

---

3rd Central & Eastern European LUMEN International Conference  
New Approaches in Social and Humanistic Sciences | NASHS 2017 |  
Chisinau, Republic of Moldova | June 8-10, 2017

# New Approaches in Social and Humanistic Sciences

---

## Illness Perception and Ability for Physical Activity among Patients with Chronic Diseases

Kremena MINEVA, Miroslava PETKOVA

<https://doi.org/10.18662/lumproc.nashs2017.26>

How to cite: Mineva, K., & Petkova, M. (2018). Illness Perception and Ability for Physical Activity among Patients with Chronic Diseases. In V. Manolachi, C.M. Rus, S. Rusnac (eds.), *New Approaches in Social and Humanistic Sciences* (pp. 303-315). Iasi, Romania: LUMEN Proceedings.  
<https://doi.org/10.18662/lumproc.nashs2017.26>

© The Authors. LUMEN Conference Center & LUMEN Proceedings.  
*Selection and peer-review under responsibility of the Organizing Committee of the conference*



This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial 4.0 Unported License, permitting all non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited

3<sup>rd</sup> Central & Eastern European LUMEN International Conference  
New Approaches in Social and Humanistic Sciences |  
NASHS 2017 | Chisinau, Republic of Moldova | June 8-10, 2017

## Illness Perception and Ability for Physical Activity among Patients with Chronic Diseases

Kremena MINEVA<sup>1</sup>, Miroslava PETKOVA<sup>2</sup>

### *Abstract*

*Illness perception refers to patient's evaluation for his/her life with disease. According to the self-regulatory model (Leventhal, Brissette & Leventhal, 2003) the illness perception is subjective and is created by cognitive and emotional components. The unique combination between different parts of illness perception for every patient can predict the patient's health behaviour including motivation and performing physical activity. The PURPOSE of this study is to examine the main predictors of illness perception and to evaluate the significance of ability for physical activity for construction of illness perceptions. METHODOLOGY: 237 patients with rheumatic arthritis, ankylosing spondylitis, hypertension and diabetes mellitus type 2 have been examined. Optimism and Negative expectancies Inventory (Velitchkov et al., 1993), Multidimensional Health Locus of control Scales (form C) (Wallston et al., 1994), Self Efficacy Chronic Disease Scales (Lorig, et al., 1996), Brief Illness perception Questionnaire (Broadbent, et al., 2006). OWN CONTRIBUTION AND RESULTS: The results of investigation supports the idea that the patients perception of illness controllability depends of health locus of control beliefs and self-efficacy for managing chronic illness. The most important are beliefs that illness depends on patients themselves and their confidence that they have ability at ones disposal to cope with everyday functioning and communicate with doctors. CONCLUSIONS: Self-efficacy for symptom management, Self-efficacy for physical activity and negative expectations are significant and strong predictors of illness perception among patients with chronic diseases and pain.*

**Keywords:** *Illness perception, self-regulatory model, physical activity, patient's beliefs, self-efficacy.*

---

<sup>1</sup> Trakia University, Medical faculty, Stara Zagora, Bulgaria, kremenamineva@abv.bg

<sup>2</sup> Trakia University, Medical faculty, Stara Zagora, Bulgaria, petkovaa@hotmail.com

<https://doi.org/10.18662/lumproc.nashs2017.26>

Corresponding Author: Miroslava PETKOVA

Selection and peer-review under responsibility of the Organizing Committee of the conference



This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial 4.0 Unported License, permitting all non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited

## 1. Introduction

Suffering from an illness is accompanied by cognitive and emotional processes that reflect the individual impact of the disease on the patient and have as a result the formation of the illness perception. Illness perception refers to the patient's beliefs about the severity of his illness, its consequences, duration, causes, possibilities of personal (behavioral) and treatment control over disease, understanding of the disease and the level of psychological distress [23]. According to systematic reviews with meta-analyses illness perception is associated with mental health [15, 16], physical functioning [16] and the level of physical activity in rehabilitation [11] among patients with chronic diseases.

## 2. Problem Statement

The scientific literature confirms association between the generalized expectations of the future optimism-pessimism, the health locus of control and self-efficacy, on the one hand, and patients' belief about their illness, on the other hand. For example, patients with more pronounced optimism, unlike pessimists, form more positive beliefs about the disease as associated with a few symptoms, with lighter consequences, shorter duration, more controllable by behavior and treatment, they understand it better and experience less distress [19, 33, 36], as well as to a small extent attribute the causes of the disease to their personality [33].

Health locus of control (HLOC) refers to people's attribution of their own health to personal factors - internal HLOC or environmental factors – external HLOC [35]. Patients who believe that the disease depends on other people or chance, compared to patients with an internal HLOC, are significantly less likely to perceive personal control over disease [26], evaluate illness as associated with more severe and numerous symptoms and more intense pain [2,5] as well as with more negative consequences for their life [2]. The belief that the disease depends on the doctors predicts less pain intensity and more positive expectations to the treatment [2].

Chronic disease self-efficacy refers to the subjective assessment of the resources and abilities of patients to organize and implement activities to manage the disease [3]. Studies show that higher self-efficacy is significantly associated with the beliefs about less symptoms, higher control and not so heavy consequences of the disease to life in patients with diabetes [13], with the perception of weaker consequences and distress, less severity of the disease, higher personal control and better understanding of the disease in

patients with chronic obstructive pulmonary disease [7] and positively predicts perception of personal control and treatment control among patients with more than two chronic diseases [30]. Examining 3130 patients at a time of being diagnosed with a cardiovascular diseases, a study also found that patients with higher self-efficacy perceive the disease as having fewer symptoms and less severe consequences, being more controllable by behavior and treatment, and to a less extent attribute the causes of the disease to stress, behavior and aging [1]. Examining 2745 patients of the previous sample after one year, researchers found that despite the increased severity of the disease, patients with higher self-efficacy continue to believe they can control disease by behavior and treatment, unlike patients with low self-efficacy [1].

Besides the relation with the beliefs about the disease, self-efficacy is related to the choice of activities that people are engaged in, the complexity of the goals they have and the persistence and motivation in the implementation of actions [3]. The assessment of patients that they can be physically active despite the severity of symptoms predicts daily physical activity in patients with rheumatoid arthritis [21], cardiovascular diseases [31] and diabetes [14], which lead to numerous health benefits. Besides predicting physical activity, self-efficacy for physical activity is related to the creation of positive beliefs about the disease. Nine months after diagnosis of ischemic heart disease, by controlling the baseline level of efficacy, demographic characteristics and severity of the disease, self-efficacy for physical activity is significantly associated with perception of less severe symptoms and higher personal and treatment control over disease among patients [22].

In summary, the relationship between generalized expectations, health locus of control and chronic disease self-efficacy (including self-efficacy for physical activity) with the specific beliefs about the disease and its distress is strongly confirmed. There are still not sufficient data how these factors are related to the creating of the overall assessment of the disease. Furthermore, in the literature there are convincing evidences that patients' assessment of control over disease is related to the self-efficacy, internal health locus of control and optimism of patients. According to meta-analysis beliefs about personal and treatment control are a key component of illness perception and significantly determine health outcomes and psychological adaptation to the disease [15]. People with a perception of strong control over their illness tend to evaluate its timeline as shorter and the consequences and symptoms as weaker. In addition, perceived control is associated with better adaptation to the disease and better mental and somatic health due to the impact on other beliefs about the disease. Patients who perceive the disease as being controllable tend to use cognitive

strategies to change other beliefs about the disease to more positive and to reduce the level of distress. In this connection, in order to provide effective health care to patients with chronic diseases it is important to understand the contribution of psychological resources that promote patients' positive illness perception as well as perception of disease as more controllable among patients with chronic diseases.

### 3. Research Questions/Aims of the research

The aim of this study is to examine psychological factors (optimism, health locus of control, chronic disease self-efficacy) which are significant in the process of creating the illness perception as well as perception for illness control among patients with chronic diseases.

### 4. Research Methods

**Respondents:** A cross-sectional survey was conducted among 237 Bulgarian adult patients with a leading diagnose of rheumatoid arthritis (n=27), ankylosing spondylitis (n=76), arterial hypertension (n=61) and type 2 diabetes mellitus (n=73). Age: Mean=53.96, SD=0.88 (range: 25-85 years); Sex: **male** (n=109), female (n=128); Illness duration: Mean=11.2, SD=9.03 (range: 1-52 years); at the time of the study hospitalized patients (n=34), ambulatory patients (n=203).

#### **Methods:**

**1. Optimism and Negative expectancies Inventory** [32]. Scale consists of 17 items divided into subscales Optimism and Negative expectancies. Respondents answer on a 5-degree Likert type scale. Internal reliability of the scale coefficient Cronbach  $\alpha=0.76$ , for subscale Optimism Cronbach  $\alpha=0.89$ , for subscale Negative expectancies Cronbach  $\alpha=0.72$ .

**2. Multidimensional Health Locus of control Scales (MHLOC-form C)** [34]. MHLOC is a 24-item self-report questionnaire designed to assess an individual's preferred control orientation with respect to chronic illness. Scores were obtained for four dimensions of HLOC: Internal, Chance, Powerful others (relatives and health professionals) and God. The estimated reliability of subscales in the current study was Cronbach  $\alpha=0.70-0.92$ .

**3. Chronic Disease Self Efficacy Scales (CDSES) [24].** CDSES consist of 32 items in 9 scales: Exercise regularly; Get information on disease; Obtain help from community, family, friends; Communication with physician; Manage disease in general; Do chores; Do social/recreational activities; Manage symptoms; Control/manage depression. Each item measured on a scale from 0 to 10. Higher number indicates higher self-efficacy. The estimated reliability of subscales in the current study was Cronbach  $\alpha=0.71-0.95$

**4. Brief Illness perception Questionnaire (BIPQ) [8].** BIPQ consists of 9 items which measure: personal control over illness, identity, emotional representation, consequences, timeline, coherence/understanding, treatment control and cause (perceived etiology of illness). Eight items are measured on a scale from 0 to 10. Item 9 a write-in reflecting the participant's causal etiology was not analyzed in the current study. The BIPQ summary score corresponds to a person's view about illness. Higher score indicates a more threatening view of illness and vice versa. The estimated reliability of BIPQ in the current study was Cronbach  $\alpha =0.71$

**5. Statistical analysis:** Descriptive statistics, Kolmogorov-Smirnov test, Multiple hierarchical regression analysis. Data were analyzed using software package IBM SPSS v.19.0, and  $P<0.05$  was considered significant.

## 5. Findings

### *5.1. Predictors of personal control and treatment control dimensions of illness perception*

By multiple hierarchical regression analysis we found that the personal control over disease is significantly predicted by internal HLOC ( $\beta=0.12$ ,  $P=0.04$ ), self-efficacy to manage the disease in general ( $\beta=0.35$ ,  $P=0.001$ ) and self-efficacy to manage symptoms ( $\beta=0.15$ ,  $P=0.04$ ) which explain 25% of the variance in personal control beliefs. Patients' beliefs that the illness is influenced by factors such as their emotional state, attitudes, behavior and that they are able to perform successfully various activities in order to manage the disease and its symptoms (for example taking medication, following a diet, not smoking or drinking alcohol, coping with the pain, fatigue etc.) strengthen beliefs of personal control over disease.

Multiple regression model for prediction of treatment control dimension consists of five variables and explain 30% of its variance (table1).

**Table 1.** Results of multiple hierarchical regression analysis about predictors of treatment control beliefs

<b>Model</b>	<b>B</b>	<b>St.Error</b>	<b>Beta</b>	<b>t</b>	<b>Sig.</b>
(Constant)	3,013	,823		3,662	,000
HLOC (internal)	,101	,022	,260	4,509	,000
HLOC (chance)	-,042	,018	-,138	-2,290	,023
HLOC (relatives)	-,081	,034	-,141	-2,355	,019
SE daily functioning	,073	,018	,238	4,053	,000
SE communicate with physicians	,066	,018	,211	3,673	,000

Beliefs about the effectiveness of treatment weaken by the patient's belief that the disease depends on external factors such as other people or chance and strengthen by the belief that the disease depends on patients themselves and that they are able to cope with daily commitments and communicate effectively with doctors. Patients consider communication as successful when it refers not only to receiving of information about the disease from the physician but also when the physician has emotional sensitivity and attitude to discuss problems that the disease is accompanied by or that are caused by the disease. Another study finds that specific components of physicians' communication style such as patient-centered approach, being sensitive to patient concerns and providing adequate clinical information significantly predict trust in physicians in patients with rheumatoid arthritis [6]. In addition to its effect to enhance patient's expectancies about positive results of prescribed and implemented therapy, the positive relationship and trust between patient and medical professionals could promote treatment adherence which in turn leads to better therapeutic outcomes. The patients' predisposition to belief that disease depends on chance, luck and fortune reduces their confidence in the benefits of treatment, which may be due to the tendency of these patients to be distrustful to the medical specialists and less likely to adhere to the prescribed treatment [35] which indirectly may reduce the evaluation of its effect.

### ***5.2 Predictors of illness perception***

By multiple hierarchical regression analysis we found that patients' negative expectations for the future and their perceived ability to control the symptoms and to maintain physical activity, despite the symptoms, significantly predict illness perception and

explain 30% of its variance. (Table 2). Thus, stronger negative expectations, weaker confidence in the ability to control symptoms and to be physically active form more negative view of the disease in patients with chronic illnesses.

**Table 2.** Results of multiple hierarchical regression analysis about predictors of illness perception

Model	B	St.Error	Beta	t	Sig.
(Constant)	55,237	2,625		21,039	,000
Negative expectancies	,200	,096	,119	2,096	,037
SE physical activity	-,229	,078	-,195	-2,916	,004
SE managing symptoms	-,332	,058	-,384	-5,737	,000

## 6. Discussions

The self-assessment of patients of their own ability to cope with the symptoms predicts the illness perception most strongly. Systematic review establishes that higher pain self-efficacy predicts lower pain intensity and disability in patients with rheumatoid arthritis and chronic pain [25]. Two meta-analyzes confirm highly significant effect of self-efficacy for managing symptoms (pain) on problems in functioning such as functional impairment, affective distress and pain severity in chronic pain samples [17] and osteoarthritis and rheumatoid arthritis samples [18]. Furthermore, analysis of longitudinal study confirms that the personal incapacity or ineffectiveness in controlling pain is a risk factor for later problems in functioning in these patients [18]. In general, the scientific data show that patients' perceived ability to manage symptoms is a potentially important protective factor for functioning in chronic pain patients. It is associated with better somatic and mental health as well as it is critical factor for forming of positive illness perception in patients with chronic disease and pain.

The analysis found that negative expectations for the future determine the formation of more negative view of the disease while optimistic expectations are not significantly related to it. Other studies also found that optimism and negative expectations have independent impact on illness perception. Pessimism is a stronger predictor of illness perception than optimism among patients with cardiovascular disease [4]. Negative expectations lead to assessment of heavier consequences, weaker personal control and attributing the causes of disease to immune factors, optimism

predicts the perceiving of illness consequences as lighter. Also dispositional pessimism but not optimism is significantly related to lower treatment control and illness understanding in a sample of patients with chronic heart failure [12]. Except through the relationship with illness cognitions, negative expectations can lead to negative view of the disease by its association with the illness behavior. Pessimists tend to believe that difficulties are uncontrollable and the desired results are unattainable, which determine the use of problem-focused disengagement (e.g., behavioral disengagement) and emotion-focused disengagement (e.g., denial) [10]. Also when confronted with a disease pessimism can lead people into self-defeating patterns. The result can be less confidence and persistence, disruption of social activities and health-damaging behavior [10]. In respect this, it is possible that negative expectations for the future in combination with the assessment of lower perceived ability for physical activity abilities and symptom control may result in more pronounced disengagement in treatment and physical activity regimen, that may impair health and indirectly lead to more negative illness perception.

The analysis found that the ability to maintain physical activity is a significant factor in the creating process of more positive illness perception among investigated patients. On one hand, this could be explained with the fact that rheumatoid arthritis and ankylosing spondylitis lead to restrictions on physical functioning during periods of acute phase and they also lead to disabilities within the prolonged illness duration. Loss of mobility is probably one of the most severe and stressful consequences of the disease, and the ability of patients to remain active leads to perceiving the disease as less severe and damaging. On the other hand, perceived ability for physical activity is significantly associated with higher physical activity, which leads to better mental and somatic health. Physical activity improves joint health, physical function, mobility, disease-related characteristics and symptom management, such as pain relief, distraction from pain, reducing inflammation and fatigue, as well as decreases anxiety and improves the mood of patients suffering from chronic musculoskeletal pain [28]. Physical activity as a substantial part of the management of type 2 diabetes and hypertension also leads to improvements in patients' health status. In turn, these health benefits are associated with the formation of more positive illness perception.

A number of studies confirm that self-efficacy for physical activity as a predictor of physical activity levels is associated with positive illness beliefs in physically active patients. Patients who think that they are able to maintain physical activity follow a more active physical exercise regimen, which in turn leads to perception of significantly less intense symptoms and distress

in patients with multiple sclerosis [27], to better understanding and weaker disease consequences in patients with chronic obstructive pulmonary disease [7] as well as to better illness understanding and higher personal control over disease in patients with diabetes mellitus type 2 [29] in comparison with physically inactive patients.

Strengthening of self-efficacy for physical activity is a commonly acknowledged factor associated with increased levels of physical activity in patients with hypertension [9] and diabetes mellitus type 2 [20]. Adherence to physical activity regimen requires a lasting change of lifestyle and behavior. Exercise self-efficacy increases linearly from precontemplation to maintenance stage [14] and contributed to exercise behavior change with effect on the transition from intentions to engage in physical activity to action as well as on maintaining it on a long-term basis [31]. In regard of applying self-efficacy model as a psychological model in the setting of healthcare, people should be taught skills that promote self-efficacy in the practice of illness behavior. Enhancing patients' self-efficacy is critical to the creation of more positive illness perception and better chronic-disease management. In respect this, behavioral counseling and skill-building interventions for the patients to become confident and be able to control their symptoms and to maintain regular physical activity may be appropriate to patients with chronic diseases and pain.

Finally, we must emphasize that the study was conducted with the compliance with ethical standards, concerning the research on human subjects. The research methodology has been approved by local Ethical Committee at Trakia University. In all the study we strongly observed its rules and the principles of the Declaration of Helsinki (1964). An informed consent in participating in the research was obtained from all participants. They were informed they could discontinue the study whenever they wanted and without giving any reason for their decision.

Attention should be drawn to the limitations of the study. First, findings may be limited due to insufficient sample size of patients with RA as well as due to the absence of the objective data about regular psychical activity of the respondents. It is possible association between self-efficacy for physical activity and illness perception to be moderated by the level of physical activity. The second, the study outputs the predictors of illness perception among patients with four different nosological units, but represented in one sample which cannot find out the possible disease-specific differences in the determinants of illness perception in respect of the diagnose. Third, the study does not investigate the impact of other personality characteristics that might predict illness perception stronger. Findings of the study and drawn conclusions refer to the determinants of

illness perception in patients with rheumatoid arthritis, arterial hypertension and diabetes mellitus type 2 and cannot be generalized to patients with other chronic diseases. All this provides guidance for deepening researches about the determinants of illness perception in the future. Future research should examine additional personal factors that may influence illness perception as well as disease-specific determinants of illness perception in patients with chronic diseases.

## 7. Conclusions

1. Internal health locus of control and patients' self-efficacy to perform activities required to manage disease and its symptoms predict beliefs about personal control over disease.
2. Patients' beliefs that illness depends on themselves and their perceived ability to cope with everyday functioning and to communicate with physicians predict perception of illness as more controllable by treatment.
3. Self-efficacy for symptom management, self-efficacy for physical activity and negative expectations are significant and strong predictors of illness perception among patients with chronic diseases.

## References

---

- [1] Aalto A. M., Heijmans M., Weinman J., & Aro A. R. Illness perceptions in coronary heart disease: Sociodemographic, illness-related, and psychosocial correlates. *J Psychosom Res*, 2005. 58(5). pp. 393–402
- [2] Awasthi P, Mishra R. Can Social Support and Control Agency Change Illness Consequences? Evidence from Cervix Cancer Patients. *Open J Med Psychol*, 2013. 2 (3). pp. 115-123
- [3] Bandura A. Self-efficacy: Toward a unifying theory of behavioral change. *Psychol Rev*. 1977 (84). pp. 191-215
- [4] Bekke-Hansen S., Weinman J., Thastum M., Thygesen K., & Zachariae R. Psycho-social factors are important for the perception of disease in patients with acute coronary disease. *Dan Med J*, 2014. 61(8): A4885.
- [5] Berglund E., Lytsy P., & Westerling R. The influence of locus of control on self-rated health in context of chronic disease: a structural equation modeling approach in a cross sectional study. *BMC Public Health (Internet)*, 2014 May 2 (cited 2017 September); 14: (492). Available from: <https://doi.org/10.1186/1471-2458-14-492>
- [6] Berrios-Rivera JP., Street RL Jr., Garcia Popa-Lisseanu MG., Kallen MA., Richardson MN., Janssen NM., et al. Trust in physicians and elements of the

- medical interaction in patients with rheumatoid arthritis and systemic lupus erythematosus. *Arthritis Rheum.* 2006. 55(3). pp. 385-93
- [7] Bonsaksen T., Lerdal A., & Fagermoen MS. Factors associated with self-efficacy in persons with chronic illness. *Scand J Psychol.* 2012. 53(4). pp. 333-339
- [8] Broadbent E., Petrie KJ., Main J., & Weinman J. The Brief Illness Perception Questionnaire. *J Psychosom Res.* 2006; 60. pp. 631-663
- [9] Burke V., Beilin L. J., Cutt H. E., Mansour J., & Mori T. A. Moderators and mediators of behaviour change in a lifestyle program for treated hypertensives: a randomized controlled trial (ADAPT). *Health Educ Res.* 2008 23(4):583-91.
- [10] Carver CS., Scheier MF, & Segerstrom S. C. Optimism. *Clin Psychol Rev.* 2010. 30 (7). pp. 879-889
- [11] French D. P., Cooper A., & Weinman J. Illness perceptions predict attendance at cardiac rehabilitation following acute myocardial infarction: a systematic review with meta-analysis. *J Psychosom Res.* 2006. 61(6). pp. 757-767
- [12] Giardini A., Pierobon A., Majani G., Bernocchi M., Corbellini D., & Febo O. Perception of illness and dispositional optimism in a sample of patients with chronic heart failure]. *G Ital Med Lav Ergon.* 2012 Apr-Jun; 34 (2). B38-44
- [13] Griva K., Myers L. B., & Newman S. Illness perceptions and self-efficacy beliefs in adolescents and young adults with diabetes mellitus. *Psychol Health.* 2000. (15). pp. 733–750
- [14] Guicciardi M., Lecis R., Anziani C., Corgiolu L., Porru A., Pusceddu M., & Spanu F. Type 2 diabetes mellitus, physical activity, exercise self-efficacy, and body satisfaction. An application of the transtheoretical model in older adults. *Health Psychol Behav Med (Internet)*, 2014 Jul 15 (cited August 2017). 2(1). pp. 748-758. Available from: <http://doi.org/10.1080/21642850.2014.924858>
- [15] Hagger M. S., & Orbell S. A meta-analytic review of the common-sense model of illness representations. *Psychol Health.* 2003. (18). pp. 141-184
- [16] Hudson J. L., Bundy C., Coventry P. A., & Dickens C. Exploring the relationship between cognitive illness representations and poor emotional health and their combined association with diabetes self-care. A systematic review with meta-analysis. *J Psychosom Res.* 2014 Apr; 76(4). Pp. 265-274
- [17] Jackson T., Wang Y., Wang Y., & Fan H. Self-Efficacy and Chronic Pain Outcomes: A Meta-Analytic Review. *J Pain.* 2014 May 28 (cited 2017 August), 15 (8). pp. 800-814. Available from: <https://doi.org/10.1016/j.jpain.2014.05.002>
- [18] Jia X., & Jackson T. Pain beliefs and problems in functioning among people with arthritis: a meta-analytic review. *J Behav Med.* 2016 Oct; 39(5). pp. 735-756
- [19] Karademas E. C., Frokkai E. F., & Tsotra E., Papazachariou R. The relation of optimism to cardiac patients' subjective health through illness

- representations: Does the level of optimism matter? In: Efklides A., Moraitou D., editors. *A positive psychology perspective on quality of life*, Dordrecht: Springer; 2013. pp. 175-188.
- [20] Kirk A., MacMillan F., & Webster N. Application of the transtheoretical model to physical activity in older adults with type 2 diabetes and/or cardiovascular disease. **Psychol Sport Exerc.** 2010; 11 (4). pp. 320-324
- [21] Larkin L., & Kennedy N. Correlates of physical activity in rheumatoid arthritis: a systematic review. *J Phys Act Health*, 2014. 11(6). pp. 1248-1261
- [22] Lau-Walker M. Predicting self-efficacy using illness perception components: A patient survey. *Br J Health Psychol*, 2006. 11(4). pp. 643-661
- [23] Leventhal H., Brissette I., & Leventhal E. A. The common-sense model of self regulation of health and illness. In: Cameron LD, Leventhal H, editors. *The selfregulation of health and illness behaviour*. London: Routledge, 2003. pp. 42-65
- [24] Lorig K., Stewart A., Ritter P., González V., Laurent D., & Lynch J. *Outcome Measures for Health Education and other Health Care Interventions*. Thousand Oaks CA: Sage Publications. 1996.
- [25] Marks R. Self-efficacy and arthritis disability: An updated synthesis of the evidence base and its relevance to optimal patient care. *Health Psychol Open.* ([Internet](#)), 2014 December 23 (cited 2017 September) 1(1): Available from: <http://journals.sagepub.com/doi/10.1177/2055102914564582>
- [26] Moss-Morris R., Weinman J., Petrie K. J., Horne R., Cameron L. D., & Buick D. The revised illness perception questionnaire (IPQ-R). *Psychology and Health*, 2002 (17). pp. 1–16
- [27] Motl R.W., McAuley E., Snook E. M., & Gliottoni R.C. Physical activity and quality of life in multiple sclerosis: Intermediary roles of disability, fatigue, mood, pain, self-efficacy and social support. *Psychol Health Med*, 2009. 14 (1). pp. 111-24
- [28] Musumeci G. Effects of exercise on physical limitations and fatigue in rheumatic diseases. *World J Orthop.*, 2015 Nov 18. 6(10).762-790
- [29] Petriček G., Vrcić-Keglević M., Vuletić G., Cerovečki V., Ožvačić Z., & Murgić L. Illness Perception and Cardiovascular Risk Factors in Patients with Type 2 Diabetes: Cross-sectional Questionnaire Study. *CMJ*. 2009. 50(6). pp. 583-593
- [30] Schüz B., Wurm S., Warner L. M., & Ziegelmann J. P. Self-efficacy and multiple illness representations in older adults: A multilevel approach. *Psychol Health*, 2012. 27. pp. 13-29
- [31] Sniehotta F. F., Scholz U., & Schwarzer R. Bridging the intention-behaviour gap: Planning, self-efficacy, and action control in the adoption and maintenance of physical exercise. *Psychol Health*, 2005 (20). pp. 143-160
- [32] Velitckov A., Radoslavova M., & Rasheva M. Metod za izmervane na generalizirane ochakvaniq za valentnostta na poluchenite rezultati (optimizam i negativni ochakvaniq). *Bylgarsko spisanie po psihologia*, 1993. 1 (3). pp. 85-100

- [33] Vollmann M., Scharloo M., Langguth B., Kalkouskaya N., & Salewski C. Illness representations as mediators of the relationship between dispositional optimism and depression in patients with chronic tinnitus: A cross-sectional study. *Psychol Health*, 2014 (29). pp. 81–93
- [34] Wallston K., Stein M., & Smith C. Form C of the MHLC scales: A condition- specific measure of locus of control. *J Pers Assess*, 1994. 63(3). pp. 534-553
- [35] Wallston K. A., & Wallston B. S. Who is responsible for your health: The construct of health locus of control. In: Sanders G., Suls J, editors. *Social Psychology of Health and Illness*. Hillsdale, N. J: Lawrence Erlbaum & Associates. 1982. pp. 65-95
- [36] Zhang N., Fielding R., Soong I., Chan K. K., Tsang J., Lee V., et al. Illness perceptions among cancer survivors. *Support Care Cancer*. 2016 Mar; 24(3). pp. 1295-1230