Original article

FEELING OF HAPPINESS IN PATIENTS WITH MULTIPLE SCLEROSIS AND COMORBIDITY

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SUMMARY

Purpose: As the feeling of happiness in multiple sclerosis (MS) is not investigated in Bulgaria yet, we decided to reveal some essential features of this non-motor symptom in multiple sclerosis patients with and without comorbidity.

Material/Methods: We examined 80 MS patients, 56 females and 24 males, at a mean age of 49 years. Forty of them presented with multiple sclerosis alone, and 40 did with multiple sclerosis and accompanying diseases. Health-related quality of life was assessed by means of Short Form-36 questionnaire and Multiple Sclerosis Quality of Life Questionnaire with 54 items.

Results: We established a lower frequency of feeling of happiness reported in MS patients with comorbidity. There were statistically significant positive correlations between the health status self-assessment and MS influence upon the feeling of happiness ($R=0.428$; $p<0.01$) as well as between MS influence upon social activities and the feeling of happiness ($R=0.539$; $p<0.01$). There were statistically reliable negative correlations between depression and feeling of happiness ($R=-0.591$; $p<0.01$) as well as between health-related quality of life scores and feeling of happiness in MS patients ($R=-0,565$; $p<0,01$). There was a statistically significant difference concerning the feeling of happiness ($p<0.001$) between the patients with MS only and those with MS and comorbidity.

Conclusion: Multiple sclerosis alone and with comorbidity exerts an unfavourable influence on individual patient's feeling of happiness. The presence of this common non-motor symptom in MS patients needs more comprehensive research.

Keywords: multiple sclerosis, happiness, comorbidity

INTRODUCTION

Happiness is the first condition for health development. The people who are happy feel more secure, take decision more easily, have a more cooperative spirit, and feel more satisfied compared to the people with whom they are living [1, 2]. Happy people enjoy a stronger sense of personal control, are more likely to think about their capabilities rather than their inabilities, and cope with stress more often [3].

The International Classification of Functioning, Disability and Health [4] aims at comprehensively assessing the physical, mental and social functioning of any individual, including persons with diseases and disabilities. It stems from a relevant conceptual change leading to the evaluation of health conditions from a constructive perspective. It is based on the assumption of a dynamic interplay between individual features (body functions, activities, and participation) and environmental aspects that can facilitate or hinder the person's functioning [5]. The implementation of this model into practice is problematic, as it requires a multidisciplinary integration effort involving researchers and practitioners from the healthcare, education and policy domains [6]. Eudaimonic dimensions are predominant among the psychological definitions of happiness. In a study, inner harmony was reported by the highest percentage of participants, followed by self-actualization and personal growth [7]. This finding is consistent with previous evidence [8] and further supports the view of happiness as connectedness of the inner and relational levels [9].

Lay definitions of happiness of 2799 adults aged 30-60 years and living in urban areas of Argentina, Brazil, Croatia, Hungary, India, Italy, Mexico, New Zealand, Norway, Portugal, South Africa, and United States were explored [9]. These subjects completed the Eudaimonic and Hedonic Happiness Investigation reporting their own definition of happiness. Inner harmony predominated among psychological definitions, and family and social relationships did among contextual definitions. Relationships were widely acknowledged as basic happiness components.

The association between selective attention to emotional stimuli (i.e. emotional faces) and both the emotional and cognitive components of subjective well-being (i.e. emotional well-being and satisfaction in life) was examined in 83 individuals by means of eye-tracking methodology [3]. These emotional and cognitive components were related to a general bias to attend to happy faces and avoid sad faces. Positive emotions, rather than life satisfaction, were responsible for positive information-processing bias.

Happiness is an emotional state reflecting positive feelings and satisfaction with life, which, as an outcome in multiple sclerosis (MS) is a neglected concept in most therapeutic areas [10]. Happiness provides a reliable overview of the patient's general status over and above stand-

ard parameters for quality of life and is more wide-ranging than the narrow measures of MS activity or treatment efficacy [10].

In Bulgaria, there has been no investigation devoted to the issues of the feeling of happiness in MS patients yet.

The purpose of the present study is to reveal some essential features of this non-motor symptom in MS patients with and without comorbidity.

MATERIALS AND METHODS

Our study covered a total of 80 MS patients, 56 females and 24 males, at a mean age of 49 years. Of them, 40 patients presented with MS alone and 40 did with MS and with one to seven accompanying diseases affecting different organs and systems [11, 12].

Health-related quality of life was assessed by means of Short Form-36 (SF-36) questionnaire and Multiple Sclerosis Quality of Life Questionnaire with 54 items (MSQoL-54) [11, 12]. Patients' Expanded Disability Status Scale scores ranged from 2.0 to 2.5. The influence of MS and its comorbidity during the preceding four weeks on the feeling of happiness was assessed. Statistical data processing was performed by means of correlation analysis (Pearson's coefficient) and t-test. Statistical significance was considered at a p-value less than 0.05.

RESULTS

The frequency of feeling of happiness of all the MS patients according to sex is demonstrated in Table 1. Frequencies of the feeling of happiness of MS patients with and without comorbidity according to sex, age and EDSS scores are shown in Table 2, Table 3, and Table 4.

Table 1. Frequency of feeling of happiness of all MS patients according to sex (n=80)

Frequency of feeling of happiness	males		females		total	
	n	%	n	%	n	%
always	3	3.75	6	7.50	9	11.25
most of time	9	11.25	27	33.75	36	45.00
a good bit of time	8	10.00	14	17.50	22	27.50
some of time	3	3.75	7	8.75	10	12.50
a little of time	1	1.25	2	2.50	3	3.75
total	24	30.0	56	70.0	80	100.0

Table 2. Frequency of feeling of happiness of MS patients with and without comorbidity according to sex (n=80)

Frequency of feeling of happiness	with MS only						with MS and comorbidity					
	males		females		total		males		females		total	
	n	%	n	%	n	%	n	%	n	%	n	%
always	2	5.00	6	15.00	8	20.00	1	2.50	0	0	1	2.50
most of time	4	10.00	18	45.00	22	55.00	5	12.50	9	22.50	14	35.00
a good bit of time	1	2.50	5	12.50	6	15.00	7	17.50	9	22.50	16	40.00
some of time	1	2.50	2	5.00	3	7.50	2	5.00	5	12.50	7	17.50
a little of time	1	2.50	0	0	1	2.50	0	0	2	5.00	2	5.00
total	9	22.50	31	77.50	40	100.00	15	37.50	25	52.50	40	100.00

Table 3. Frequency of feeling of happiness in MS patients with and without comorbidity according to age (n=80)

Age groups (years)	always		most of time		a good bit of time		some of time		a little of time	
	n	%	n	%	n	%	n	%	n	%
25-35	2	2.50	8	10.00	5	6.25	1	1.25	2	2.50
36-45	2	2.50	15	18.75	9	11.25	2	2.50	0	0
46-55	4	5.00	11	13.75	6	7.50	3	3.75	0	0
56-65	1	1.25	2	2.50	2	2.50	3	3.75	1	1.25
66-75	0	0	0	0	0	0	1	1.25	0	0
total	9	11.25	36	45.00	22	27.50	10	12.50	3	3.75

Table 4. Frequency of feeling of happiness in MS patients with and without comorbidity according to EDSS scores (n=80)

EDSS scores	always		most of time		a good bit of time		some of time		a little of time	
	n	%	n	%	n	%	n	%	n	%
2.00 (n=39)	8	10.00	20	25.00	6	7.50	3	3.75	2	2.50
2.50 (n=41)	1	1.25	16	20.00	16	20.00	7	8.75	1	1.25
total (n=80)	9	11.25	36	45.00	22	27.50	10	12.50	3	3.75

It is noteworthy that no patients report that they have never felt happy at all. Two males and six females with MS only and only one male with MS and comorbidity (11.25% of all cases) felt always happy. According to SF-36 scores, 15% of patients with MS alone each but none and 20% of those with comorbidity felt happy most of the time and some of the time, respectively. According to MSQoL-54 scores, 58.06% of females with MS alone and 33.33% of those with comorbidity as well as 44.44% of males with MS alone and 36.00% of those with comorbidity felt happy most of the time (p>0.05). Only 16.25% of MS patients felt happy some of the time and a little of time.

There is a statistically significant positive correlation between the frequency of feeling of happiness and EDSS scores (Pearson's coefficient r=12.325; p=0.015).

The correlations between EDSS, the feeling of happiness, and some characteristics of MS patients, are presented in Table 5.

Table 5. Correlations between EDSS, feeling of happiness and some characteristics of MS patients (n=40)

Patient's characteristics	EDSS		happiness	
	Pearson's correlation	significance (2-tailed)	Pearson's correlation	significance (2-tailed)
gender	0.298	0.085	0.179	0.268
age	0.276	0.062	0.229	0.155
consecutive attack	0.335*	0.035	0.218	0.177
disease duration	0.247	0.124	0.269	0.094
comorbidity	0.153	0.347*	0.124	0.447*

*Correlation significance at p<0.05

There is a statistically significant positive correlation between the health status self-assessment and the influence of MS upon the feeling of happiness (R=0.428; p<0.01), as well as between the influence of MS upon social activities and the feeling of happiness (R=0.539; p<0.01). There is a statistically reliable negative correlation between depression and feeling of happiness (R=-0.591; p<0.01), as well as between health-related quality of life scores and the feeling of happiness in MS patients (R=-0.565; p<0.01). The comparison between the patients with MS only and those with MS and comorbidity by means of t-test reveals a statistically significant difference concerning the feeling of happiness (t=-3.399; p<0.001).

The accompanying diseases in 40 MS patients are listed in Table 6.

Table 6. Frequency of comorbidity in MS patients according to sex (n=40)

Comorbidity	males		females		total	
	n	%	n	%	n	%
skin disease	1	2.5	0	0.0	1	2.5
lung disease	3	7.5	2	5.0	5	12.5
cardiovascular diseases	4	10.0	5	12.5	9	22.5
gastrointestinal diseases	2	5.0	1	2.5	3	7.5
liver disease	0	0.0	1	2.5	1	2.5
endocrine disease	0	0.0	1	2.5	1	2.5
kidney disease	0	0.0	1	2.5	1	2.5
gynaecological disease	0	0.0	1	2.5	1	2.5
neurological diseases	4	10.0	3	7.5	7	17.5
psychiatric diseases	0	0.0	1	2.5	1	2.5
other diseases	0	0.0	5	12.5	5	12.5
more than one disease	1	2.5	4	10.0	5	12.5
total patients	15	37.5	25	62.5	40	100.0

The statistical results from the independent *t*-test of differences between MS patients with and without comorbidity are shown in Table 7.

Table 7. Independent *t*-test of differences between MS patients with and without comorbidity (n=40 each)

Variable	comorbidity	arithmetic mean	standard deviation	standard error
feeling of happiness	yes	2.875	0.911	0.144
	no	2.175	0.931	0.147

DISCUSSION

Recently, happiness has been monitored more extensively, with measures to raise its levels being taken as an effective means of improving patient's outcomes.

In some aspects, our results concerning the feeling of happiness in MS patients were similar to other authors' ones [7]. However, we failed to detect any investigations devoted to this particular issue in MS patients with comorbidity in the literature available.

Happiness was found to be preserved in MS patients treated with interferon-beta-1a [13]. Its dynamics was compared between MS patients treated with interferon-beta-1a and healthy subjects [14].

Feeling of happiness of a total of 141 MS patients from a large Boston teaching hospital was analyzed by means of Carol Ryff Happiness Scale within a cross-sectional study [15]. Psychosocial interrelations of fatigue and feeling of happiness were explored in 139 MS patients with a broad range of disability using this specific scale [16].

Well-being indicators were investigated among 62 MS patients, their 62 caregivers and two age- and gender-matched control groups [7] by the Positive Affect Negative Affect Schedule, the Satisfaction with Life Scale, and the Eudaimonic and Hedonic Happiness Investigation instrument in order to provide information on parti-

cipants' happiness, goals and meanings through scaled and open-ended questions contextualized within major life domains. These indicators included happiness (its definition and recent related situations), hedonic well-being (positive and negative affect, satisfaction with life) and eudaimonic well-being (perceived meaningful things and goals). Information was collected on happiness and meaningfulness levels in life in general, as well as in the specific domains of work, family, standard of living, interpersonal relations, health, personal growth, leisure, spirituality/religion, community, and society [7]. There were no relevant differences between MS patients and caregivers when compared with the respective control groups concerning happiness-associated life domains. There were no substantial differences in happiness levels in life and across most domains [7]. All participants reported the highest levels of happiness in the domains of family, health, interpersonal relations, life in general, and personal growth (with slight variations in domain order across groups). The level of happiness with health in MS patients and controls was predicted by group type (r^2=0.126; F=17.47; p<0.001) and employment status (r^2=0.048; F=7.04; p<0.01), together explaining 17.4% of the variable variance. Participants' distribution concerning psychological and family-related happiness definitions was

predicted by group type only (B=-1.27; odds ratio=0.079; Wald χ^2=22.63; p<0.001; and B=0.67; odds ratio=3.820; Wald χ^2=9.04; p<0.01, respectively) [7].

The role of access to internet resources and other determinants as enabling in-person and online social participation as well as the association between social participation and emotional health were assessed in 508 patients with relapsing/remitting or secondary/progressive MS [17]. Individuals with access to the internet were more likely to participate online with friends (odds ratio=5.47; p<0.001) and the community (odds ratio=47.7; p<0.001). Those who had regularly participated in in-person social participation with friends reported being happier (B=0.38; p<0.001), less depressed (B=-2.01; p<0.001), and less anxious (B=-1.21; p<0.001) than those who had not.

Pregnancy can be a protective factor to MS without any harmful effects on the fetus. The use of immunomodulatory therapy during pregnancy needs a careful evaluation process, and experts of this field may contribute to family happiness of the affected mother [18]. In a randomized controlled pilot study, 30 adult patients with moderate MS completed website evaluation questionnaire and interviews after 12 weeks of individualized web-based physiotherapy sessions [19]. They reported that this website was easy to make use of, convenient and motivating and that is why they would feel happy to use in the future, too.

A single patient with medication-resistant MS tremor experienced smiling, laughing, and subjective euphoria during intraoperative stimulation of the left thalamic ventralis oralis anterior border [20]. He developed a contralateral smile progressing to a bilateral smile accompanied by a feeling of subjective happiness. The smile habituated in approximately 60 seconds, and it was reproducible on a repeated stimulation.

CONCLUSION

Our results convincingly indicate the unfavourable influence of MS on individual patient's feeling of happiness that is relatively more commonly affected in MS patients with comorbidity than in those with MS alone. Further research is needed to more comprehensively elucidate the complex interactions between the presence of this non-motor symptom and the peculiarities of the clinical course and therapeutic outcomes in MS patients without and with accompanying diseases.

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