish MS population. Furthermore, the vast majority of patients had a relapsing-remitting course of MS and relatively mild disability, factors which probably affected the employment rate and the distribution of responses. However, findings from the study group seem relevant for MS subjects with potential job productivity and may provide a better insight into relationships between MS and work-related aspects.

Today, these issues deserve special attention in view of the impact of the SARS-CoV-2 pandemic. Work-related problems due to lockdown significantly contributed to distress in MS patients [30–32], and long-term pandemic consequences in this field are likely to affect their psychosocial condition [31].

Thus these problems need to be addressed with a adequate systemic support.

### Clinical implications/future directions

The clinical symptoms of MS and the associated cumulative disability have a significantly adverse impact upon work-related aspects, something which should be considered among the outcomes of the disease. Unemployment and the perceived influence of this disease on vocational activity are associated with a higher frequency of depression and a lower quality of life in MS patients.

**Conflicts of interest:** None.

**Funding:** Financial support for this paper by Wrocław Medical University, grant no. sub.c.220.22.102.

### References

1. Przybek-Skrzypecka J, Matecka I, Członkowska A, et al. Demographic and clinical profile of patients with multiple sclerosis diagnosed over the last 30 years according to different diagnostic criteria. *Neurol Neurochir Pol.* 2020; 54(2): 169–175, doi: [10.5603/PJNNS.a2020.0027](https://doi.org/10.5603/PJNNS.a2020.0027), indexed in Pubmed: [32242912](https://pubmed.ncbi.nlm.nih.gov/32242912/).
2. Kordovski VM, Frndak SE, Fisher CS, et al. Identifying employed multiple sclerosis patients at-risk for job loss: When do negative work events pose a threat? *Mult Scler Relat Disord.* 2015; 4(5): 409–413, doi: [10.1016/j.msard.2015.07.005](https://doi.org/10.1016/j.msard.2015.07.005), indexed in Pubmed: [26346789](https://pubmed.ncbi.nlm.nih.gov/26346789/).
3. Messmer Uccelli M, Specchia C, Battaglia MA, et al. Factors that influence the employment status of people with multiple sclerosis: a multinational study. *J Neurol.* 2009; 256(12): 1989–1996, doi: [10.1007/s00415-009-5225-0](https://doi.org/10.1007/s00415-009-5225-0), indexed in Pubmed: [19582536](https://pubmed.ncbi.nlm.nih.gov/19582536/).
4. Playford ED. Work status in MS: a proxy measure for comprehensive MS management. *Mult Scler.* 2016; 22(14): 1766–1767, doi: [10.1177/1352458516681506](https://doi.org/10.1177/1352458516681506), indexed in Pubmed: [27941155](https://pubmed.ncbi.nlm.nih.gov/27941155/).
5. Marck CH, Aitken Z, Simpson S, et al. Predictors of change in employment status and associations with quality of life: a prospective international study of people with multiple sclerosis. *J Occup Rehabil.* 2020; 30(1): 105–114, doi: [10.1007/s10926-019-09850-5](https://doi.org/10.1007/s10926-019-09850-5), indexed in Pubmed: [31392475](https://pubmed.ncbi.nlm.nih.gov/31392475/).
6. Blattner C. Right to work or refusal to work: disability rights at a crossroads. *Disability & Society.* 2020; 36(9): 1375–1398, doi: [10.1080/09687599.2020.1788511](https://doi.org/10.1080/09687599.2020.1788511).
7. van der Hiele K, van Gorp DAM, Heerings MAP, et al. MS@Work Study Group. The MS@Work study: a 3-year prospective observational study on factors involved with work participation in patients with relapsing-remitting Multiple Sclerosis. *BMC Neurol.* 2015; 15: 134, doi: [10.1186/s12883-015-0375-4](https://doi.org/10.1186/s12883-015-0375-4), indexed in Pubmed: [26264389](https://pubmed.ncbi.nlm.nih.gov/26264389/).
8. Machado A, Murley C, Hillert J, et al. Sickness absence and disability pension within different employment status in multiple sclerosis. *European Journal of Public Health.* 2021; 31(Suppl. 3): ckab165.318, doi: [10.1093/eurpub/ckab165.318](https://doi.org/10.1093/eurpub/ckab165.318).
9. Simmons RD, Tribe KL, McDonald EA. Living with multiple sclerosis: longitudinal changes in employment and the importance of symptom management. *J Neurol.* 2010; 257(6): 926–936, doi: [10.1007/s00415-009-5441-7](https://doi.org/10.1007/s00415-009-5441-7), indexed in Pubmed: [20084515](https://pubmed.ncbi.nlm.nih.gov/20084515/).
10. Polman C, Reingold S, Banwell B, et al. Diagnostic criteria for multiple sclerosis: 2010 revisions to the McDonald criteria. *Ann Neurol.* 2011; 69(2): 292–302, doi: [10.1002/ana.22366](https://doi.org/10.1002/ana.22366), indexed in Pubmed: [21387374](https://pubmed.ncbi.nlm.nih.gov/21387374/).
11. World Health Organization (WHO). [https://www.who.int/classifications/icf/WHODAS2.0\\_36itemsSELF.pdf](https://www.who.int/classifications/icf/WHODAS2.0_36itemsSELF.pdf) (12.04.2022).
12. Beck AT, Ward CH, Mendelson M, et al. An inventory for measuring depression. *Arch Gen Psychiatry.* 1961; 4: 561–571, doi: [10.1001/archpsyc.1961.01710120031004](https://doi.org/10.1001/archpsyc.1961.01710120031004), indexed in Pubmed: [13688369](https://pubmed.ncbi.nlm.nih.gov/13688369/).
13. Kurtzke JF. Rating neurologic impairment in multiple sclerosis: an expanded disability status scale (EDSS). *Neurology.* 1983; 33(11): 1444–1452, doi: [10.1212/wnl.33.11.1444](https://doi.org/10.1212/wnl.33.11.1444), indexed in Pubmed: [6685237](https://pubmed.ncbi.nlm.nih.gov/6685237/).
14. Krause JS, Dismuke-Greer CE, Reed KS, et al. Employment and job benefits among those with spinal cord dysfunction: a comparison of people with spinal cord injury and multiple sclerosis. *Arch Phys Med Rehabil.* 2019; 100(10): 1932–1938, doi: [10.1016/j.apmr.2019.05.031](https://doi.org/10.1016/j.apmr.2019.05.031), indexed in Pubmed: [31247166](https://pubmed.ncbi.nlm.nih.gov/31247166/).
15. Van der Hiele K, Middelkoop HAM, Ruimschotel R, et al. A pilot study on factors involved with work participation in the early stages of multiple sclerosis. *PLoS One.* 2014; 9(8): e105673, doi: [10.1371/journal.pone.0105673](https://doi.org/10.1371/journal.pone.0105673), indexed in Pubmed: [25153710](https://pubmed.ncbi.nlm.nih.gov/25153710/).
16. Bøe Lunde HM, Telstad W, Grytten N, et al. Employment among patients with multiple sclerosis—a population study. *PLoS One.* 2014; 9(7): e103317, doi: [10.1371/journal.pone.0103317](https://doi.org/10.1371/journal.pone.0103317), indexed in Pubmed: [25054972](https://pubmed.ncbi.nlm.nih.gov/25054972/).



17. O'Connor RJ, Cano SJ, Ramió i Torrentà L, et al. Factors influencing work retention for people with multiple sclerosis: cross-sectional studies using qualitative and quantitative methods. *J Neurol*. 2005; 252(8): 892–896, doi: [10.1007/s00415-005-0765-4](https://doi.org/10.1007/s00415-005-0765-4), indexed in Pubmed: [15895310](https://pubmed.ncbi.nlm.nih.gov/15895310/).
18. Rumrill PD, Roessler RT, Li J, et al. The employment concerns of Americans with multiple sclerosis: perspectives from a national sample. *Work*. 2015; 52(4): 735–748, doi: [10.3233/WOR-152201](https://doi.org/10.3233/WOR-152201), indexed in Pubmed: [26599671](https://pubmed.ncbi.nlm.nih.gov/26599671/).
19. Julian LJ, Vella L, Vollmer T, et al. Employment in multiple sclerosis. Exiting and re-entering the work force. *J Neurol*. 2008; 255(9): 1354–1360, doi: [10.1007/s00415-008-0910-y](https://doi.org/10.1007/s00415-008-0910-y), indexed in Pubmed: [18677639](https://pubmed.ncbi.nlm.nih.gov/18677639/).
20. Fantoni-Quinton S, Kwiatkowski A, Vermersch P, et al. Impact of multiple sclerosis on employment and use of job-retention strategies: the situation in France in 2015. *J Rehabil Med*. 2016; 48(6): 535–540, doi: [10.2340/16501977-2093](https://doi.org/10.2340/16501977-2093), indexed in Pubmed: [27243419](https://pubmed.ncbi.nlm.nih.gov/27243419/).
21. Ellenberger D, Parciak T, Broła W, et al. Comparison of employment among people with Multiple Sclerosis across Europe. *Mult Scler J Exp Transl Clin*. 2022; 8(2): 20552173221090653, doi: [10.1177/20552173221090653](https://doi.org/10.1177/20552173221090653), indexed in Pubmed: [35496757](https://pubmed.ncbi.nlm.nih.gov/35496757/).
22. Trezzini B, Schuller V, Schüpbach S, et al. Environmental barriers to and facilitators of labour market participation as experienced by disabled people living in Switzerland. *Disability & Society*. 2020; 36(6): 925–951, doi: [10.1080/09687599.2020.1768053](https://doi.org/10.1080/09687599.2020.1768053).
23. Patti F, Pozzilli C, Montanari E, et al. Italian Study Group On Quality Of Life In Ms. Effects of education level and employment status on HRQoL in early relapsing-remitting multiple sclerosis. *Mult Scler*. 2007; 13(6): 783–791, doi: [10.1177/1352458506073511](https://doi.org/10.1177/1352458506073511), indexed in Pubmed: [17613607](https://pubmed.ncbi.nlm.nih.gov/17613607/).
24. Pflieger CC, Flachs EM, Koch-Henriksen N. Social consequences of multiple sclerosis (1): early pension and temporary unemployment a historical prospective cohort study. *Mult Scler*. 2010; 16(1): 121–126, doi: [10.1177/1352458509352196](https://doi.org/10.1177/1352458509352196), indexed in Pubmed: [20007430](https://pubmed.ncbi.nlm.nih.gov/20007430/).
25. Kirk-Brown AK, Van Dijk PA, Simmons RD, et al. Disclosure of diagnosis of multiple sclerosis in the workplace positively affects employment status and job tenure. *Mult Scler*. 2014; 20(7): 871–876, doi: [10.1177/1352458513513967](https://doi.org/10.1177/1352458513513967), indexed in Pubmed: [24263383](https://pubmed.ncbi.nlm.nih.gov/24263383/).
26. Bessing B, Claffin SB, Taylor BV, et al. Estimating the impact of work difficulties, work self-efficacy and work psychological safety on MS-related work productivity loss. *Mult Scler*. 2022 [Epub ahead of print]: 13524585221097573, doi: [10.1177/13524585221097573](https://doi.org/10.1177/13524585221097573), indexed in Pubmed: [35652440](https://pubmed.ncbi.nlm.nih.gov/35652440/).
27. Strober LB, Christodoulou C, Benedict RHB, et al. Unemployment in multiple sclerosis: the contribution of personality and disease. *Mult Scler*. 2012; 18(5): 647–653, doi: [10.1177/1352458511426735](https://doi.org/10.1177/1352458511426735), indexed in Pubmed: [22183935](https://pubmed.ncbi.nlm.nih.gov/22183935/).
28. Krause I, Kern S, Horntrich A, et al. Employment status in multiple sclerosis: impact of disease-specific and non-disease-specific factors. *Mult Scler*. 2013; 19(13): 1792–1799, doi: [10.1177/1352458513485655](https://doi.org/10.1177/1352458513485655), indexed in Pubmed: [23635910](https://pubmed.ncbi.nlm.nih.gov/23635910/).
29. Salter A, Thomas N, Tyry T, et al. Employment and absenteeism in working-age persons with multiple sclerosis. *J Med Econ*. 2017; 20(5): 493–502, doi: [10.1080/13696998.2016.1277229](https://doi.org/10.1080/13696998.2016.1277229), indexed in Pubmed: [28035846](https://pubmed.ncbi.nlm.nih.gov/28035846/).
30. Motolese F, Rossi M, Albergò G, et al. The psychological impact of COVID-19 pandemic on people with multiple sclerosis. *Front Neurol*. 2020; 11: 580507, doi: [10.3389/fneur.2020.580507](https://doi.org/10.3389/fneur.2020.580507), indexed in Pubmed: [33193033](https://pubmed.ncbi.nlm.nih.gov/33193033/).
31. Bishop M, Rumrill S. The employment impact of the COVID-19 pandemic on Americans with MS: preliminary analysis. *J Vocat Rehabil*. 2021; 54(1): 81–87, doi: [10.3233/jvr-201120](https://doi.org/10.3233/jvr-201120).
32. Pokryszko-Dragan A, Chojdak-Lukasiewicz J, Gruszka E, et al. Burden of COVID-19 pandemic perceived by Polish patients with multiple sclerosis. *J Clin Med*. 2021; 10(18): 4215, doi: [10.3390/jcm10184215](https://doi.org/10.3390/jcm10184215), indexed in Pubmed: [34575327](https://pubmed.ncbi.nlm.nih.gov/34575327/).