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The influence of anxiety and depression on Korean lupus patients' quality of life

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ABSTRACT

Background & Aim: Approximately 40% of lupus patients experience anxiety and depression. This study aimed to determine the effects of anxiety and depression on lupus patients' quality of life.
Methods & Materials: This study adopted a correlational predictive survey design. Using convenience sampling, we recruited 117 patients who had been diagnosed with lupus at a general tertiary hospital in Korea. Structured questionnaires were used to assess their demographic and clinical characteristics, the Hospital Anxiety and Depression Scale, and Lupus Quality of Life. Data analyses included descriptive statistics, independent t-test, one-way ANOVA, Pearson's correlation analysis, and stepwise multiple regression analysis and were performed with the SAS program (version 9.4).
Results: The participants obtained a mean overall quality of life score of 63.49 out of 100. The highest and lowest means emerged for physical health and burden to others, respectively. Anxiety emerged as the strongest predictor of quality of life, followed by disease activity, depression, and duration since diagnosis. These variables explained 53 % of the variance in lupus patients' quality of life.
Conclusion: Medical professionals should pay close attention to each lupus patient's disease activity and duration to improve his or her quality of life. In particular, multidisciplinary efforts are needed to take proactive steps to screen for anxiety and depression in lupus patients.

Introduction

The systemic lupus erythematosus (lupus) is a chronic inflammatory autoimmune and systemic disease that affects various organs (e.g., connective tissues, skin, joints, blood, kidneys) and causes fatal complications and organ damage (1). Since 2005, lupus has been classified as a rare and incurable disease in Korea. The annual prevalence was 21.25 cases per 100 000 individuals in 2005 and 35.45 cases per 100 000 individuals in 2015. The peak age of prevalence was 30 to 49 years, and of incidence was 20 to 49 years. The prevalence of lupus was 10-fold higher in women than in men (2).

Lupus patients experience various physical symptoms depending on the organs that have been affected. During the course of the disease, which cycles between alleviation and aggravation, lupus patients experience irreversible damage, disability, and poor quality of life (3-5). Lupus patients' quality of life is negatively affected by not only disease activity and physical dysfunction but also psychosocial factors (e.g., anxiety, depression, poor self-esteem), job change (6), and disabilities that interfere with their daily life activities (3,7).

Anxiety and depression are the most common psychosocial factors that lower lupus patients' quality of life. Anxiety and depression are not just neuropsychiatric

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reactions (8) but have a biological connection with lupus (9). Approximately 40 % of lupus patients experience anxiety and depression (10), and poor quality of life is associated with higher levels of anxiety and depression (11,12). When lupus patients are unable to control their physical functions, they feel anxious because of the uncertainty surrounding the progression and prognosis of their disease (4,7). Their anxiety adversely affects their subjective perceptions of health and, consequently, lowers their quality of life (11).

Lupus is common among relatively younger age groups. Chronic and recurrent diseases and subsequent treatment processes make them feel anxious and depressed because they alter their body image and lifestyle (7,9). Furthermore, when their emotional problems limit their participation in physical or social activities, they experience higher levels of anxiety and depression (11). These negative emotions result in medication nonadherence and disease activity (13,14), which in turn lower their quality of life (11,15). When medical professionals care for patients with chronic illnesses, they tend to focus on medication adherence and only passively treat their anxiety and depression (16). Because lupus patients' anxiety and depression are important predictors of their quality of life, it is necessary to closely monitor and manage them (1,4,15). In previous studies, lupus patients with higher anxiety were also higher depression and higher anxiety and depression, lowering the quality of life (12). Yilmaz-Oner et al. reported that anxiety and depression in lupus patients with reduced quality of life were associated with emotional disorders (1).

Approaches to the management of lupus and its psychological ramifications should vary depending on the patient's cultural background because the quality of life varies as a function of culture, value systems, and interests (4,11). In Korea, lupus is still classified as a rare and incurable disease. The available social interest and welfare support resources are insufficient because of the stigma attached to this disease and the lower social status that young adults and women occupy in Korean society.

Therefore, in this study, we used instruments that have been validated across several studies to identify the predictors (e.g., the severity of anxiety and depression) of the quality of life of lupus patients. The findings were intended to serve as an empirical base for the development of suitable interventions.

The specific aims of the study were to (a) determine lupus patients' levels of anxiety, depression, and quality of life; (b) examine demographic and clinical differences in their quality of life; (c) investigate the correlations between the independent variables and quality of life, and (d) identify the predictors of the quality of life of lupus patients.

Methods

Study design

This study adopted a correlational predictive survey design.

Participants

Using convenience sampling, we recruited 117 adult outpatients (age≥18 years) who were diagnosed with lupus at the Department of Rheumatology of a general tertiary hospital in Daejeon City, South Korea. Structured questionnaires were used to assess their demographic and clinical characteristics, anxiety, depression, and quality of life. A total of 120 questionnaires were distributed, and the responses of 117 participants were included in the final analysis. The responses of 3 participants were excluded because they submitted incomplete questionnaires. The sample size that was required to conduct multiple regression analysis was estimated using G*Power 3.1.7 and the following specifications: effect size=0.15, significance level=0.05, power=80 %, and the number of predictors=6–8. The required sample size was found to be 109. The

number of subjects in this study was 117, which satisfies the conditions sufficiently.

Instruments

A) General characteristics

The following demographic and clinical characteristics were assessed: age, gender, religion, marital status, educational level, occupation, subjective socioeconomic status, disease duration, and disease activity. Disease activity was measured using the Systemic Lupus Erythematosus Disease Activity Index (SLEDAI), developed by Bombardier and colleagues (17). The SLEDAI assesses disease activity that is related to nine organ systems (i.e., central nervous system, vascular, renal, musculoskeletal, serosal, dermal, immunologic, constitutional, and hematologic), and it consists of 24 items. Composite scores are calculated by summing the weighted scores of each item. The composite scores can range from 0 to 105. Higher scores are indicative of greater disease activity. Scores≥6 indicate clinically significant disease activity, which should be considered when treatment decisions are made, the area under receiver operator curves was 0.82-0.83, sensitivity was in the 60-70% range, and specificity was 80% (18).

B) Anxiety and depression

Anxiety and depression were measured using the Korean version of the Hospital Anxiety and Depression Scale (HADS), which has been developed by Zigmond and Snaith (19). This instrument consists of 14 items, and responses are recorded on a 4-point scale that ranges from 0 (normal) to 3 (severe). Seven items assess anxiety (HADS-A) and depression (HADS-D) each. Total subscale scores can range from 0 to 21, and higher scores are indicative of higher levels of anxiety and depression. The scores are classified as follows: 0–7=normal, 8–10=mild anxiety or depression, and ≥11=moderate anxiety or depression. The Cronbach's alpha was 0.94 in Zigmond and Snaith (19). The Cronbach's alpha of this scale was 0.92 (HADS-A: 0.83, HADS-D: 0.90) in this study.

C) Quality of life

Quality of life was measured using the Korean version of the Lupus Quality of Life, which McElhone and colleagues (20) have developed for use with lupus patients. This instrument consists of 34 items, and responses are recorded on a 5-point scale that ranges from "always" (0 points) to "never" (4 points). This instrument consists of the following dimensions: physical health (8 items), emotional health (6 items), body image (5 items), pain (3 items), planning (3 items), fatigue (4 items), intimate relationships (2 items), and burden to others (3 items). Total scores can range from 0 to 100, and higher scores are indicative of a better quality of life. The Cronbach's alpha was 0.89-0.94 in McElhone and colleagues (20). The Cronbach's alpha of this scale was 0.97 (dimensions: 0.89–0.93).

Data Collection

Prior to data collection, the medical team at the Department of Rheumatology in a university hospital in D City was informed about this study's purpose and procedures, and their consent was obtained. Next, signed informed consent was obtained from patients who met the inclusion criteria, and data were collected between September and December 2017. The participants independently responded to the assessments, and they took approximately 15 minutes to complete them.

Data analysis

The collected data were analyzed using SAS for Windows (version 9.4). The participants' demographic and clinical characteristics and their levels of anxiety, depression, and quality of life were examined by computing frequencies, percentages, means, and standard deviations. Demographic and clinical differences in quality of life were examined using *t*-test

and analysis of variance. The Scheffé test served as a post-hoc test. The relationship between quality of life and the other study variables was examined by conducting Pearson's correlation analysis, and the predictors of quality of life were identified using multiple regression analysis.

Ethical considerations

All the study procedures were conducted after obtaining ethical approval from the institutional review board (IRB) of K National University (IRB EMC 2016-10-009-002).

Results

Demographic and clinical characteristics of the participants

The mean age of the participants was 39.1 years (range=18–64). Further, 30.8% of them were between the ages of 40 and 49 years, 95.7% of them were women, 52.1% were not affiliated to any religion, 51.3% had graduated from high school, and 65.8% of them were married. Furthermore, 51.3% of them were employed, 68.4% of them had a moderate subjective socioeconomic status, and the disease duration of 68.4% of them was ≥5 years. Their mean disease activity score was 7.34. Whereas 63.3% of the participants obtained disease activity scores that were ≥6, 36.7% obtained scores that were <6 (Table 1).

Table 1. Demographic and clinical differences in quality of life (N=117)

Characteristics	Total	Quality of life		
	N (%) or Mean±SD	Mean±SD	t or F	*P*
Age (years)	39.1 ± 11.5			
<30	28 (23.9)	67.67±21.26	1.04	
31～39	31 (26.5)	63.61±19.64		.380
40～49	36 (30.8)	63.99±21.06		
≥50	22 (18.8)	57.15±22.92		
Gender				
Male	5 (4.3)	73.09±14.27	1.04	
Female	112 (95.7)	63.06±21.31		.301
Religion				
Yes	56 (47.9)	66.08±21.02	1.28	
No	61 (52.1)	61.10±21.09		.204
Spouse				
Yes	77 (65.8)	63.98±20.13	-0.63	
No	40 (34.2)	62.54±23.13		.529
Education				
High school	60 (51.3)	62.29±24.24	-0.35	
≥College	57 (48.7)	64.74±17.35		.727
Job				
Yes	60 (51.3)	66.29±20.91	1.48	
No	57 (48.7)	60.54±21.11		.142
Subjective economic status				
Good (a)	15 (12.8)	61.72±16.85	3.60	
Moderate (b)	80 (68.4)	66.60±20.51		.031
Poor (c)	22 (18.8)	53.38±23.35		a,b>c
Duration since diagnosis (years)				
<5	37 (31.6)	69.75±19.13	2.22	
≥5	80 (68.4)	60.59±21.47		.028
Disease activity (SLEDAI)	7.34 ± 4.79			
<6	43 (36.7)	69.75±19.13	2.22	.028
≥6	74 (63.3)	60.59±21.47		

[a,b,c]=Scheffe test; SLEDAI=Systemic Lupus Erythematosus Disease Activity Index

Anxiety, depression, and quality of life

The mean anxiety score was 6.98, and 58.1% of the participants were classified as normal. However, 27.4% and 14.5% of them had mild and moderate levels of anxiety, respectively. The mean depression score was 6.63, and 59.8% of the participants were classified as normal. In contrast, 21.4% and 18.8 % of them had mild and moderate levels of depression, respectively. The mean overall quality of life score was 63.49. The highest mean emerged for physical health (68.94), and the lowest means emerged for fatigue (58.17) and burden to others (53.56) (Table 2).

Table 2. Anxiety, depression, and quality of life (N=117)

Variables	N (%) or Mean±SD
Anxiety (HADS-A)	6.98±4.22
0～7	68 (58.1)
8～10	32 (27.4)
11～21	17 (14.5)
Depression (HADS-D)	6.63±3.82
0～7	70 (59.8)
8～10	25 (21.4)
11～21	22 (18.8)
Quality of life (LupusQoL)	63.49±21.12
Physical health	68.94±21.88
Pain	62.04±28.92
Planning	66.52±25.05
Intimate relationships	61.95±28.27
Burden to others	53.56±27.34
Emotional health	66.63±23.64
Body image	61.71±25.26
Fatigue	58.17±25.74

HADS-A=Hospital Anxiety and Depression Scale-Anxiety; HADS-D=Hospital Anxiety and Depression Scale-Depression; LupusQoL=Lupus Quality of Life

Demographic and clinical differences in quality of life

The quality of life of the participants differed as a function of their subjective socioeconomic status (F=3.60, P=0.031) and duration since diagnosis (t=2.22, P=0.028). In other words, the quality of life of those with a low subjective socioeconomic status (53.38) was poorer than that of those with good (61.72) and moderate (66.60) subjective socioeconomic statuses. Moreover, the quality of life of those with durations since diagnosis that were <5 years (69.75) was better than the quality of life of those with duration since diagnosis that were ≥5 years (60.59) (Table 1).

Correlation between quality of life and disease activity, anxiety, and depression

Quality of life was inversely related to disease activity (r=-0.38, P< 0.001), anxiety (r=-0.64, P<0.001), and depression (r=-0.57, P< 0.001).

Predictors of quality of life

Based on the univariate analysis results, we identified the variables that significantly affected the quality of life. One such variable, namely, subjective socioeconomic status, was converted into a dummy variable. Multiple regression analysis was conducted, and disease duration, disease activity, anxiety, and depression were entered as continuous variables. The estimated regression model was significant (F=20.94, P<0.001) and explained 53 % of the quality of life variance. The strongest predictor of quality of life was anxiety (β=-0.38, P<0.001), followed by disease activity (β=-0.25, P<0.001), depression (β=-0.23, P=0.016), and duration since diagnosis (β=-0.17, P=0.012) (Table 3).

Table 3. Predictors of quality of life (N=117)

Variables	*β*	SE	partial R^2	95% CL	*P*
Intercept		5.01		83.60-103.48	<001
Subjective economic status: moderate	.15	3.68	0.05	-0.52-14.05	.068
Subjective economic status: good	.03	5.09	0.01	-8.25-11.90	.721
Duration since diagnosis: ≥5 years	-.17	2.97	0.04	-13.46 to -1.69	.012
Disease activity (SLEDAI)	-.25	0.30	0.06	-1.69 to -0.50	<.001
Anxiety (HADS-A)	-.38	0.50	0.10	-2.86 to -0.89	<.001
Depression (HADS-D)	-.23	0.53	0.28	-2.34 to -0.24	.016
R^2			.53		
Adjusted R^2			.51		
F (*p*)			20.94 (<.001)		

SE=Standard error; CL=Confidence Limits; SLEDAI=systemic lupus erythematosus disease activity index.
HADS-A=Hospital Anxiety and Depression Scale-Anxiety; HADS-D=Hospital Anxiety and Depression Scale-Depression.
Reference: subjective economic level (poor), duration since diagnosis (<5 years).

Discussion

This study investigated the correlations between anxiety, depression, and quality of life and identified the predictors of Korean lupus patients' quality of life. In this study, the participating lupus patients obtained a mean quality of life score of 63.49 out of 100, indicating an average quality of life. This value is comparable to the quality of life scores that have been obtained by British (*M*=63.38, range=51.98–72.79) (20) and Turkish (*M*=60.9) lupus patients (21) but lower than the scores that have been obtained by lupus patients in Mexico (*M*=68.4)(6).

Among the different quality of life domains, the lowest mean emerged for the burden to others. The same results were observed among lupus patients in Mexico (6) and Turkey (22). As a result of chronic and unpredictable disease activity, lupus patients often need others' help in their daily lives or at work. Previous studies have found that patients report poorer quality of life when they have difficulty walking or engaging in self-care (7). In contrast, they report better quality of life when they can independently participate in social activities (3). Therefore, efforts should be taken to provide useful resources to patients who lack the ability to engage in self-care to continue participating in social activities and pursuing their careers as much as possible.

In this study, anxiety, disease activity, depression, and duration since diagnosis emerged as significant predictors of lupus patients' quality of life. Further, anxiety was found to be the stronger predictor of quality of life. In a previous study, anxiety levels were significantly higher in lupus patients than healthy and rheumatoid arthritis patients (23). Lupus patients may perceive their quality of life as poor because of their high levels of anxiety, resulting from the uncertainty surrounding their treatment and the financial burden that treatment, caregiving, and engagement in daily life activities entail (15). In this study, the lupus patients obtained a mean anxiety score of 6.98, and more than 40 % of them had mild or moderate levels of anxiety. In contradistinction to the present findings, Portuguese lupus patients obtained mean anxiety scores of 9.31 in previous studies (12), respectively. Similar to this study, the previous study had also used convenience samples of outpatients. Thus, it remains unclear whether these differences in anxiety levels are attributable to differences in the participants' disease-related characteristics or their cultural backgrounds. Also, previous research found that higher cumulative

glucocorticoid dose was associated with anxiety in lupus patients (24). But we did not investigate the role of cumulative glucocorticoid dose and anxiety.

In a previous study conducted among long-term patients, depression had a stronger effect on the quality of life than anxiety did (25). In this study, anxiety emerged as a stronger predictor than depression (11,26). In general, lupus patients in Korea periodically receive outpatient care and the usual medication-oriented treatment for their symptoms. Medical professionals should pay more attention to the anxiety levels and unmet needs (16) of patients who rely on home-based self-care. In addition, high-risk individuals should be identified based on the severity of their anxiety, and active interventions (e.g., psychological counseling) should be provided. In this study, anxiety (i.e., the severity of anxiety symptoms) had a stronger effect on the quality of life than the other variables, including disease activity. Therefore, medical professionals should not overlook their patients' emotional states when they formulate a treatment plan.

Consistent with previous findings (6, 27) disease activity emerged as a predictor of quality of life. Disease activity refers to the level of clinical activity of a disease in a patient, and it is ascertained by assessing his or her condition (27). It is an index of a patient's response to treatment and a predictor of their quality of life (6). The present findings suggest that greater disease activity is associated with poorer quality of life among lupus patients. These results are consistent with the findings of a study conducted among Swiss lupus patients (27). Higher levels of disease activity increase physical (e.g., physical dysfunction), emotional, and socioeconomic burden (13). Consequently, patients may perceive their quality of life to be poor.

In this study, depression predicted lupus patients' quality of life. Their mean depression score was 6.63, and more than 40 % of the participants had mild or moderate depression. This score is higher than the depression scores obtained by Turkey lupus patients (1) in a previous study. Previous studies have found that depression has a negative effect on the quality of life (6). Lupus patients experience depression because of their physical dysfunction, poor self-esteem, and lethargy (7), and patients with depression have a poorer quality of life than patients without depression (1). In this study, depression was the third strongest predictor of quality of life, following anxiety and disease activity. Whereas anxiety is experienced for only short durations of time, depression has long-term effects on quality of life (15). Because anxiety can have fatal consequences (e.g., medication nonadherence, job loss, and suicide) (14,28), it must be treated as an important factor. Quality of life is increasingly assessed to ascertain treatment interventions' effects on patients with chronic illnesses who require continuous and repeated treatment (e.g., lupus). However, such patients are not adequately screened for anxiety and depression, which are likely to adversely affect their quality of life. Therefore, to improve patients' quality of life, anxiety and depression should be systematically assessed, and active interventions and treatments for lupus should be provided.

In this study, participants whose duration since diagnosis were ≥5 years reported poorer quality of life than those whose duration since diagnosis were <5 years. In general, longer disease duration are expected to be associated with the recovery of quality of life within the domains of physical functions and mental health as patients adapt to their disease and treatment processes (27). This is the case because the physical dysfunction that results from the disease worsens as the disease duration increases. Further, the number of life domains within which limitations are experienced an increase, and social interest and support decrease (29). Longer disease durations increase patients' risk of developing depression, anxiety, cognitive disorders, and social dysfunction (5). Therefore, medical professionals should be mindful of disease durations when developing treatment plans and assessing lupus patients' responses to treatment and their quality of life.

There are some limitations to this study. The present findings have limited generalizability because convenience sampling was used to recruit the lupus patients. Also, most participants of this study were female because of the prevalence of lupus disease characteristics. In addition, the generalizability of this study was limited by the Korean version of the Lupus Quality of Life.

Furthermore, we did not examine differences in quality of life due to the severity of their symptoms, complications, and medication. Moreover, we did not consider the quality of life of patients with both anxiety and depression. In this study, we examined the quality of life of Korean lupus patients. The results suggest that their anxiety should be reduced intervention to improve their quality of life. The findings also underscore the need for systematic assessments of patients' quality of life with long disease durations. This study is significant because its findings enhance our understanding of Korean lupus patients' quality of life and offer new information about their preferential needs to medical professionals.

Conclusion

This study identified the predictors of the quality of life of lupus patients. Specifically, in addition to disease-related characteristics such as duration since diagnosis and activity, anxiety and depression emerged as important factors that should be preferentially addressed to improve lupus patients' quality of life. Several important conclusions can be drawn based on the present findings. First, to improve lupus patients' quality of life, medical professionals should closely monitor and alleviate their anxiety. Second, the findings underscore the need to offer various types of resources useful to patients with long disease durations to improve their quality of life. Further, longitudinal studies should be conducted to examine variations in the quality of life levels (i.e., overall and within each domain) as a function of disease duration and activity changes.

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Conflict of interest

The authors declared no potential conflicts of interest.

References

1. Yilmaz-Oner S, Oner C, Dogukan FM, Moses TF, Demir K, Tekayev N, Yilmaz N, Tuglular S, Direkemeli H. Anxiety and depression predict quality of life in Turkish patients with systemic lupus erythematous. Clinical and Experimental Rheumatology. 2015 May-Jun;33(3):360-5.
2. Bae EH, Lim SY, Han KD, Jung JH, Choi HS, Kim HY, Kim CS, Ma SK, Kim SW. Trend of prevalence and incidence of systemic lupus erythematosus in South Korea, 2005 to 2015: a nationwide population-based study. Korean Journal of Internal Medicine. 2020 May;35(3):652-61. doi: 10.3904/kjim.2018.303.
3. Larsen. JL, Hall EOC, Jacobsen S, Birkelund R. The existential experience of everyday life with systemic lupus erythematosus. Journal of Advanced Nursing.2018;74:1170-9. doi:10.1111/jan.13525
4. Hyphantis T, Palieraki K, Voulgari PV, Tsifetaki N, Drosos AA. Coping with health-stressors and defence styles associated with health-related quality of life in patients with systemic lupus erythematosus. Lupus. 2011 Aug;20(9):893-903. doi: 10.1177/0961203311398264.
5. Schmeding A, Schneider M. Fatigue, health-related quality of life and other patient-reported outcomes in systemic lupus erythematosus. Best Practice & Research and Clinical Rheumatology. 2013 Jun;27(3):363-75. doi: 10.1016/j.berh.2013.07.009.
6. Etchegaray-Morales I, Meindez-Martinez S, Jimenez-Hernández C, Mendoza-Pinto C, Alonso-Garcia NE, Montiel-Jarquin A, Lopez-Colombo A, Garcia-Villaserior A, Cardiel MH, Garcia-Carrasco M. Factors associated with health-related quality of life in Mexican lupus patients using the lupusqol. Public Library of

Science ONE. 2017 Jan;12(1):e0170209. doi: 10.1371/journal.pone.0170209.
7. McElhone K, Abbott J, Gray J, Williams A, Teh LS. Patient perspective of systemic lupus erythematosus in related to health-related quality of life concepts: A qualitative study. Lupus. 2010 Dec;19(14):1640-7. doi: 10.1177/0961203310378668.
8. Haghighi AB, Haza SG. Neuropsychiatric manifestations of systemic lupus erythematosus: Iranian experience. Annals of Indian Academy of Neurology. 2010 Apr;13:108-11. doi: 10.4103/0972-2327.64633.
9. Maneeton B, Maneeton N, Louthrenoo W. Prevalence and predictors of depression in patients with systemic lupus erythematosus: a cross-sectional study. Neuropsychiatric Disease and Treatment. 2013;9:799-804. doi: 10.2147/NDT.S44248.
10. Zhang L, Fu T, Yin R, Zhang Q, Shen B. Prevalence of depression and anxiety in systemic lupus erythematosus: A systemic review and meta-analysis. BioMed Central Psychiatry. 2017 Feb;17(1):70. doi: 10.1186/s12888-017-1234-1.
11. Shen B, Tan W, Feng G, He Y, Liu J, Chen W, Huang X, Da Z, Xu X, Liu H, Gu Z. The correlations of disease activity, socioeconomic status, quality of life, and depression/anxiety in Chinese patients with systemic lupus erythematosus. Clinical & Developmental Immunology. 2013; 2013:270878. doi: 10.1155/2013/270878.
12. Figueiredo-Braga M, Cornaby C, Bernardes M, Figueiredo M, Mesquita CDS, Costa L, Poople BD. Correlation between physical markers and psychiatric health in a Portuguese systemic lupus erythematosus cohort: the role of suffering in chronic autoimmune disease. Public Library of Science ONE. 2018 Apr;13(4):e0195579. doi: 10.1371/journal.pone.0195579.
13. Mikdashi J, Nived O. Measuring disease activity in adults with systemic lupus erythematosus: the challenges of administrative burden and responsiveness to patient concerns in clinical research. Arthritis Research & Therapy. 2015 Jul 20;17(1):183. doi: 10.1186/s13075-015-0702-6.
14. Alsowaida N, Alrasheed M, Mayet A, Alsuwaida A, Omair MA. Medication adherence, depression and disease activity among patients with systemic lupus erythematosus. Lupus. 2018 Feb;27(2):327-32. doi: 10.1177/0961203317725585.
15. Shen B, Feng G, Tang W, Huang X, Yan H, He Y, Chen W, Da Z, Liu H, Gu Z. The quality of life in Chinese patients with systemic lupus erythematosus with disease activity and psychiatric disorders: a path analysis. Clinical & Experimental Rheumatology. 2014 Jan-Feb ;32(1):101 -7.
16. Nicassio PM, Carr FN, Moldvan I. An overview of psychological functioning in systemic lupus erythematosus. International Journal of Clinical Rheumatology. 2011;6(5):569-81. doi: 10.2217/IJR.11.45.
17. Bombardier C, Gladman DD, Urowitz MB, Caron D, Chang CH. Derivation of the SLEDAI. A disease activity index for lupus patients. The committee on prognosis studies in SLE. Arthritis and Rheumatism. 1992 Jun;35(6):630-40. doi: 10.1002/art.1780350606.
18. Curtis JR, Yang S, Chen L, Pope JE, Keystone EC, Haraoui B, Boire G, Thorne JC, Tin D, Hitchon CA, Bingham 3rd CO, Bykerk VP. Determining the minimally important difference in the clinical disease activity index for improvement and worsening in early rheumatoid arthritis. Arthritis Care & Research. 2015;67(10):1345-53. doi: 10.1002/acr.22606.
19. Zigmond AS, Snaith RP. The hospital anxiety and depression scale. Acta Psychiatrica Scandinaviaca. 1983 Jun;67(6):361-70. doi: 10.1111/j.1600-0447.1983.tb09716.x.
20. McElbone K, Abbott J, Shelmerdine J, Bruce IN, Ahmad Y, Gordon C, Peers K, Isenberg D, Ferenkeh-Koroma A, Griffiths B, Akil M, Maddison P, Teh LS. Development and validation of a disease-specific health-related quality of life measure, the LupusQol, for adults with systemic lupus erythematosus. Arthritis and Rheumatism. 2007 Aug 15;57(6):972-9. doi: 10.1002/art.22881.
21. Yilmaz-Oner S, Oner C, Dogukan FM, Moses TF, Demir K, Tekayev N, Atagunduz P, Tuglular S, Direskeneli H. Health-related quality of life assessed by LupusQoL questionnaire and SE-36 in Turkish patients with systemic lupus erythematosus. Clinical Rheumatology. 2016 Mar;35(3):617-22. doi: 10.1007/s10067-015-2930-1
22. Pamuk ON, Onat AM, Donmez S, Mengüs C, Kisacik B. Validity and reliability of the lupus QoL index in Turkish systemic lupus erythematosus patients. Lupus. 2015 Jul;24(8):816-21. doi: 10.1177/0961203314565412.
23. Figueiredo-Braga M, Cornaby C, Cortez A, Pharm M, Bernardes M, Terroso G,

Figueiredo M, Santos Mesquita CD, Costa L, Poole BD. Depression and anxiety in systemic lupus erythematosus: the crosstalk between immunological, clinical, and psychosocial factors. Medicine (Baltimore). 2018 Jul;97(28):e11376. doi: 10.1097/MD.0000000000011376

24. Mak A, Tang CSK, Chan MF, Cheak AAC, Ho RCM. Damage accrual, cumulative glucocorticoid dose and depression predict anxiety in patients with systemic lupus erythematosus. Clinical Rheumatology. 2011 Jun;30(6):795-803. doi: 10.1007/s10067-010-1651-8

25. Yang YO, Kim M, Park KY. Meta-analysis of social psychological factors related to quality of life in stroke patients. Journal of Korean Academy of Community Health Nursing. 2018;29(4):510-9. doi: 10.12799/jkachn.2018.29.4.510

26. Olesińska M, Saletra A. Quality of life in systemic lupus erythematosus and its measurement. *Reumatologia.* 2018;56(1):45--54. doi: 10.5114/reum.2018.74750.

27. Chaigne B, Chizzolini C, Perneger T, Trendelenburg M, Huynh-Do U, Dayer E, Stoll T, von Kempis J, Ribi C. Impact of disease activity on health-related quality of life in systemic lupus erythematosus-a cross-sectional analysis of the Swiss systemic lupus erythematosus cohort study (SSCS). BioMed Central Immunology. 2017 Mar;18(1):17. doi: 10.1186/s12865-017-0200-5.

28. Yim HW, Jeong H, Jung YE, Wang HR, Kim SY. Management of depression and suicide. Journal of the Korean Medical Association. 2011 Mar;54(3):275-83. doi: 10.5124/jkma.2011.54.3.275

29. Mazzoni D, Cicognani D. Social support and health in patients with systemic lupus erythematosus: a literature review. Lupus. 2011 Oct;20(11):1117-25. doi: 10.1177/0961203311412994.