



Sense of happiness in Polish patients with multiple sclerosis

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ABSTRACT

Introduction. Happiness is crucial to patient well-being and their acceptance of their disease. The aim of this study was to assess the sense of happiness in persons with multiple sclerosis (PwMS), compare it to the level of happiness in patients with other neurological conditions, and determine which factors affect the sense of happiness in PwMS.

Material and methods. Five hundred and eighty-nine PwMS and 145 control subjects (post-stroke patients with chronic pain syndromes and neuropathies) were included in the study. Due to the differences between the groups in terms of demographic variables, an adjusted group of PwMS ($n = 145$) was selected from the entire group of PwMS. All patients were assessed using the Oxford Happiness Questionnaire (OHQ), the Satisfaction with Life Scale (SLS), and the Family APGAR Questionnaire. Based on regression analysis, the study examined which variables affected the level of happiness in the groups.

Results. Analysis of the OHQ scores showed that PwMS had a lower sense of happiness compared to the control group in the overall score [113.21 (25–42) vs. 119.88 (25–49), respectively; $p = 0.031$] and the subscales (OHQ subscale 1 — 54.52 vs. 57.84, respectively; $p = 0.027$; subscale 2 — 35.61 vs. 37.67; respectively; $p = 0.044$). Based on linear regression analysis, life satisfaction ($\beta = 0.40$; $p < 0.001$), positive orientation ($\beta = 0.32$; $p < 0.001$), and primary education ($\beta = 0.08$; $p = 0.009$) were the most significant predictors of a higher level of happiness in PwMS. Similar results were found in the control group.

Conclusions. The sense of happiness in PwMS was lower than in patients with other conditions. The most important factors influencing happiness included life satisfaction and positive orientation. Influencing these predictors should be the aim of psychological interventions, especially in patients with a reduced sense of happiness.

Keywords: multiple sclerosis, happiness, well-being, positive psychology, psychosocial interventions

(*Neurol Neurochir Pol* 2023; 57 (6): 484–491)

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Received: 21.09.2023 Accepted: 31.10.2023 Early publication date: 27.11.2023

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Introduction

Multiple sclerosis (MS) significantly affects all aspects of a patient's life and is the cause of many years of struggle with disability [1]. Given usual disease onset at a young age, and therefore little life experience, it can be assumed that persons with MS (PwMS) may be less happy compared to healthy individuals or to patients with other conditions. On the other hand, patients with sudden onset stroke or chronic pain may also have a reduced sense of happiness. PwMS struggle with psychosocial consequences, the necessity to reevaluate their life goals, work, personal life, leisure activities, and daily living. In MS, psychological consequences are significantly more frequent and severe compared to healthy individuals and those affected by other chronic diseases. Various psychological consequences, especially depression, anxiety, decreased well-being, quality of life and problems associated with social roles and relationships, have been analysed in many studies [2–8]. However, the sense of happiness in PwMS has been assessed much less frequently [9, 10]. In chronic diseases such as MS, positive mood and the sense of happiness can significantly influence attitudes toward care and treatment. Therefore, learning how it is formed in PwMS may have practical significance, particularly for developing psychological interventions.

There are various definitions of happiness in the literature. Tatarkiewicz defines happiness as “permanent, complete and justified satisfaction with life as a whole” [11], while for Kraut it is “the belief that one is getting the important things one wants, as well as certain pleasant effects that normally go along with this belief” [12]. According to Diener, happiness is “a preponderance of positive affect over negative affect with a distinct focus on the affective evaluation of one's life situation” [13]. Happiness is also conceptualised as a “positive inner experience, the highest good, and the ultimate motivator for all human behaviours” [14, 15], and as “the degree to which an individual judges the overall quality of his or her life as a whole favourably” [16]. Happiness includes emotional and cognitive elements and consists of three main elements: positive affect or joy; a high level of satisfaction; and the absence of negative feelings (depression and anxiety) [18].

Studies on happiness have approached the question from different perspectives. Personality models consider happiness to be a fixed trait, largely dependent on personality traits [19], which determines how a person responds to events rather than situations they encounter or seek out. From this perspective, there is a tendency to experience things positively, and a person enjoys pleasure because of being happy [13]. Based on life-event models, it is assumed that the level of happiness can change over time, and therefore both positive and negative events result in changes in happiness [20]. From this perspective, happiness is the sum of many small pleasures [13].

Many theories have tried to determine the causes of happiness. It can be achieved when some state, goal, or need is fulfilled [13], or through social interactions, leisure, or other activities. Happiness is also brought about by comparing some standard with the actual situation (the happier a person is, the closer the standard is to the actual status).

There are three basic views on happiness [21]. The first approach (hedonism) posits happiness as an individual balance between pleasure and dissatisfaction (wherein experiencing more pleasure means being happy). The second, known as the life-satisfaction view, identifies happiness as an attitude regarding one's own life (wherein a favourable attitude towards life means being happy). Thirdly, in the context of affective state theory, happiness is identified with an overall positive emotional state.

Research into happiness has mainly focused on identifying the mechanisms that lead to the sense of happiness and determining which personality traits they may be associated with [22]. Psychological mechanisms are important in experiencing happiness. These mechanisms include attitudes, perspectives, beliefs, self-esteem, optimism and future time perspectives [23]. When personality has been analysed, it has been determined that traits such as extraversion, being agreeable, and openness to new experiences are particularly associated with happiness [22].

The aim of our study was to assess the sense of happiness in PwMS and compare it to the levels of happiness in patients with other neurological conditions, as well as to identify factors affecting happiness in MS patients.

Material and methods

Study population and design

Five hundred and eighty-nine PwMS from nine Polish centres providing the diagnosis and treatment of MS (Białystok, Końskie, Międzyzylesie, Rzeszów, Sandomierz, Szczecin, Zabrze and two in Warsaw) were enrolled in this cross-sectional study. The clinical characteristics of the entire group of PwMS are set out in Table 1.

The inclusion criteria were: age 17–70 and clinically confirmed MS according to the 2010 or 2017 McDonald criteria [24]. The exclusion criteria were: an advanced medical condition preventing study participation such as cognitive or speech impairment, the coexistence of neoplastic diseases, and the ingestion of psychotropic drugs, including antidepressants, mood stabilisers, anxiolytics, or antipsychotics. The presence of comorbidities was verified based on the medical records. Patients with a history of psychiatric illness, or severe cardiovascular, pulmonary, haematological, or endocrine disorders were excluded from the study.

The control group comprised 145 patients (aged 18 to 70) with diseases other than MS. They were being treated in the centres participating in the study. The study subjects had a history of stroke, chronic root pain syndromes and

Table 1. Clinical characteristics of PwMS group

Variable	Patients with MS (n = 589)
Male, n (%)	157 (26.7)
Female, n (%)	432 (73.3)
Age, years, mean ± SD	
Age at survey completion	43.9 (12.83)
Age at disease onset	29.8 (8.6)
Disease duration (years, mean ± SD)	8.62 (6.69)
EDSS score	3.2 (2.1)
Disease course subtypes, n (%)	
Relapsing remitting	437 (74.2)
Secondary progressive	127 (21.6)
Primary progressive	25 (4.2)
Treatment, n (%) ^a	
Interferon beta	202 (34.3)
Glatiramer acetate	43 (7.3)
Dimethyl fumarate	226 (38.4)
Teriflunomide	52 (8.8)
Natalizumab	26 (4.4)
Fingolimod	22 (3.7)
Other (ocrelizumab, alemtuzumab, mitoxantrone)	18 (3.1)

^aTreatment data at 31 December 2020; PwMS — persons with MS; SD — standard deviation

neuropathies. Patients with dementia, comorbid depression, anxiety or a speech disorder that impaired communication were excluded from the study.

The sociodemographic and clinical data of the study subjects was collected at the beginning of the questionnaire. Demographic covariates included age, gender, education, marital status, place of residence, and financial status. All participants provided written informed consent prior to the study.

Measurements

All participants completed the following questionnaires:

1. The **Oxford Happiness Questionnaire (OHQ)** is widely used for assessing personal happiness. The OHQ was developed in 2002 by scientific research psychologists [25]. It measures the complex construct of happiness, which is composed of satisfaction with one's own life and self-assurance and personal resources conditioning it. The questionnaire has 29 self-report statements for responses on a 6-point Likert scale (the highest possible average is 6, while the lowest possible is 1). The Polish version of the OHQ consists of two subscales: general satisfaction with life, and control of life [26]. The measure has high parameters of reliability, as well as construct and criterion validity. A slightly shortened, 26-item, version of the tool is recommended for use.

2. The **Satisfaction with Life Scale (SLS)** was developed and validated by Diener et al. [27]. It is a short (5-item) instrument designed to measure global cognitive judgements of satisfaction with one's life. The scale usually requires only about one minute of a respondent's time, where respondents provide answers on a Likert scale. The questions are open to interpretation, making the scale suitable for adults with a range of backgrounds. It shows favourable psychometric properties, including high internal consistency, and is most appropriate for non-clinical populations.
3. The **Family APGAR Questionnaire** has frequently been used to assess family function [28]. Developed in 1978, it is another 5-item questionnaire (each item being rated on a 3-point scale) measuring the following five constructs: *Adaptability, Partnership, Growth, Affection* and *Resolve*. Because the questionnaire consists of only five questions, it is relatively quick to administer. This has made it the preferred choice for assessing family function and health problems in primary care and general practitioner settings.

Statistical analysis

PwMS and controls were compared in terms of demographic, clinical and outcome variables.

Data was analysed using the independent-samples approach. The two-tailed t-test was applied to examine the differences between quantitative parameters. Examination of differences between the categorical parameters was based on Pearson and Fisher's exact tests.

The test of univariate association of independent variables was performed.

All tests were two-tailed, and p-value ≤ 0.05 was considered statistically significant.

Due to the differences in terms of demographic variables (Tab. 2) between the entire group of PwMS (n = 589) and the control group (n = 145), the adjusted group of PwMS (n = 145) was matched to controls based on age, gender and education, using the Hungarian optimisation algorithm implemented in MATLAB (Mathworks. Natick, MA, USA) [29].

At the beginning of the data analysis, the reliability of the OHQ was examined by determining the Cronbach's alpha coefficient for the groups. According to the questionnaire adaptation study [30], two factors in the Polish population could be extracted from the questionnaire items (i.e. life satisfaction and the sense of power [subscale 1] and the sense of meaning and control [subscale 2]). Cronbach's alpha was also calculated for these subscales.

The normality of distribution was checked for the variables. The results showed slight deviations from normality. Therefore, the level of happiness and the OHQ subscales were compared using the Student's t-test for independent variables. Using regression analysis, we checked which variables in the entire patient group affected the level of happiness. The same analysis was repeated for the subgroups of controls and the adjusted group of PwMS.

Table 2. Demographic characteristics of patients

Variables / Group	Patients			Statistics	
	Entire group of PwMS (n = 589)	Adjusted group of PwMS (n = 145)	Controls (n = 145)	Entire group of PwMS vs. controls	Adjusted group of PwMS vs. controls
Age (years ± SD)	43.90 (12.83)	42.63 (12.68)	42.71 (11.93)	Z = -6.41; p < 0.001^a	T(274.26) = 1.52; p = 0.250 ^b
Gender, n	Female	432	97	chi ² (1) = 1.10; p = 0.295 ^c	Chi ² (1) = 3.10; p = 0.077 ^c
	Male	157	48		
Education, n	Primary	19	12	chi²(3) = 13.91; p = 0.003^c	Chi ² (1) = 5.81; p = 0.121 ^c
	Secondary	214	49		
	Higher	270	52		
	Vocational	86	32		

PwMS — persons with MS; SD — standard deviation; ^aMann-Whitney U test; ^bStudent test; ^cchi-square test; statistically significant differences in bold

Table 3. Results of intergroup comparison for level of happiness

	Adjusted group of PwMS (n = 145)	Controls (n = 145)	Parameters
OHQ subscale 1	54.54 (12)	57.84 (12.59)	T(274) = 2.23; p = 0.027
OHQ subscale 2	35.61 (8.77)	37.68 (8.19)	T(274) = 2.03; p = 0.044
OHQ overall score	113.21 (25.42)	119.88 (25.49)	T(274) = 2.17; p = 0.031

Statistically significant differences in bold

All statistical analyses were performed using SPSS Statistics 27.0 (IBM, Armonk, NY, USA).

Ethics approval

This study was approved by the Bioethics Committee of the Institute of Psychology at the University of Szczecin (KB 13/2021, 20 May, 2021) and was performed in accordance with the Declaration of Helsinki.

Results

The reliability analysis of the OHQ showed that for the entire group of PwMS and the controls, Cronbach's α was 0.96. For individual groups, α values were also high (adjusted group of PwMS, $\alpha = 0.96$; control group, $\alpha = 0.953$). The values for the subscales were as follows: subscale 1 — $\alpha = 0.91$, subscale 2 — $\alpha = 0.90$ in the PwMS group and subscale 1 — $\alpha = 0.88$, subscale 2 — $\alpha = 0.09$ in controls.

Intergroup comparisons

The Student's t-test for independent samples showed that the groups differed in their levels of happiness in terms of the OHQ overall score and the subscales. The results are set out in Table 3.

Regression analysis

Stepwise regression analysis was performed for the entire group of PwMS (n = 589) in which the predictors included age, gender, education, Family APGAR score, positive orientation score, life satisfaction, marital status, mobility, and work status.

Based on regression coefficients, life satisfaction ($\beta = 0.40$; $p < 0.001$), positive orientation ($\beta = 0.32$; $p < 0.001$), and primary education ($\beta = 0.08$; $p = 0.009$) were found to be significant predictors of the level of happiness (Tab. 4). Standardised β coefficients showed that the higher the level of life satisfaction and positive orientation a patient had, the higher the level of happiness. Primary education also contributed to a higher sense of happiness. The proposed model was a good fit to the data $F(3.644) = 179.48$ ($p < 0.001$) and explained 43% of the variance of the dependent variable ($R^2 = 0.43$).

Stepwise regression analysis was performed for the adjusted group of PwMS (n = 145) in which age, gender, education, Family APGAR score, positive orientation score, life satisfaction score, marital status, mobility and work status were also predictors. Based on the regression coefficients, life satisfaction ($\beta = 0.37$; $p < 0.001$), positive orientation ($\beta = 0.27$; $p = 0.006$), primary education ($\beta = 0.16$; $p = 0.016$), secondary education ($\beta = 0.22$; $p = 0.002$), and marital status ($\beta = 0.18$; $p = 0.01$) were found to be significant predictors of the level of happiness (Tab. 5). Primary and secondary education, and having a partner, also gave patients higher levels of happiness. The model was also a good fit to the data $F(5.120) = 20.58$ ($p < 0.001$) and explained 44% of the variance of the dependent variable ($R^2 = 0.44$).

When similar predictors were assessed, stepwise regression analysis was also performed for the control group (n = 145). Based on the regression coefficients, life satisfaction ($\beta = 0.37$; $p < 0.001$), positive orientation ($\beta = 0.27$; $p = 0.006$) and primary education ($\beta = 0.16$; $p = 0.016$) were found to be significant predictors of higher levels of happiness (Tab. 6). The model

Table 4. Stepwise linear regression results for level of happiness for entire group

Variables	B	β	p	95% CI
Life satisfaction	0.172	0.398	< 0.001	1.32–1.99
Positive orientation	0.209	0.325	< 0.001	1.24–2.06
Education (primary)	3.673	0.076	0.009	2.36–16.78
Constant	4.399		< 0.001	25.51–42.79

B — non-standardised coefficient Beta; β — standardised coefficient Beta; CI — confidence interval. Statistically significant differences in bold

Table 5. Stepwise linear regression results for level of happiness for adjusted group of PwMS

Variables	B	β	p	95% CI
Life satisfaction	1.656	0.373	< 0.001	0.81–2.51
Positive orientation	1.536	0.269	0.006	0.44–2.63
Education (primary)	21.766	0.166	0.016	4.14–39.39
Education (secondary)	11.718	0.22	0.002	4.53–18.9
Marital status	9.476	0.175	0.011	2.26–16.7
Constant	23.7		< 0.001	–0.07 to 47.47

B — non-standardised coefficient Beta; β — standardised coefficient Beta; CI — confidence interval. Statistically significant differences in bold

was also a good fit to the data $F(3,118) = 42.64$ ($p < 0.001$) and explained 51% of the variance of the dependent variable ($R^2 = 0.51$).

Discussion

Happiness is a positive concept that is crucial for maintaining health. To date, there have been only a few studies on happiness in PwMS. Information about the sense of happiness in any disease can be used in clinical practice to develop psychological support strategies to help patients become happier and think more positively about their health.

A significant percentage of PwMS develop depressive disorders that may also be related to the disease process itself [31]. The sense of happiness may decrease either as a psychological reaction to a severe disease, such as MS, or due to neuronal damage.

The level of happiness and well-being in PwMS used to be seen as unimportant in terms of PwMS quality of life. However, papers in the field of positive psychology in recent years have drawn attention to the significance of the problem and the relevance of these aspects of patient care [10, 32, 33]. Studies have found that strong predictors of happiness include social competence, self-esteem, satisfaction with relationships with close loved ones, and support providers. Additionally, research has shown that many of these relationships are significantly impaired in MS [34].

Barack and Achiron [10] found that happiness as a trait (assessed by the OHQ), life satisfaction (according to the SLS), and personal growth (based on the Personal Growth Initiative Scale) were all relatively well preserved. These studies highlighted a very important point, namely that MS did not necessarily negatively affect levels of happiness, positive

thinking, or personal development. Previously, it was thought that healthy individuals considered MS to be a ‘tragic change’, while PwMS had a completely different view of their life with the disease [35].

Both happiness and personal development are not significantly different in patients and healthy individuals. The willingness and ability to experience positive emotions during the disease process have also been reported in other chronic diseases [36]. From a psychological perspective, chronic patients or those with disability describe themselves as people who, despite their illness, cope well under extraordinary circumstances and calmly accept biological impairment and material, social and institutional obstacles [37]. Despite various limitations, mobilisation of personal, relational and environmental resources allows patients to attain high levels of mental health [36, 38, 39]. In turn, life satisfaction in MS decreases due to the real impact of the disease burden.

Our study showed that some subgroups of PwMS had a reduced sense of happiness compared to patients with other diseases, particularly those with low satisfaction and negative attitudes toward life. We demonstrated that significant predictors of the levels of happiness included life satisfaction, positive orientation and primary education. Since the study group was not very large, results related to primary education should be approached with caution.

The sense of happiness in PwMS may also be influenced by cultural or religious differences. The relationship between love of life and happiness was assessed in an Iranian PwMS population [39]. This was a descriptive cross-sectional study and the instruments included the Love of Life Scale and the self-rating scale of happiness. That study showed that love of life significantly positively correlated with happiness ($p < 0.01$). Despite the cultural differences between Polish and Iranian

PwMS, we are of the same opinion as the authors of the above study that positive excitement, life satisfaction and a lack of negative emotions such as depression and anxiety, all have a positive impact on happiness [39].

The feeling of happiness was also assessed in Bulgarian PwMS with and without comorbidities [40]. Eighty PwMS were evaluated, of whom 40 patients presented with MS alone, and 40 with MS and comorbidities. Health-related quality of life was assessed using the Short Form-36 questionnaire and the Multiple Sclerosis Quality of Life Questionnaire with 54 items. Statistically significant negative correlations were found between depression and the feeling of happiness ($R = -0.591$; $p < 0.01$). Additionally, a statistically significant difference related to the feeling of happiness was reported between the patients with MS only and those with MS and comorbidities ($p < 0.001$) [40]. That study found that MS with comorbidities had an unfavourable influence on an individual patient's feeling of happiness, which is in line with our findings.

The methodology for conducting research on happiness varies. In our study, we preferred face-to-face patient-doctor contact. Eijkholt and Sparling assessed the feeling of happiness in PwMS using online social networks and explored the differential impact of online versus face-to-face interaction on happiness [41]. By definition, such a method could help to increase social participation in PwMS by circumventing potential physical, emotional and cognitive barriers. The study focused on the analysis of responses obtained from 440 patients and assessed the relationship between honesty, anonymity and happiness in PwMS who reported using online social networks. They reported that they could be more honest in face-to-face interactions compared to online contacts, irrespective of whether they were anonymous or identifiable. Happiness was associated with honesty and authenticity in personal interactions. Eijkholt and Sparling concluded that anonymity might not improve the happiness of PwMS [41].

Our results also suggest that positive psychological interventions should be incorporated in PwMS, especially in the subgroups of patients with a reduced sense of happiness. To date, several interventions increasing happiness have been indicated [43–45].

A limitation of our study on happiness in PwMS is related to the possible influence of depressive disorders on happiness. Although our patients declared that they had not been previously treated, and did not have a depressed mood, the data, according to which 42–54% of patients develop depression in the course of MS, could suggest a possible influence of depression on study findings [46]. A similarly confounding factor may be the presence of euphoria, the prevalence of which is estimated to range widely from zero to 63% in MS patients [46]. Concerns about the impact of the above confounding factors on the results have also been expressed by other authors who have analysed the sense of happiness in MS because patients with euphoria, hypomania and dissatisfied patients may have described themselves as being in a normal mood [10].

Clinical implications/future directions

Multiple sclerosis begins at a young age and is a severe, debilitating and life-long disease that rapidly leads to significant disability. Our study found that the sense of happiness in such patients was often lower than in patients with other conditions.

However, MS does not always need to have a negative impact on the level of happiness. The most significant predictors of happiness were life satisfaction and positive orientation. Influencing these predictors should be a target for psychological interventions, particularly in patients with a reduced sense of happiness.

Article information

Data availability statement: *The data that supports the findings of this study is available from the corresponding author, W.B., upon reasonable request.*

Ethics statement: *This study was conducted according to the guidelines of the Declaration of Helsinki. This project research was authorised by the Bioethics Committee of the Institute of Psychology at the University of Szczecin (KB 13/2021, 20 May, 2021). Informed consent was obtained from all subjects involved in the study.*

Authors' contributions: *Conceptualisation: A.P. (Andrzej Potemkowski), W.B.; methodology: A.P. (Andrzej Potemkowski), W.B.; acquisition of data: W.B., M.Ż., P.S., M.S., R.R.S., Z.K., K.K.-T., A.C., J.T., B.Z.-P., K.K.-B., N.M., A.S., J.Z., H.B.-P., B.L., A.P. (Adam Perenc), M.P., A.R., M.R.; formal analysis: A.P. (Andrzej Potemkowski), W.B.; project administration: W.B., M. W. (Maciej Wilski), M. W. (Marcin Wnuk); supervision: W.B., A.K., H.B.-P., M.A.-S.; writing — original draft preparation: A.P. (Andrzej Potemkowski), W.B.; writing — review & editing: A.P. (Andrzej Potemkowski), W.B., Z.K. All authors have read and agreed to the published version of the manuscript.*

Funding: *Project financed under the programme of the Ministry of Education and Science called 'Regional Initiative of Excellence' in the years 2019–2023, project no. 024/RID/2018/19, amount of financing PLN 11,999,000,00.*

Acknowledgements: *The authors wish to thank all patients, collaborators and institutions that helped make this study possible.*

Conflicts of interest: *W.B. — received advisory board and speaker honoraria from Biogen, Roche, Novartis, Merck and BMS; M.S. — declares no conflict of interest; M. W. (Maciej Wilski) — declares no conflict of interest; M.Ż. — declares no conflict of interest; P.S. — served as a lecturer for Boehringer-Ingelheim, Ever Pharma, and travel expenses to scientific conferences covered by Ipsen and Ever Pharma; M.W. (Marcin Wnuk) — declares no conflict of interest; R.R.S. — declares no conflict of interest; K.K.-T. — received support for congress participation from Biogen, Genzyme, Roche; A.C. — received support for congress participation from Novartis, Biogen, Roche; J.T. — declares no conflict of interest; A.K. — received compensation for*

speaking and consulting services from Biogen, Bayer, Novartis, Roche, Merck, Teva, and Sanofi-Genzyme; B.Z-P. — received compensation for speaking and consulting services from Biogen, Novartis, Roche, and Merck; K.K-B. — declares no conflict of interest; N.M. — declares no conflict of interest; M.A.-S. — received compensation for speaking and consulting services from Biogen, Bayer, Novartis, Roche, Merck, Teva, Sanofi-Genzyme and BMS; A.S. — served as a lecturer and an expert at advisory boards for Allergan, Amgen, Bayer, Novartis, Biogen, Merck, Polpharma, Roche, Teva, and Eli Lilly; J.Z. — declares no conflict of interest; H.B-P. — received advisory board and speaker honoraria from Biogen, BMS, Novartis, Merck, Roche and Teva and support for congress participation from Roche and Biogen; B.L. — declares no conflict of interest; A.P. — declares no conflict of interest; M.P. — declares no conflict of interest; A.R. — declares no conflict of interest; M.R. — declares no conflict of interest; Z.K. — declares no conflict of interest; A.P. (Andrzej Potemkowski) — received support for congress participation from Biogen Poland, Novartis Poland, Roche and Merck.

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