



Research Article

ISSN : 2277-3657
CODEN(USA) : IJPRPM

Dimensions of Adaptation, General Health, and life Satisfaction in Multiple Sclerosis

*Hassan Babamohamadi¹, Monir Nobahar*¹, Mohaddeseh Saffari¹, Afshin Samaei², Majid Mirmohammadkhani³*

¹ Nursing Care Research Center, Nursing Department, Faculty of Nursing and Allied Health, Semnan University of Medical Sciences, Semnan, Iran.

² Rehabilitation Research Center, Neurology Department, Kowsar Hospital, Faculty of Medicine, Semnan University of Medical Sciences, Semnan, Iran.

³ Social Determinants of Health Research Center, Community Medicine Department, School of Medicine, Semnan University of Medical Sciences, Semnan, Iran.

*Corresponding Author Email: Nobahar43@Semums.ac.ir

ABSTRACT

Introduction: Multiple Sclerosis (MS) is a debilitating disease which can affect general health and life' satisfaction. This study aimed to determine dimensions of adaptation, general health, and life satisfaction in MS patients. **Methods:** This study was a cross-sectional that samples were selected from MS patients in 2015. Data was collected by using a demographic questionnaire, Roy Adaptation Model (RAM), General Health Questionnaire (GHQ), and Satisfaction with Life Scale (SWLS) and analyzed by using of SPSS software. **Results:** Results indicated the physiological and self-concept was associated with the history of MS, while the role function was associated with marital status. In addition, physiological dimension was associated with education level and occupation. Social functioning was associated with marital status. Somatic symptoms were associated with physiological dimension and self-concept. Anxiety and depression were associated with physiological dimension, self-concept, and role function. Social dysfunction was associated with self-concept and role function. Satisfaction with life did not have any significant relationship with demographic variables, RAM, and GHQ. **Conclusion:** Finding shown that RAM, GHQ, and SWLS can be used to evaluate the health status of MS patients and to design high quality care programs. Such programs can motivate patients to engage in self-care, show better adaptation, and improve their quality of life.

Keywords: Dimensions of Adaptation; General Health; Satisfaction with Life; Multiple Sclerosis

INTRODUCTION

Multiple Sclerosis (MS) is a chronic and incurable disease (Henze, Rieckmann, Toyka, & Society, 2006). The number of people with MS in the world is estimated to be about 2.5 million (Cameron, Poel, Haselkorn, Linke, & Bourdette, 2011). In Iran, the prevalence of MS is about 5.3 to 74.28 per hundred thousand people. The ratio of disease in women compared to men is 1.8 to 3.6 (Etemadifar et al., 2013).

MS patients are among the most vulnerable groups (Edmonds, Vivat, Burman, Silber, & Higginson, 2007). They suffer from several physical and mental complications, leading to more complex clinical situations (Krupp & Rizvi, 2002). Because of the complexity of the disease, the MS patients, from the time of diagnosis, are in need of well managed and properly planned care services. To deliver a well-managed care, nurses play a major role in the assessment and implementing intervention designed for various aspects of the disease including the physical,

psychological, and social dimensions; they also support and educate patients, and take part in the evaluations and research in this field (Forbes, While, Mathes, & Griffiths, 2006).

The delivery of proper care for these patients can reduce the rate of disease recurrence, postpone the initiation of new MS lesions, and hinder in the escalation of the long-term disability (Tullman, 2013). In order to provide proper care, it is important to identify the specific needs of patients (Strupp et al., 2015). In addition, to improve medical outcomes it is necessary to ensure the continuity of care and delivery of intensive care for MS patients.

Given the importance of professional care for the patients with MS, care providers should pay special attention to different aspects of care planning for these patients (Masoudi, Abedi, Abedi, & Mohammadianinejad, 2015). As a result, to ensure the delivery of optimal care for patients and their family members at the best possible time it is necessary to understand the complex roles of the nurses in the assessment and management of care services (Maloni, 2013).

Nurses in the assessment of MS patients have concluded that the common clinical symptoms of the disease such as fatigue, depression, impaired mental function, and perceptual and cognitive impairment can reduce the perceived health of a person (Cioncoloni et al., 2014). The loss of part of identity of a person (occupation, physical functioning, habits, etc.) can cause many various personal crisis for MS patients that require ongoing adaptation (Goretti, 2010). Goretti et al. study (2010) showed that most of people with MS do not adopt efficient methods of adaptation, as a result they cannot cope with the challenges associated with the disease, and thus they have lower quality of life (Goretti, 2010). In addition, the health-related quality of life (HRQOL) in MS patients is low (Mikula et al., 2015). Physical limitations caused by the disease, such as loss of Interdependence, interrupts the social participation of the people, which in turn leads to decreased HRQOL (Mikula et al., 2015). Social participation, in turn, is associated with self-esteem, satisfaction with life, and mental health status of people and hence it is an important factor affecting HRQOL (Suzuki, Amagai, Shibata, & Tsai, 2011).

These patients are faced with uncertainty in diagnosis which creates a sense of insecurity (Krahn, 2014).

Exclusive research focused on the problems of people with MS has just started in recent years (Golla, Galushko, Pfaff, & Voltz, 2012). Although the studies previously were mainly focused on the hospital, now they are more focused on the primary care units (Strickland & Baguley, 2015). In primary care units, nurses can utilize standardized instruments to perform a careful evaluation of the patients and consequently provide patients with long term physical, mental, and emotional support.

Bio-psychosocial models are among the most authentic instruments used for the assessment of patients, and Roy adaptation model (RAM) is one of them (Roy, 2009). According to RAM, the main role of a nurse is to promote health in all life processes in order to achieve higher levels of well-being. As a result, the main goal of many nursing activities is to promote adaptation responses in each of the four dimensions of adaptation model. The four dimensions of RAM, i.e. "physiological dimension", "self-concept", "role function", and "Interdependence" and their relationship with general health and satisfaction with life in MS patients have received few attentions (Roy, 2009). As many factors may cause poor quality of life for patients, evaluation of patients' condition is very useful. The results of such assessments are important for the delivery of care for these patients.

MS can expose patients to changes in personal and family life, threaten the general health and satisfaction with life, and consequently damage the all aspects of quality of life. In addition, most of MS patients cannot cope with the problems and tensions. RAM can be used to assess these patients in terms of different dimensions of adaptation and evaluate the connection between each of its dimensions with general health and satisfaction with life. The general health and satisfaction with life are among the predictors of physical and mental health, and represent the inner well-being and attitude towards life as a whole. Therefore, this study aimed to determine dimensions of adaptation, general health, and life satisfaction in MS patients.

MATERIALS & METHODS

This study was a cross-sectional descriptive analytical study. The study population included patients with MS who referred to offices of neurology specialists in 2015. Based on the inclusion criteria, the patients who were diagnosed

with MS since at least six months ago (according to the patient's medical records) and signed a written consent were enrolled into the study. Patients who experienced stressful events during the last 6 months or died were excluded from the study.

Data collection tools included a demographic information questionnaire, Roy Adaptation Model, General Health Questionnaire and Satisfaction with Life Scale.

Demographic information questionnaire was used to collect data about age, gender, occupation, marital status, education level, and history of MS disease. Using RAM questionnaire, the patients were assessed in four following dimensions; the dimensions were rated on a five point Likert scale.

Each of these dimensions has some subclasses. The "physiological dimension" has nine subclass (circulation and oxygenation, nutrition, elimination, activity and rest, protection, senses, fluid and electrolytes, neuro, and endocrine function) and 25 questions (with a total of 25 to 125 points). The "self-concept" has five subclasses (physical perceptions, ideals, goals, moral/ethical beliefs) and 10 questions (with a total of 10 to 50 points). The "role function" has three subclasses (primary role, secondary role, and tertiary role) and eight questions (with a total of 8 to 40 points). Finally, the "autonomy and interdependence" has two subclasses (significant others, support systems) and six questions (with a total of 6 to 30 points). The questions designed for each dimension were asked from the patients, and patient's responses were scored based on the adaptive mode of care. The form used in this study had been extracted from authoritative scientific sources and its content reliability had been approved via test-retest; the correlation coefficient of the questionnaire was 0.79.

General health was assessed via the score of a patient obtained from the GHQ-28. The questionnaire is consisted of four subtests, and each of them has seven questions. The questions of each subtest are presented sequentially; accordingly, the questions from 1 to 7 are related to the "somatic symptoms" subtest, from 8 to 14 are related to the "insomnia and anxiety" subtest, from 15 to 21 are related to "social dysfunction" subtest, and from 22 to 28 are related to the "depression". This questionnaire is scored on a Likert scale; in view of that, different responses are scored as follows: "no" is scored zero, "usual" is scored one point, "more than usual" is scored two points, and "far more than usual" is scored three points. The total score was calculated through summing up the total points obtained for all the questions. A score of 0 to 27 was considered as "optimal health", from 28 to 55 was considered as "fairly good health", and from 56 to 84 was considered as "poor health". The results of previous studies on the validity of the questionnaire in different countries have shown that the reliability coefficients of GHQ-28 for different dimensions of anxiety, depression, social dysfunction, and somatic symptoms were 0.78, 0.82, 0.85, and 0.76 respectively (Narimani, 2008).

The individual's satisfaction with life was measured based on the score obtained by every participants from the SWLS. This Questionnaire is consisted of five questions, and is scored with a seven point Likert scale ranging from "strongly agree" to "strongly disagree". The scores were ranged from 5 to 35 and higher scores indicated a higher level of satisfaction with life. Internal consistency of the questionnaire was 0.85 and test-retest reliability was equal to 0.77 (Vahedi, 2010).

Data was analyzed using SPSS software version 16. We used Kolmogorov-Smirnov test, t-test, and Pearson's correlation coefficients to analyze the data. In all test, a p-value less than 0.05 was considered as significant.

Ethical Approval

Research was approved by the Ethics Committee of the Semnan University of Medical Sciences. This study was registered as No. 94/49954–July 15th, 2015, and received approval number IR.SEMUMS.REC.1394.56. We also explained the aims of research to all the participants, assured them about data confidentiality and obtained written informed consent from the patients.

RESULTS

In this study, a total of 30 female patients were assessed. The minimum age was 20 years and the maximum age was 49 years (mean 31.5 years); the minimum and maximum history of MS, were 1 and 18 years respectively (mean 5.5

years). Of all, 50% of patients had academic education, 24 patients (80%) were married and six patients (20%) were single (Table 1).

Table 1. Baseline characteristics of overall sample

Demographic Characteristic		N	%
Age, years	≤ 30	14	46.7
	>30	16	53.3
History of MS, years	≤ 5	17	56.7
	> 5	13	43.3
Education	Academic	15	50
	Non Academic	15	50
Occupation	Household	20	66.7
	Working	10	33.3
Marital status	Married	24	80
	Single	6	20

The scores obtained for different dimensions of RAM were as follow: 104.70 ± 8.29 for physiological dimension, 42.37 ± 7.10 for self-concept, 30.93 ± 5.13 for role function, and 25.00 ± 2.72 for interdependence. There was a significant relationship between demographic dimensions and physiological adaptation (p=0.012) and self-concept (p=0.020) in MS patients. In addition, there were significant relationships between marital status and role function (p=0.005), education level and physiological dimension (p=0.034), and occupation and physiological dimension (p=0.042). Age did not have a relationship with any of the dimensions. Also, the interdependence and autonomy had no significant relationship with any of the demographic variables (Table 2).

Table 2. Mean ± SD of RAM dimensions scores and demographic characteristics

Demographic	Age, years		History of MS, years			Education			Occupation		Marital status			
	≤ 30	> 30	≤ 5	> 5	P-value	Academic	Non Academic	P-value	Household	Working	P-value	Married	Single	P-value
RAM Dimensions														
Physiological	1.07 ± 7.82	1.02 ± 8.04	1.07 ± 7.30	1.00 ± 7.79	0.012	1.07 ± 6.80	1.01 ± 8.64	0.034	1.02 ± 8.61	1.09 ± 5.84	0.042	1.04 ± 7.78	1.02 ± 11.65	0.544

Self-concept	42.5 ± 8.43	42.2 5± 5.99	0.925	44.94± 4.6 2	39.0 0± 8.47	0.020	43.93± 6.89	40.8± 7.20	0.234	41.35± 7.31	44.4± 6.55	0.275	42.9 ± 6.81	38.8 ± 8.72	0.250
Role Function	29.6 4± 5.37	32.0 6± 4.80	0.204	32.35± 3.5 5	29.0 7± 6.35	0.083	32.46± 4.42	29.4± 5.48	0.103	29.85± 5.21	33.1± 4.45	0.103	31.91 ± 4.5	25.2 ± 4.65	0.005
Interdependence	24.4 2± 3.34	25.5 6± 2.03	0.265	25.52± 1.9 0	24.3 8± 3.52	0.263	25.6± 1.12	24.46 ± 3.68	0.264	24.8± 3.25	25.5± 1.17	0.518	24.91 ± 2.87	24.8 ± 1.64	0.931
Total	2.04 ± 22.4 3	2.02 ± 18.1 7	0.767	2.1 0± 13. 11	1.92 ± 23.1 6	0.012	2.09± 16.16	1.96± 21.5	0.270	1.98± 20.92	2.12± 14.92	0.081	2.04 ± 18.64	1.91 ± 24.5 3	0.173

Statistical test: t-test

The scores obtained for different dimensions of GHQ were as follow: 7.37 ± 3.18 for somatic symptoms, 6.40 ± 3.59 for insomnia and anxiety, 9.50 ± 4.25 for social dysfunction, and 4.33 ± 4.99 for depression. The total general health score was 27.60 ± 9.09 . The results of evaluation of the relationship between general health and demographic data showed that only marital status was associated with social dysfunction ($p=0.014$) (Table 3).

Table 3. Mean \pm SD of GHQ dimensions scores and demographic characteristics

Demographic	Age, years		History of MS, years			Education		Occupation		Marital status		P-value			
	≤ 30	> 30	P-value	≤ 5	> 5	P-value	Academic	Non Academic	P-value	Household	Working		P-value	Married	Single
Somatic symptoms	6.28 ± 3.07	8.31 ± 3.07	0.082	7.2 9± 3.6 0	7.4 6± 2.6 9	0.890	6.4± 2.99	8.33± 3.17	0.097	8.15± 3.28	5.8± 2.44	0.055	7.20± 3.29	7.6 ± 3.04	0.809
Anxiety & Insomnia	6± 3.32	6.75 ± 3.89	0.578	5.6 4± 3.7 0	7.3 8± 3.3 3	0.195	6.06± 3.84	6.7± 3.43	0.620	7.3± 3.61	4.6± 2.95	0.051	6.62± 3.60	6.2 ± 3.70	0.813
Social dysfunction	8.14 ± 4.11	10.6 8± 4.14	0.103	10.47± 5.0 1	8.2 3± 2.6 8	0.157	9.4± 4.76	9.6± 3.85	0.900	9.7± 3.67	9.1± 5.44	0.723	9.91± 3.57	5.4 ± 2.88	0.014

Depression	4.42 ± 5.28	4.25 ± 4.89	0.924	3.5 8± 4.3 8	5.3 ± 5.7 2	0.359	3.6± 5.64	5.06± 4.31	0.431	4.65± 4.88	3.7± 5.41	0.632	3.95± 4.65	7± 6.44	0.223
Total	24.8 5± 8.42	30± 9.24	0.124	27± 9.6 9	28 ± 8.5 7	0.687	25.46± 9.27	29.73± 8.70	0.204	29.8± 9.19	23.2± 7.48	0.060	27.7± 9.11	26.2 ± 10.7 5	0.746

Statistical test: t-test

The evaluation of the relationship between different dimensions of RAM and GHQ showed that somatic symptoms were associated with physiological dimensions ($p=0.000$) and self-concept ($p=0.049$). Anxiety was associated with physiological dimensions ($p=0.000$), self-concept ($p=0.000$), and role function ($p=0.004$). Social dysfunction was associated with self-concept ($p=0.002$) and role function ($p=0.002$). In addition, depression was associated with physiological dimension ($p=0.002$), self-concept ($p=0.000$), and role function ($p=0.000$) (Table 4).

Table 4. Relationships between different dimensions of Roy adaptation model and general health

RAM Dimensions	Physiologic		Self-concept		Role-function		Interdependence		Total	
	r	p	r	p	r	p	r	p	r	p
GHQ Dimensions										
Somatic symptoms	- 0.64	0.000	- 0.36	0.049	- 0.32	0.082	0.10	0.580	- 0.46	0.009
Anxiety & Insomnia	- 0.68	0.000	- 0.71	0.000	- 0.50	0.004	- 0.34	0.059	- 0.71	0.000
Social dysfunction	0.33	0.071	0.53	0.002	0.54	0.002	0.35	0.057	0.51	0.003
Depression	- 0.53	0.002	- 0.79	0.000	- 0.60	0.000	- 0.29	0.109	- 0.70	0.000
Total	- 0.63	0.000	- 0.59	0.001	- 0.39	0.031	- 0.10	0.597	- 0.58	0.001

Statistical test: Pearson's correlation coefficients

r: correlation coefficients

P: p-value

The score of patients' satisfaction with life was 23.07 ± 7.65 . Satisfaction with life did not have any significant relationship with demographic variables, RAM, and GHQ.

DISCUSSION

This study showed that MS patients were faced with some challenges in four different dimensions of RAM. Their health status was fairly favorable. But, they had high levels of satisfaction with life. The results of Pittock et al. study (2004) showed that, despite the presences of some defects and somatic symptoms, MS patients had a good quality of life (Pittock et al., 2004).

The results showed that somatic symptoms were associated with physiological dimension and self-concept. Pyramidal system dysfunction is the most important mental factor which contributes in the perception of poor physical health (Cioncoloni et al., 2014). Given the high speed of the disease progress, based on Maslow's hierarchy of needs, the patients' needs varies from their concerns about self-concept in the individual development level to concerns about their physical needs (Kenrick, Griskevicius, Neuberg, & Schaller, 2010). Physical, psychological, and mental dysfunctions can reduce the physical and mental performance of patients and reduce their social participation (Cioncoloni et al., 2014). The extent of patients' physical disability is significantly associated with their physical condition (Mikula et al., 2014), can cause a wide range of unmet needs in the patients (Galushko et al., 2014). The abilities of people with MS are severely affected, reduced, or changed by the disease while they did not expect such changes (Galushko et al., 2014).

The results showed that anxiety was associated with physiological dimension, self-concept, and role function. Patients' lack of knowledge and information about the disease, and their low self-concept, and low life expectancy could lead to inefficient management and makes them vulnerable. It can also increase their anxiety, depression, and sorrow. According to previous studies, 29% of the needs of the patients are physical and 19% are mental, social, and adaptive needs (Goretti, 2010). Functional, behavioral, and mental disorders and lack of information about the functional impairments in MS patients are associated with a lack of well-being (Sherman et al., 2007). Some variables such as the duration and severity of the disease are associated with reduced well-being (Ryan et al., 2007). Low awareness of functional limitations may increase patients' needs for support for activities previously performed independently. The two factors of social support and lack of awareness of defects are associated with positive well-being (Ryan et al., 2007), and would help to reduce anxiety (Sherman et al., 2007).

The results showed that social dysfunction was associated with self-concept and role function. MS is a disease that not only affects physical dimensions, but also limits the social life of patients. People with MS experience various social complications which can affect various aspects of their life. The five main categories of social complications are "coping with stigma", "outcome of stigma", "paying attention to stigma", "disruption of life", and "concerns about work" (Abolhassani, Yazdannik, Taleghani, & Zamani, 2015). Social participation is an important factor that depends entirely on the patient's psychological condition (Mikula et al., 2015). According to Galushko et al. (2014) it is very important for patients to receive support from friends and family members through increased contacts and increased understanding of the consequences of disability (Galushko et al., 2014). It is critical for patients to think they are supported, but their expectations are usually unmet. Understanding the importance of social support and positive self-concept can protect MS patients from depression.

The results showed that depression was associated with physiological dimension, self-concept, and role function. MS patients suffer from symptoms of psychological distress, especially depression, which is closely related to the factors associated with the disease. The prevalence of depressive symptoms in these patients is 46% (Forman & Lincoln, 2010). With increasing the complication of MS disease, patients' needs for psycho-social support also increases. According to the results of Mikula et al. study (2014) stopping undesirable feelings and thoughts is the most important method of adaptation in patients with MS (Mikula et al., 2014).

The results showed that patients' history of MS was associated with their physiological dimension and self-concept. Psychological complications in MS patients are closely associated with age of onset of the disease and the extent of disability caused by MS (Hyphantis et al., 2008). In addition, hostility, non adaptive defense, and poor self-concept were closely associated with various forms of mental disorders, especially depression symptoms (Hyphantis et al., 2008). Symptoms of depression are the most important indicators which are highly associated with a reduction in patients' self-concept of mental health (Kirchner & Lara, 2011). It seems that patients with MS may reach adaptation through an emphasis on stopping the negative emotions and thoughts (Mikula et al., 2014). Therefore, patients, caregivers, and physicians should be trained about this type of adaptation and its positive effects on the mental condition of the patients (Mikula et al., 2014).

The results showed that the marital status of the patients was associated with role function and social functioning. Level of education and occupation were also associated with physiological dimension. People with this illness suffer from the stigma of the disease and occupational and marital problems which are caused due to inaccurate information about MS. Health care workers can provide appropriate information about MS and present them to the

patients and their family members to minimize their social problems (Abolhassani et al., 2015). The losses caused by the illness lead to a reduced level of social communication and collaboration and consequently lead the patients to focus more on the basic needs (Galushko et al., 2014). There is a strong association between unemployment and quality of life and individual factors (Mikula et al., 2015). Job support for patients and their families and friends can reduce such deprivations (Meier, Bodenmann, Mörgeli, & Jenewein, 2011).

The results showed that the dimension of interdependence was not associated with any of the demographic variables. Functional limitations caused by the disease can lead to a reduction in individual autonomy, job loss, and burnout; as a result they can disrupt the social performance of an individual. Patients with MS have lower levels of interdependence, are less able to solve problems, and receive less social and emotional support (Kirchner & Lara, 2011). MS patients have problems such as weakness, difficulty walking, and unsteadiness that can cause problems in their role functions and can motivate them to become dependent on family members and caregivers (Hemmati Maslakkpak & Raiesi, 2014). The MS patients need to accept individual changes and try to find their own meaning of life (Galushko et al., 2014).

The findings showed that people with MS had high levels of satisfaction with life. Satisfaction with life was not associated with demographic variables, RAM, and general health dimensions. Ryan et al. (2007) argue that neuropsychiatric disorders have a reverse relationship with satisfaction with life and quality of life (Ryan et al., 2007). According to Cioncoloni et al. (2014) individual factors were not directly related to the dysfunctions caused by the disease (Cioncoloni et al., 2014).

One of the limitations of this study was the small sample size. Furthermore, all participants in this study were female. To design and implement better programs for the patients with MS, it is necessary to assess the effects of different adaptation strategies on the quality of life of people with MS.

CONCLUSION

The results of this study provided valuable information for planning and practical interventions provided to patients with MS. RAM, GHQ, and SWLS can be used to evaluate the health status of people with MS, and the results can be used to design high quality care programs. Such programs can motivate patients to engage in self-care, show better adaptation, and improve their quality of life. It can also help nurses to make better decisions about treatment and care services.

ACKNOWLEDGEMENTS

The authors of this paper would like to express their thanks to the Deputy of Research and Technology in Semnan University of Medical Sciences and the other colleagues who made it possible to carry out this research. The research team would also like to thank people who expressed their valuable comments openly.

REFERENCES

- Abolhassani, S., Yazdannik, A., Taleghani, F., & Zamani, A. (2015). Social aspects of multiple sclerosis for Iranian individuals. *Disabil Rehabil*, 37(4), 319-326. doi: 10.3109/09638288.2014.918192
- Cameron, M. H., Poel, A. J., Haselkorn, J. K., Linke, A., & Bourdette, D. (2011). Falls requiring medical attention among veterans with multiple sclerosis: a cohort study. *J Rehabil Res Dev*, 48(1), 13-20.
- Cioncoloni, D., Innocenti, I., Bartalini, S., Santarnecchi, E., Rossi, S., Rossi, A., & Ulivelli, M. (2014). Individual factors enhance poor health-related quality of life outcome in multiple sclerosis patients. Significance of predictive determinants. *J Neurol Sci*, 345(1-2), 213-219. doi: 10.1016/j.jns.2014.07.050
- Edmonds, P., Vivat, B., Burman, R., Silber, E., & Higginson, I. J. (2007). Loss and change: experiences of people severely affected by multiple sclerosis. *Palliat Med*, 21(2), 101-107. doi: 10.1177/0269216307076333

- Etemadifar, M., Sajjadi, S., Nasr, Z., Firoozeei, T. S., Abtahi, S. H., Akbari, M., & Fereidan-Esfahani, M. (2013). Epidemiology of multiple sclerosis in Iran: a systematic review. *Eur Neurol*, 70(5-6), 356-363. doi: 10.1159/000355140
- Forbes, A., While, A., Mathes, L., & Griffiths, P. (2006). Evaluation of a MS specialist nurse programme. *Int J Nurs Stud*, 43(8), 985-1000. doi: 10.1016/j.ijnurstu.2005.11.019
- Forman, A. C., & Lincoln, N. B. (2010). Evaluation of an adjustment group for people with multiple sclerosis: a pilot randomized controlled trial. *Clin Rehabil*, 24(3), 211-221. doi: 10.1177/0269215509343492
- Galushko, M., Golla, H., Strupp, J., Karbach, U., Kaiser, C., Ernstmann, N., . . . Voltz, R. (2014). Unmet needs of patients feeling severely affected by multiple sclerosis in Germany: a qualitative study. *J Palliat Med*, 17(3), 274-281. doi: 10.1089/jpm.2013.0497
- Golla, H., Galushko, M., Pfaff, H., & Voltz, R. (2012). Unmet needs of severely affected multiple sclerosis patients: the health professionals' view. *Palliat Med*, 26(2), 139-151. doi: 10.1177/0269216311401465
- Goretti, B. P., E. Zipoli, V. Razzolini, L. Amato, M. P. (2010). Coping strategies, cognitive impairment, psychological variables and their relationship with quality of life in multiple sclerosis. *Neurological sciences*, 31(2), 227-230.
- Hemmati Maslakpak, M., & Raiesi, Z. (2014). Effect of a self-management and follow-up program on self-efficacy in patients with multiple sclerosis: a randomized clinical trial. *Nurs Midwifery Stud*, 3(4), e25661.
- Henze, T., Rieckmann, P., Toyka, K. V., & Society, M. S. T. C. G. o. t. G. M. S. (2006). Symptomatic treatment of multiple sclerosis. Multiple Sclerosis Therapy Consensus Group (MSTCG) of the German Multiple Sclerosis Society. *Eur Neurol*, 56(2), 78-105. doi: 10.1159/000095699
- Hyphantis, T. N., Christou, K., Kontoudaki, S., Mantas, C., Papamichael, G., Goulia, P., . . . Mavreas, V. (2008). Disability status, disease parameters, defense styles, and ego strength associated with psychiatric complications of multiple sclerosis. *Int J Psychiatry Med*, 38(3), 307-327.
- Kenrick, D. T., Giskevicius, V., Neuberg, S. L., & Schaller, M. (2010). Renovating the Pyramid of Needs: Contemporary Extensions Built Upon Ancient Foundations. *Perspect Psychol Sci*, 5(3), 292-314. doi: 10.1177/1745691610369469
- Kirchner, T., & Lara, S. (2011). Stress and depression symptoms in patients with multiple sclerosis: the mediating role of the loss of social functioning. *Acta Neurol Scand*, 123(6), 407-413. doi: 10.1111/j.1600-0404.2010.01422.x
- Krahn, T. M. (2014). Care ethics for guiding the process of multiple sclerosis diagnosis. *J Med Ethics*, 40(12), 802-806. doi: 10.1136/medethics-2011-100063
- Krupp, L. B., & Rizvi, S. A. (2002). Symptomatic therapy for underrecognized manifestations of multiple sclerosis. *Neurology*, 58(8 Suppl 4), S32-39.
- Maloni, H. W. (2013). Multiple sclerosis: managing patients in primary care. *Nurse Pract*, 38(4), 24-35; quiz 35-26. doi: 10.1097/01.NPR.0000427606.09444.c6
- Masoudi, R., Abedi, H., Abedi, P., & Mohammadianinejad, S. E. (2015). The perspectives of Iranian patients with multiple sclerosis on continuity of care: a qualitative study. *J Nurs Res*, 23(2), 145-152. doi: 10.1097/JNR.0000000000000070
- Meier, C., Bodenmann, G., Mörgeli, H., & Jenewein, J. (2011). Dyadic coping, quality of life, and psychological distress among chronic obstructive pulmonary disease patients and their partners. *Int J Chron Obstruct Pulmon Dis*, 6, 583-596. doi: 10.2147/COPD.S24508

- Mikula, P., Nagyova, I., Krokavcova, M., Vitkova, M., Rosenberger, J., Szilasiova, J., . . . van Dijk, J. P. (2014). Coping and its importance for quality of life in patients with multiple sclerosis. *Disabil Rehabil*, 36(9), 732-736. doi: 10.3109/09638288.2013.808274
- Mikula, P., Nagyova, I., Krokavcova, M., Vitkova, M., Rosenberger, J., Szilasiova, J., . . . van Dijk, J. P. (2015). Social participation and health-related quality of life in people with multiple sclerosis. *Disabil Health J*, 8(1), 29-34. doi: 10.1016/j.dhjo.2014.07.002
- Narimani, M. R. I., S. (2008). A survey of relationship between coping styles and mental health in patients undergoing hemodialytic treatment. *J Fund Ment Health*, 10(38), 117-122.
- Pittock, S. J., Mayr, W. T., McClelland, R. L., Jorgensen, N. W., Weigand, S. D., Noseworthy, J. H., & Rodriguez, M. (2004). Quality of life is favorable for most patients with multiple sclerosis: a population-based cohort study. *Arch Neurol*, 61(5), 679-686. doi: 10.1001/archneur.61.5.679
- Roy, S. C. (2009). *The Roy adaptation model*. Upper Saddle River, NJ: Pearson.
- Ryan, K. A., Rapport, L. J., Sherman, T. E., Hanks, R. A., Lisak, R., & Khan, O. (2007). Predictors of subjective well-being among individuals with multiple sclerosis. *Clin Neuropsychol*, 21(2), 239-262. doi: 10.1080/13854040600582460
- Sherman, T. E., Rapport, L. J., Hanks, R. A., Ryan, K. A., Keenan, P. A., Khan, O., & Lisak, R. P. (2007). Predictors of well-being among significant others of persons with multiple sclerosis. *Mult Scler*, 13(2), 238-249. doi: 10.1177/1352458506070754
- Strickland, K., & Baguley, F. (2015). The role of the community nurse in care provision for people with multiple sclerosis. *Br J Community Nurs*, 20(1), 6-10. doi: 10.12968/bjcn.2015.20.1.6
- Strupp, J., Golla, H., Galushko, M., Buecken, R., Ernstmann, N., Hahn, M., . . . Voltz, R. (2015). Self-rating makes the difference: identifying palliative care needs of patients feeling severely affected by multiple sclerosis. *Palliat Support Care*, 13(3), 733-740. doi: 10.1017/S1478951514000510
- Suzuki, M., Amagai, M., Shibata, F., & Tsai, J. (2011). Factors related to self-efficacy for social participation of people with mental illness. *Arch Psychiatr Nurs*, 25(5), 359-365. doi: 10.1016/j.apnu.2011.03.004
- Tullman, M. J. (2013). A review of current and emerging therapeutic strategies in multiple sclerosis. *Am J Manag Care*, 19(2 Suppl), S21-27.
- Vahedi, S. E., F. (2010). The validation and multi-group confirmatory factor analysis of the Satisfaction with Life Scale in nurse and midwife undergraduate students. *Iran J Nurs Res*, 5(17), 68-79.