

Predictors of pain catastrophizing in women with systemic lupus erythematosus

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SUMMARY

OBJECTIVE: The aim of this study was to identify predictive factors associated with pain catastrophizing in women with systemic lupus erythematosus (SLE).

METHODS: A total of 104 volunteered women with a diagnosis of systemic lupus erythematosus participated in the study. Pain Catastrophizing Scale, Body Awareness Questionnaire, Tampa Scale of Kinesiophobia, and Beck Depression Inventory were used to assess patients. Correlations between pain catastrophizing (dependent variable) and independent variables (age, body mass index, disease activity, organ damage, depression, kinesiophobia, and body awareness) were analyzed with Pearson's rho correlation analysis. The multiple stepwise linear regression models with R² were used to compare across the models and explain the total variance. The significance level of a p-value was considered significant if p<0.05.

RESULTS: There were no correlations between Pain Catastrophizing Scale and age, Beck Depression Inventory, disease activity, and organ damage (p>0.05). Pain Catastrophizing Scale was correlated with Tampa Scale of Kinesiophobia (r=0.585; p<0.001), Beck Depression Inventory (r=0.511; p<0.001), and Body Awareness Questionnaire (r=0.277; p<0.005). The regression analysis showed that the predictor factors of pain catastrophizing in women with systemic lupus erythematosus were TSK (B 0.411; p<0.001), Beck Depression Inventory (B 0.363; p<0.001), Body Awareness Questionnaire (B 0.273; p<0.001), and body mass index (B -0.169; p=0.02) (Nagelkerke R²=0.52).

CONCLUSIONS: As a result, the most related factors on pain catastrophizing were kinesiophobia, depression, body awareness, and body mass index in women with systemic lupus erythematosus. We suggest assessing these parameters as predictive of pain catastrophizing throughout systemic lupus erythematosus management.

KEYWORDS: Catastrophization. Pain. Systemic lupus erythematosus.

INTRODUCTION

Systemic lupus erythematosus (SLE) is a chronic, autoimmune disease with a broad spectrum of clinical symptoms affecting almost all organ systems¹. Pain, musculoskeletal symptoms, fatigue, depression, and cognitive deficits are common, in addition to skin-related and systemic manifestations². These findings can be aggravated by a disease or found independently linked to the physical and psychological restraints^{3,4}.

One of the first and most common symptoms reported by SLE patients is pain, frequently caused by musculoskeletal conditions. Also, it is shown that the physiopathology of pain impacts patients as well as inflammation of joints⁵. There is a link between cognitive, affective, and behavioral factors and pain catastrophizing which stimulates avoidance, fear, and depression⁶.

Pain catastrophizing is magnifying pain sensations, inability to deal with pain, and feeling helpless and has been proven to develop a chronic cycle ending in central sensitization⁷. Pain

catastrophizing strongly correlates with depression, coping skills, physical functioning, and quality of life in rheumatic diseases, particularly in SLE⁶. Whichever the pain results, patients with SLE are likely to develop maladaptive coping skills, perception, body awareness, and fear of movement.

Understanding the relationship between pain catastrophizing and related factors may help identify the main rehabilitation targets in SLE patients. This study aimed to identify factors predicting pain catastrophizing in women with SLE. We hypothesized that kinesiophobia, depression level, body awareness, and body mass index (BMI) predict pain catastrophizing in women with SLE.

METHODS

This cross-sectional study was conducted between 2018 and 2019 at Ankara University, Faculty of Medicine, Department of Rheumatology. The Ethical Institution of the Ankara University

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approved the study protocol with the number 06-301-17. All assessments were made if patients agreed to participate in the study when they came for their routine controls, and all the participants were provided with verbal and written informed consent according to the Declaration of Helsinki. Individuals who met the American College of Rheumatology 1997 criteria for diagnosis of SLE⁸ and volunteered to participate were included in the study. Exclusion criteria were difficulties reading and understanding Turkish and having a psychological disorder.

A rheumatologist performed a physical examination and assessed disease-specific manifestations, disease activity, and disease-related organ damage. Disease activity and organ damage were evaluated with the Revised Systemic Lupus Activity Measure (SLAM-R)⁹ and Systemic Lupus International Collaborating Clinics/American College of Rheumatology Damage Index (SLICC/ACR-DI)¹⁰, respectively. The SLAM-R estimates a degree of severity for the last month, and the score range is 0–86, where a score ≥ 7 is considered a flare⁹. The SLICC/ACR-DI is divided into nine organ systems with scores ranging from 0 to 47, and SLICC/ACR-DI ≥ 1 was considered to have organ damage¹⁰.

Patient-reported outcome measurements

Pain Catastrophizing Scale

Turkish PCS was used to measure how people catastrophize in response to pain. This scale is a 5-Likert scale with 13 questions and evaluates the feelings and thoughts of a person when they are experiencing pain¹¹.

Body Awareness Questionnaire

The BAQ is a tool with psychometric properties that reflect the concept of body awareness (such as self-reported predictions about the body, disease, and sleep cycle). It is a Likert-type questionnaire consisting of 18 items and 4 subgroups. A high survey score means that the body awareness level is high¹².

Tampa Scale for Kinesiophobia

The TSK is a 17-question 4-point Likert scale that measures fear of movement/re-injury. The total score ranges between 17 and 68 points, and a score equal to 37 or higher means an individual has kinesiophobia¹³.

Beck Depression Inventory

BDI was used to measure characteristics, attitudes, and symptoms of depression. It is a valid and reliable questionnaire having four cutoff scores: 0–12 for minimal, 13–18 for mild, 19–28 for moderate, and 29–63 for severe depression in the Turkish population¹⁴.

Statistical analyses

SPSS version 23 (IBM Corp., Armonk, NY, USA) was used for statistical analysis. Correlations between pain catastrophizing (dependent variable) and independent variables (age, BMI, disease activity, organ damage, body awareness, kinesiophobia, and depression) were analyzed with Pearson's rho correlation analysis; a value of 1.0 was interpreted as perfect, 0.9–0.7 as strong, 0.6–0.4 moderate, 0.3–0.1 weak, and 0 as zero. The multiple stepwise linear regression models with R^2 were used to compare across the models and explain the total variance. The significance level of a p-value was considered significant if $p \leq 0.05$.

RESULTS

This study included 104 women with SLE. The mean age of the patients was 49.49 ± 7.19 years, and the mean BMI was 27.17 ± 4.01 kg/m². The disease activity level measured by SLAM-R was 5.39 ± 3.68 , and the disease damage index measured by SLICC/ACR-DI was 0.58 ± 0.87 . There were no correlations between PCS (22.12 ± 12.09) and age, BMI, SLAM-R, and SLICC/ACR-DI ($p > 0.05$) (Table 1). PCS was correlated with BAQ (88.94 ± 19.85) ($p < 0.005$), TSK (42.94 ± 7.76), and BDI (15.63 ± 11.18) ($p < 0.001$) (Table 1).

A multiple stepwise linear regression analysis was built to check for variables independently affecting PCS. The independent variables (BMI, SLAM-R, SLICC/ACR-DI, BAQ, TSK, and BDI) were entered into the stepwise regression model. The regression analysis showed that the predictor factors of pain catastrophizing in women with SLE were TSK (B 0.411; $p < 0.001$), BDI (B 0.363; $p < 0.001$), BAQ (B 0.273; $p < 0.001$), and BMI (B -0.169; $p = 0.02$) (Nagelkerke $R^2 = 0.52$) (Table 2).

Table 1. Bivariate correlations between pain catastrophizing scale and disease-related factors.

n=104	r	p
Age (years)	0.141	0.155
BMI (kg/m ²)	-0.084	0.399
SLAM-R (0–86)	0.105	0.293
SLICC-DI (0–47)	0.153	0.123
BAQ (0–126)	0.277	0.005*
TSK (17–68)	0.585	<0.001*
BDI (0–63)	0.511	<0.001*

* $p < 0.001$. BMI: Body mass index; SLAM-R: Revised Systemic Lupus Activity Measure; SLICC/ACR-DI: Lupus International Collaborating Clinics/American College of Rheumatology Damage Index; BAQ: Body Awareness Questionnaire; TSK: Tampa Scale for Kinesiophobia; BDI: Beck Depression Inventory.

Table 2. The regression analysis showing the predictor factors of pain catastrophizing in women with systemic lupus erythematosus.

Model		Unstandardized coefficients		Standardized coefficients	t	*p
		B	Standard error	Beta		
Independent variables	Tampa Scale of Kinesiophobia	0.642	0.125	0.411	5.130	<0.001
	Beck Depression Scale	0.392	0.086	0.363	4.573	<0.001
	Body Awareness Questionnaire	0.168	0.045	0.273	3.745	<0.001
	Body mass index	-0.543	0.229	-0.169	-2.368	0.020

Dependent variable: Pain Catastrophizing Scale; *p<0.001; R²=0.518

DISCUSSION

Our study investigated predictive factors of pain catastrophizing in women with SLE. Pain catastrophizing was correlated with body awareness, kinesiophobia, and depression. As a result, in regression analyses, body awareness, kinesiophobia, depression, and BMI were significant predictors of pain catastrophizing in women with SLE. In the literature, body awareness and kinesiophobia are not currently reported as predictive factors of pain catastrophizing in individuals with SLE. Therefore, this study's results also highlight these predictors in the SLE population regarding pain catastrophizing.

Pain catastrophizing is a factor that contains psychological and physical parameters. Although there is no agreement on what pain catastrophizing is, the main components are defined as rumination, magnification, and helplessness, and its understanding expands beyond these¹⁵. Since it is known that pain catastrophizing is related to pain intensity and disability, predicting factors that affect pain catastrophizing is a topic that is still compelling and intriguing. Since a human being is considered far from only being a biological creature, psychological and social parameters affect humans, varying from person to person. Our study shows that fear of movement, depressive mood, awareness of your body and symptoms, and BMI are considered predictors of catastrophizing. These findings emphasize the importance of considering pain catastrophizing and being careful to not miss possible predictors of pain catastrophizing during treatment.

The relationship between age, disease activity, organ damage, kinesiophobia, depression levels, BMI, and pain catastrophizing of women was investigated in this study. There was no significant correlation with age, disease activity, and organ damage, but others were significantly correlated with pain catastrophizing. Similarly, Somers et al. investigated the relationship between pain coping cognitions, pain catastrophizing and physical symptoms, and psychological distress in SLE patients.

These authors found that self-efficacy and catastrophizing correlated with pain, stiffness, fatigue, and positive and negative mood¹⁶. Our findings support these results as these psychological parameters engage each other.

Body awareness comprises physical conditions, cognitions, and body experiences with the psychosocial background of oneself. Similarly, in this study, body awareness predicted pain catastrophizing in women with SLE. Body awareness is the general description of embodied identity, which is related to two categories: "living in the body" and "living concerning others and society"¹⁷. Therefore, our results are more predictable than having negative beliefs about the body, and negative thoughts and experiences with pain would deteriorate catastrophizing.

It is shown that kinesiophobia and depression significantly affect patients with SLE¹⁸. In our study, it was found that pain catastrophizing was associated with both kinesiophobia and depression. Most importantly, kinesiophobia was the most crucial variable predicting pain catastrophizing, which makes sense considering these relationships. One reason for this result might be that 85.4% of enrolled patients had kinesiophobia. Since pain causes fear of movement and depression in rheumatic diseases, patients are more likely to develop more catastrophizing beliefs and behaviors with the chronic nature of the disease⁷.

In addition to all these psychosocial factors, the only physical finding was BMI as a predictor of pain catastrophizing in this study. Previous studies showed that obesity is related to disease activity and other outcomes in SLE patients^{19,20}. In our study, BMI was not related to disease activity but was a predictor of pain catastrophizing. BMI was a predictor because 80.8% of our patients had a BMI of 25 or above. Besides, there is a lack of studies investigating the relationship between BMI and pain catastrophizing in the SLE population.

The main limitation of this study is that the population consisted only of women. Since SLE is a disease primarily seen

in women, the results are not surprising but cannot be generalized to the whole SLE population. In addition, it is well known that women have more tendency to have pain catastrophizing than men²¹. It is also known that genetic factors and hormone levels affect the symptoms of the disease²². Therefore, the lack of medical record information about the hormonal status of our patients is another limitation. We suggest examining the effects of hormonal and menopausal conditions on pain catastrophizing for further studies.

CONCLUSIONS

We recommend healthcare professionals working with women with SLE consider predictors in managing the disease. Thus, identifying disease-related parameters effective for pain catastrophizing, developing coping strategies with them, and reducing chronic pain in SLE patients can increase their quality of life.

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Further studies are needed to support our results, including gender and hormonal status.

Clinical Impact

- Kinesiophobia, depression, body awareness, and BMI are significant predictors of pain catastrophizing in women with SLE.
- Health professionals working with the SLE population should consider the abovementioned factors in the treatment process.

AUTHORS' CONTRIBUTION

GİK: Conceptualization, Formal Analysis, Writing – original draft. **GAB:** Formal Analysis, Writing – original draft. **EG:** Aydemir-Guloksuz Data curation, Writing – original draft. **GK:** Data curation.

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