Avicenna Journal of Neuro Psycho Physiology
doi: 10.53208/AJNPP.12.1.33 2025 July;12(1): 33-40 https://ajnpp.umsha.ac.ir

Original Article

Impact of Acceptance and Commitment Therapy-based Training Program on the Quality of Life, Anxiety, and Depression in Women with Systemic Lupus Erythematosus in Tehran

Minoo Irani[1], **Hossein Zare**[2*], **Mohammad Oraki**[3], **Ezatallah Kordmirza Nikoozadeh**[4], **Amin Rafieipour**[5]

1. PhD Student, Department of Psychology, Payam-e-Noor University, Tehran, Iran
2. Professor, Department of Psychology, Payame Noor University, Tehran, Iran
3. Professor, Department of Psychology, Payame Noor University, Tehran, Iran
4. Associate Professor, Department of Psychology, Payame Noor University, Tehran, Iran
5. Associate Professor, Department of Psychology, Payam-e-Noor University, Tehran, Iran

***Corresponding author:**
Hossein Zare, Department of Psychology, Payame Noor University, Tehran, Iran
Tel: +989122334723
Email: h_zare@ pnu.ac.ir

Received: 5 May 2024
Accepted: 18 July 2025
ePublished: 19 July 2025

Abstract

Background and Objective: Systemic lupus erythematosus (SLE), as a chronic and debilitating disease, causes anxiety in affected people and leads to worry and tension in response to threatening conditions, and ultimately, results in decreased quality of life. Therefore, it is highly critical to apply appropriate training interventions to mitigate the potential psychological consequences in such patients. One of the training methods is Acceptance and Commitment Therapy (ACT), which has been addressed in a few studies. Therefore, the present study aimed to assess the effect of the ACT program on the quality of life, anxiety, and depression in women suffering from SLE in Tehran.

Materials and Methods: This quasi-intervention study was performed on 30 SLE-afflicted women residing in Tehran in 2024. The participants were selected via the convenience sampling method and randomly allocated to two intervention and control groups (n=15 in each group). The data were collected by the World Health Organization Quality of Life Questionnaires (WHOQOL-BREF) and the Hospital Anxiety and Depression Scale (HADS), which were completed by the control and intervention groups before and two months after the intervention. The data were analyzed in SPSS Software (version 27) using the Wilcoxon test, Mann-Whitney U test, and Fisher's exact test.

Results: The results of the Mann-Whitney test indicated that before the training intervention, no statistically significant difference was observed between the intervention and control groups in terms of the mean score of quality of life ($P=0.945$), depression ($P=0.612$), and anxiety ($P=0.095$), while after the training intervention, a significant difference was spotted between the two groups in quality of life, depression, and anxiety ($P<0.05$).

Conclusion: The results of the present study demonstrated the positive effect of the ACT program on women suffering from SLE. The findings of this study can be employed first for the patients themselves, then for their families, the countrywide medical universities, and the Ministry of Health. Furthermore, they can provide valuable information for designing and planning future interventions.

Keywords: Anxiety, Depression, Quality of life, Systemic lupus erythematosus, Women

Background

Systemic lupus erythematosus (SLE) is a chronic autoimmune disease characterized by inflammation and immune-mediated damage to multiple organ systems, including the mucosal, musculoskeletal, hematological, and renal systems [1]. Lupus affects multiple body systems and organs at different times and causes extensive damage to connective tissue and blood vessels [2]. The exact cause behind lupus is not established yet; nonetheless, researchers have recognized genetic and environmental stressor risk factors in its development [3]. The disease prevalence was reported in 2025 in the study by Alexander et al. (2025) as 40.47 per 100000 persons in 2012 and 59.87 per 100000 persons in 2019 [4]. Li et al. (2024) reported its prevalence in women living in China as 14.09 per 100000 person-years [5]. Along the same lines, in their study, Bournia et al. (2024) indicated that in 2023, lupus prevalence increased by 19% compared to 2019 [6]. This implies the marked increase in lupus in recent years [7].

Lupus often affects multiple organs [8], and it commonly manifests with symptoms, such as fatigue, fever, and arthritis, which can negatively impact the quality of life (QoL) and daily functioning [9]. in their study, Fei et al. (2025) noticed low quality of life in the patients with lupus [10]. Tanaka et al. (2025) also pointed out a low standard of living in lupus suffering patients in their research [11]. A lupus diagnosis can have a profound impact on the suffering individual's mental and emotional health, and the person may experience mental and physical problems, including difficulty concentrating or sleeping. The sufferer may also experience feelings, such as sadness, fear, anxiety, and depression [12]. Pratama et al. (2025) indicated high levels of stress and depression in lupus afflicted women in their study [13]. In another research conducted by Beider et al. (2025), high levels of stress and depression were reported in women with lupus [14].

Given the importance of the quality of life in lupus suffering women and their high levels of anxiety and depression, it is required to focus on boosting the quality of life and relieving stress and depression in this group. In their study, Masadeh et al. (2025) highlighted the importance of quality of life in lupus sufferers and emphasized the requirement to implement health interventions in the affected women [15]. In the same vein, Chang et al. (2025) pointed out the significance of employing interventions to improve the mental health of women with lupus [16]. Furthermore, various psychological treatments have been utilized to promote positive variables and reduce negative variables in patients with psychosomatic diseases, each of which has its own effectiveness [17].

One of the vital psychological interventions for enhancing the quality of life and mitigating anxiety and depression in the affected patients is acceptance and commitment therapy (ACT)-based intervention [18]. ACT-based intervention, as a third wave of cognitive behavioral therapy, stresses the development of psychological flexibility, i.e., the ability to adaptively respond to internal experiences while engaging with a psychological status [18]. This training intervention integrates diverse evidence-based techniques, including mindfulness, acceptance, cognitive dissonance, values clarification, and behavior change strategies to promote well-being and improve performance [18]. Some studies have focused on applying ACT-based training methods in lupus suffering patients. Among these investigations, we can refer to the studies conducted by McCormick et al. (2022) and Echeverría et al. (2022) [19, 20]. Patients with lupus are highly exposed to anxiety and depression due to their conditions; moreover, there is a marked decline in their quality of life, social relationships, physical activity, and specific types of nutrition (all of which are dimensions of quality of life). On the other hand, the number of patients with lupus is currently increasing, and Iran is no exception in this regard. In light of the aforementioned issues, the present research aimed to evaluate the impact of an ACT-based training program on the quality of life, anxiety, and depression of SLE-suffering women in Tehran.

Objectives

This study was designed and implemented to assess the effect of the ACT program on the quality of life, anxiety, and depression in SLE-suffering women in Tehran.

Materials and Methods

The present study was conducted based on a quasi-intervention pre-test and post-test design with intervention and control groups. The statistical population of the study included the female patients suffering from SLE (n=30) who were referred to the Government Medical Clinic in Tehran. The inclusion criteria entailed dwelling in Tehran, having an active disease file under the supervision of a physician, cooperating with the researcher to receive the due training, not having similar training, the willingness to participate in the study, and adequate visual and auditory functioning. On the other hand, the exclusion criteria were withdrawal from further cooperation and reluctance to receive training interventions.

Sample Size and Sampling

The sample size was figured out following a similar study by Arjol et al. (2022) entitled "Brief Acceptance and Commitment Therapy Group Intervention on Systemic Lupus Erythematosus" [18]. The sample size was calculated at 30 cases using the formula for the mean difference in the two populations, a 0.95% confidence level, and 80% test power.

Study Protocol

Firstly, the research project was registered in Payam-e-Noor University Ethics Committee system and received an ethics code (IR.PNU.REC.1403.666. Following that, a list of hospitals that provide lupus-suffering patients with medical services was extracted, the hospitals were referred to, and the patients were personally spoken to and asked to participate in the project. Thereafter, the patients completed the pre-test questionnaires, and households participating in the study were registered. The patient list was written on paper, and the first patient was then randomly allocated to the intervention group, and the second patient to the control group, and this process continued until the end of the patient list. For this purpose, and considering that the researcher kept contact with the patients, assigning the patients to the study groups was performed by another person (the second researcher). To implement and carry out the current research, the questionnaires were completed in both groups, i.e., the intervention and control groups, before the intervention (the questionnaire was completed at the hospital before discharge by the researcher). Next, for the intervention group, the eight 90-minute training sessions were run for two weeks in the hospital before discharge (the interventions were designed only for the intervention group, while the control group received the routine care at discharge, and the designed intervention was not available to them). The training intervention was designed based on a review of various resources (18, 19 references and the protocol developed by Hayes et al. (2013). It was then verified by the faculty members (n=3), experts (n=1), and an internal specialist (n=1). The face-to-face method for the patients was established by the researcher. The hospital was selected as the training location. The patients' physician also helped the researcher with the training. Finally, all patients completed post-test questionnaires, and statistical analysis was carried out based on project objectives.

Training Intervention

The ACT program followed the content of the ACT-based training protocol (Hayes et al., 2013, and similar literature review), which was implemented for the intervention group for two weeks.

Table 1. ACT-based training content summary (Hayes et al., 2013)

Session	Session summary
1	Getting to know the members - Raising confidentiality issues - Talking about the goals and type of therapy - Talking about thoughts, feelings, physical symptoms, desires, and memories - Giving tasks - Administering the pre-test.
2	Reviewing the response to the session before Task Revision - The therapist helps the members identify all actions they do to reduce or avoid inner experiences and anxiety, and to evaluate the effectiveness of these strategies (creative hopelessness), where the “digging a hole” metaphor was used. (Falling into a hole and the only thing there is a shovel, so people in this situation start digging to save themselves from the hole, and this is similar to what people do for their inner experiences, thoughts, feelings, and physical symptoms.) For example, the things they do to relieve anxiety, such as distraction, talking to themselves, avoiding situations, etc. Giving a task on identifying their diggings.
3	Reviewing the response to the session before Task Revision- As members reached creative hopelessness, introducing harness as a problem in this session was also used as a metaphor. The inner and outer worlds and their laws were explained. The” childhood “metaphor and the “polygraph” metaphor (a detector) were also mentioned. These metaphors mean the harnessing approaches we utilize for inner experiences and this example is a child who makes a fuss for getting something and satisfying his/her need in this way makes him/her learn in this way, and each time louder. Giving a task, identify all the tasks that they use as a harness.
4	Reviewing the response to the session before Task Revision- The discussion of acceptance/experiential willingness, pure suffering, and impure suffering was elaborated to the members. The explanation on willingness, an alternative to harness through expressing the “two scales” metaphor, which intends to increase the degree of willingness towards inner experiences, i.e., thoughts, emotions, etc., instead of decreasing them- Giving the willingness task for the next session.
5	Reviewing the response to the session before Task Revision of the members- The exercises and metaphors used in this session were used to indicate that these are just thoughts, feelings, memories, desires, and physical symptoms and should not be considered as reality, so that the chessboard metaphor was applied. By decoupling, it means that the clients should consider themselves as a page that is merely in charge of keeping the internal events, not fighting the due thoughts and feelings. The “passenger on the bus “metaphor was also expressed for this goal. The concept of the self was stated, replacing the self-as-context or transcendent sense of self, conceptualized in place of the self, meaning that the clients can simply experience unpleasant internal experiences at the moment and are able to separate the self from unpleasant reactions, memories, and thoughts.) The expression of a behavioral commitment (a commitment that the clients can maintain 100%).
6	Reviewing the previous session content. Revision of the tasks. To create mindfulness at the present moment, an exercise was done as a self-observer. For further practice in looking at thoughts and feelings as well as moving in the direction of values, the” train” metaphor and the” beggar at the door” metaphor were used. These metaphors address the fact that all emerging thoughts, feelings, and memories we don't like are like beggars who enter our party. If we only focus on them, we will lose our purpose, which is the party, i.e., we will only seek to externalize our inner experiences rather than addressing the values of life. The task is weighing values and specifying them.
7	Resolving the ambiguities about the previous session. The task revision. After identifying the members’ values, the goals and actions that would drive the members consistent with such values are determined to direct the members toward the committed actions. Explaining the “tree planting “metaphor. The “bubble “metaphor is illustrated as well. Giving the clients a values statement form as a task and asking them to write down their short-term and long-term goals, analyze the obstacles, and commit to them.
8	Revision of all the materials and metaphors of the previous sessions by the clients. Reviewing the tasks of all members. Changing the behavior of the members in line with the created values, accomplishing multiple goals by the members. Terminating the sessions. And ultimately, implementing the post-test.

Data Collection Tools

The data were collected by a demographics questionnaire containing personal information about the individuals and the World Health Organization Quality of Life Questionnaire (WHOQOL-BREF) and the Hospital Anxiety and Depression Scale (HADS).

Demographics questionnaire: The questionnaire in this section included six options and some variables, such as age, marital status, education, job, and economic status.

World Health Organization Quality of Life Questionnaire (WHOQOL-BREF): The WHOQOL is a quality of life assessment tool developed by the WHOQOL Group with 15 international field centers, simultaneously, in an attempt to develop a quality of life assessment that would be applicable cross-culturally. The WHOQOL-BREF assesses quality of life (QOL) within the context of an individual's culture, value systems, personal goals, standards, and concerns. The WHOQOL-BREF questionnaire is made up of 26 items measuring an individual's general quality of life. This scale was developed in 1996 by a group of WHO experts through modifying the items of the 100-item form of this questionnaire. The score ranges from 1-130, and the average score is 65. In Iran, Nejat et al. (2006) translated this scale into Persian and reported its validity and reliability. Cronbach's alpha coefficient of 0.84 indicates its favorable internal consistency [21].

Hospital Anxiety and Depression Scale (HADS): The Hospital Anxiety and Depression Scale, developed by Zigmond & Snaith (1983), is a 14-item self-report questionnaire used to assess mood changes, particularly anxiety and depression. HADS focuses on non-physical symptoms so that it can be used to diagnose depression in people with significant physical ill-health. Any overlap, for instance, impaired concentration secondary to pain rather than depression, is usually easy to separate on an individual basis. This scale includes 7 items pertinent to anxiety symptoms (items 1,4,5,8,9,12, and 13) and 7 items about depression symptoms (items 2, 3,6,7,10,11, and 14). This questionnaire is scored on a 4-point scale (0, 1,2, 3). Its validity and reliability were confirmed in Iran. In a study conducted by Amini et al. (2017), Cronbach's alpha coefficients for the two subscales of anxiety and depression were obtained at 0.866 and 0.735, respectively, indicating satisfactory convergent validity [22].

Data Method

To collect the data, first, the code of ethics was received from the Ethics Committee (IR.PNU.REC.1403.666) of Payam-e-Noor University. Thereafter, the required permits were obtained from the university, and the researcher visited the public hospitals and extracted the patient list after getting the due consent. Thereafter, the pre-test questionnaires were handed to the hospital, and the information was provided about how to complete the questionnaire, the study purpose, and the conditions for quitting the study. In addition, the patients were given time to complete the questionnaires, and a week later, the researcher collected the questionnaires by visiting the hospital. Subsequently, after determining the intervention group and two months after the training intervention, the post-test questionnaires were collected again from the intervention and control groups.

Data Analysis

Data were analyzed using SPSS software (version 27). The mean, standard deviation, and frequency indices were employed to describe the data. Fisher's exact test, Mann-Whitney, and Wilcoxon tests were used to analyze the data. The significance in all tests was considered 0.05.

Results

Table 2 displays the demographic information of the two intervention and control groups in the study. The results revealed that 8 (53.33%) and 7 (46.7%) cases in the intervention and control groups were married, respectively. Regarding education level, 7 (46.7%) and 7 (46.7%) subjects in the intervention and control groups had secondary/primary education, respectively. Most of the subjects in both intervention and control groups, i.e., 9 (60%) cases, had jobs. Most subjects, that is, 13 (86.66%) and 14 (93.4%) subjects in the control and intervention groups had adequate economic status, respectively. According to the results of the Chi-square and Fisher's exact tests, the two groups were homogeneous in terms of marital status, education, job, and economic status (P>0.05). The mean age scores in the intervention and control groups were 38.04±3.89 and 39.16±3.64 years, respectively. According to the Mann-Whitney test, no significant difference was observed between the mean age scores of the two groups (P=0.894). (Table 2).

Table 2. Comparing the frequency distribution of the primary variables of participants in the two groups

Variable		Intervention group n (%)	Control group n (%)	P-value
Marital status	Married	8 (53.33)	7 (46.7)	0.354*
	Single	7 (46.7)	8 (53.33)	
Education	Secondary level	7 (46.7)	7 (46.7)	
	High-school level/diploma holder	7 (46.7)	6 (40)	
	Academic	1 (6.7)	2 (13.3)	
Employment	Office holder	9 (60)	9 (60)	0.214**
	Housewife	6 (40)	6 (40)	
Economic status	Good	13 (86.66)	14 (93.4)	0.305*
	Average	2 (13.33)	1 (6.7)	
Age(mean± S.D)		38.04±3.89	39.16±3.64	0.894***

* Chi-square test ,** Fisher's exact test, *** Mann-Whitney test

Table 3 demonstrates the comparison of the mean score of quality of life, anxiety, and depression in the intervention and control groups of pre-and post-intervention. The results of the pre-intervention Mann-Whitney test indicated no statistically significant difference between the intervention and control groups in terms of the mean score of the quality of life (P=0.945), depression (P=0.612), and anxiety (P=0.095), while that of the post-intervention revealed a tangible difference between the quality of life, depression, and anxiety (P<0.05).

Table 3. Comparing mean scores of quality of life, anxiety, and depression in two groups of pre-and post-intervention

Model variables	Group	Pre-intervention mean± S.D	Post-intervention mean± S.D	P-value **
Quality of Life	Intervention	54.26±6.57	107.20±12.39	0.001
	Control	54.33±6.64	54.13±6.01	0.845
P-value*		0.945	0.001	
Depression	Intervention	24.73±3.61	10.66±4.13	0.001
	Control	24.13±2.85	24.73±3.61	0.065
P-value*		0.612	0.001	
Anxiety	Intervention	24.3±66.06	10.46±3.96	0.001
	Control	24.46±2.69	24.73±3.61	0.115
P-value*		0.095	0.001	

* Mann-Whitney test, ** Wilcoxon tests

Discussion

The current study was conducted to investigate the impact of ACT-based training intervention on the quality of life, anxiety, and depression in women suffering from SEL in Tehran. The results demonstrated that the ACT-based intervention program was effective in improving the quality of life, anxiety, and depression among the SEL-suffering women. As revealed by the analysis, there was no tangible difference in demographic variables between the two intervention and control groups, indicating demographic homogeneity between the two groups, which can increase the validity of the study results. It can be concluded that any different results could be ascribed to the intervention and not the initial differences between the groups. Furthermore, based on the results of the analysis, the distribution of the mean and standard deviation of age was the same in the two groups, implying that the age variable was not confounding.

In accordance with the results, the training program led to an improvement in the average quality of life in women living with lupus. The interpretation of this finding indicates that the average quality of life in the ACT-based intervention group was enhanced compared to that of the control group, and the difference was statistically meaningful. This finding was consistent with those reported in the studies by Kavvadia et al. (2025) [23], Geertsema-Hoeve et al. (2024) [24], Hamed et al. (2024) [25], Canal-Pérez et al. (2024) [26], and Tuna et al. (2024) [27]. Although the aforementioned studies did not specifically survey the impact of ACT-based training intervention on the quality of life, they did conduct quality interventions promoting the quality of life of patients suffering from lupus, and this is in agreement with the findings of the present study.

In the present study, the possible explanations for why the ACT-based training program enhanced patients' quality of life relate to the emphasis on the training method during the sessions. The ACT-based intervention comprises four approaches, including awareness, acceptance, commitment, and behavior change. The overall goal of this training approach is to eventually gain psychological flexibility in a way that does not require eliminating bad feelings, rather, it allows the individual to move toward thoughtful value-based behavior despite the presence of these feelings. In this study, the researcher made efforts to include all four approaches in the program. In the first approach, the goal is to reach awareness. The researcher trained the women to experience their suffering with full awareness, accept the environment and social behavior, and focus on full engagement with the community.

In general, the ACT-based training program supported women with lupus in developing a strong understanding of their emotions, ensuring these feelings did not hinder their expressions, and enabling them to fully experience their emotions. The comprehensive experience of emotions through the decoupling mechanism and self-acceptance was carried out during the training so that the women could reduce the expression of emotions and rely on acceptance and commitment. On the other hand, the second approach of this intervention is based on acceptance; therefore, in the training process, the researcher tried to help the affected women understand that the unpleasant thoughts related to the illness have temporarily dominated them. For instance, if women felt that they were not embraced by their society or family, efforts were made to convince them that their current struggle was an illness that necessitated additional support from their loved ones. This perception may hinder their acceptance within the family, which reflects the viewpoint of the patient and does not necessarily mirror the feelings of family members. To resolve this issue, the researcher requested the women to first engage in an in-depth discussion about any conversations or issues they were experiencing within their families and to examine the surrounding circumstances .

Sometimes, it is possible that family members themselves are involved in some issues, and the problem-induced side pressure has brought about an interaction with them that has nothing to do with the patient. In the third approach, based on the training, efforts were made to teach the women with lupus to accept the unwanted feelings, emotions, and desires imposed on them by society. They made no attempt to change it, escape from it, or even pay attention to it again, and allowed it to come to acceptance inside. Finally, in the fourth approach, the women were taught to change their behaviors for their treatment and improve their quality of life.

The results of the current study displayed that the training intervention led to a meaningful reduction in the mean anxiety and depression in the intervention group compared to that of the control group. This finding can be interpreted this way that after holding the ACT-based sessions, the mean stress and anxiety in the training group declined. This finding was congruent with the results of previous studies, namely those conducted by Yousefzadeh et al. (2022) [28], Ahmed et al. (2023) [29], Gavilán-Carrera et al. (2022) [30], Abdelrahman et al. (2023) [31], and Williams et al. (2023) [32]. One potential explanation for this observation is that the core principle of the ACT-based training in its initial stage is the acceptance or readiness to embrace distressing experiences without the urge to exert control over them. In the case of lupus and ACT-based training, in the first stage, women accept their disease without being willing to harness it, and then in the second stage, they start to act based on commitment. This training model indeed brings about a constructive shift in the thought processes and actions of individuals facing challenges, working to alter or avert harmful behaviors while promoting improved mental health and general well-being, as well as increasing psychological adaptability. In this program, initially, if prior to the intervention the individual exhibited behaviors that increased the risk of infection, during the training process, she begins to take steps based on commitment and discovers how to cultivate healthy experiences by removing the undesirable ones. In lupus, the ultimate goal in treating patients is to control the disease and prevent complications. The ACT-based training program was able to reduce stress. In patients with type 2 diabetes, there are some unwanted complications that cannot be harnessed but are controllable, and the ACT-based training program can remind patients of the importance of adherence to therapy and that if they do not follow the treatment, they may undergo complications. This training results in creating sensitivity in the patients, and ultimately, the patients feel obligated to follow the measures included in the training and prevent complications.

Strengths

Among the strong points of this study, we can refer to developing an ACT-based training program, using face-to-face training in a hospital setting, conducting the study in a population with psychological distress, and supplying practical educational material and the novelty of the topic for women.

Limitations

One of the notable limitations of this study is the self-reporting of the individual. Another limitation is that due to the presence of the researcher when completing the questionnaire, the possibility existed that the respondent could not answer the options accurately. Another limitation of the current study is the short follow-up period. Therefore, it is recommended to use longer intervention studies in future studies. The final limitation is not being able to generalize the results of this project to other places due to cultural differences. Consequently, it is suggested to design and implement this project in other provinces as well.

Conclusion

The results of the present study demonstrated that the ACT-based training intervention was effective in improving the quality of life, anxiety, and depression in women suffering from lupus. As indicated by this study, the ACT-based training program led to the acceptance of the disease in women with lupus. After creating awareness of their own disease, the women established a positive relationship with themselves and accepted their disease. Eventually, through creating a commitment in themselves, they brought about a change in behavior, which in this case resulted in improved quality of life and decreased anxiety and depression. The results of this study can be employed first for the patients themselves, then for their families, the countrywide medical universities, and the Ministry of Health. Furthermore, they can provide valuable information for designing and planning future interventions to the associated organizations, such as the Ministry of Health, medical universities, and counseling centers.

Ethical Considerations

This article was extracted from a student thesis with code (IR.PNU.REC.1403.666) at Payam-e-Noor University, the International Branch.

Acknowledgments

The author sincerely appreciates the Deputy of Research at Payam-e-Noor University, hospital colleagues, and the afflicted women, who collaborated in executing this project.

Authors' Contributions

MI, HZ, MO,EKMN and AR conceived and designed the study. MI, HZ, MO and AR collected and analyzed the data. EKMN, interpreted the data. All authors wrote the manuscript and prepared the tables. All authors revised the manuscript and approved the final manuscript.

Funding/Support

This study received no external funding.

Conflicts of Interest

The authors declare that they have no conflict of interest.

References

1. Siegel CH, Sammaritano LR. Systemic lupus erythematosus: a review. JAMA. 2024;331(17):1480-91. [DOI: 10.1001/jama.2024.2315] [PMID]
2. Barber MR, Drenkard C, Falasinnu T, Hoi A, Mak A, Kow NY, et al. Global epidemiology of systemic lupus erythematosus. Nat Rev Rheumatol. 2021 Sep;17(9):515-32. [DOI: 10.1038/s41584-021-00668-1] [PMID] [PMCID]
3. Fatoye F, Gebrye T, Mbada C. Global and regional prevalence and incidence of systemic lupus erythematosus in low-and-middle income countries: a systematic review and meta-analysis. Rheumatol Int. 2022;42(12):2097-107. [DOI: 10.1007/s00296-022-05183-4] [PMID] [PMCID]
4. Alexander T, Sewerin P, Strangfeld A, Schulte M, Borchert J, Garcia TB, et al. Real-world prevalence, incidence and management of systemic lupus erythematosus in germany: a retrospective claims data analysis. Rheumatol Ther. 2025 ;12(2):237-54. [DOI: 10.1007/s40744-024-00735-5] [PMID] [PMCID]
5. Li M, Li C, Cao M, Lu K, Wu C, Wang J, Wei C, et al. Incidence and prevalence of systemic lupus erythematosus in urban China, 2013–2017: A nationwide population-based study. Sci Bull. 2024 ;69(19):3089-97. [DOI: 10.1016/j.scib.2024.04.075] [PMID]
6. Bournia VK, Fragoulis GE, Mitrou P, Tsolakidis A, Mathioudakis K, Vassilopoulos D, et al. Increased prevalence of inflammatory arthritis, systemic lupus erythematosus and systemic sclerosis, during 2020–2023 versus 2016–2019 in a nation-wide cohort study. Rheumatol Int. 2024;44(12):2837-46. [DOI: 10.1007/s00296-024-05733-y] [PMID]
7. Duarte-García A, Hocaoglu M, Valenzuela-Almada M, Osei-Onomah SA, Dabit JY, Sanchez-Rodriguez A, et al. Rising incidence and prevalence of systemic lupus erythematosus: a population-based study over four decades. Ann Rheum Dis. 2022;81(9):1260-6. [DOI: 10.1136/annrheumdis-2022-222276] [PMID]
8. Duangmala P, Sontichai W. Depression and anxiety in childhood-onset systemic lupus erythematosus: prevalence, associated factors, and impact on quality of life and family. Pediatr Rheumatol Online. 2025;23(1):15. [DOI: 10.1186/s12969-025-01067-6] [PMID] [PMCID]
9. Hashemi S, Farahbakhsh S, Aghakhani Z, MomayezanMarnani A, Hemati N, Hashemi S. Health-related quality of life and its related factors in patients with systemic lupus erythematosus in southwest Iran: a cross-sectional study. BMC Psychol. 2023;11(1):259. [DOI: 10.1186/s40359-023-01300-5] [PMID] [PMCID]
10. Fei L, Wu Y, Guan L, Shao Y, Li F, Yu L, Liu Z, Rafay A, Ye L, Lu M, Bai G. Proxy-reported health-related quality of life of children with systemic lupus erythematosus and well-being of caregivers: a cross-sectional survey among caregivers in China. Eur J Pediatr. 2025;184(1):62. [DOI: 10.1007/s00431-024-05899-4] [PMID]
11. Tanaka Y, Miyazaki Y, Hirata S, Kusaka K, Kosaka S, Nakatsuka K, et al. Impact of quality of life on overall work productivity impairment and activity impairment of patients with systemic lupus erythematosus: the PEONY study. Lupus Sci Med. 2025;12(1). [DOI: 10.1136/lupus-2024-001291] [PMID] [PMCID]
12. Gao RC, Wu L, Shi PL, Sang N, Hao M, Wu GC. The impact of distress disclosure and anxiety on the association between social support and quality of life among Chinese women with systemic lupus erythematosus. Front Psychiatry. 2022; 13:893235. [DOI: 10.3389/fpsyt.2022.893235] [PMID] [PMCID]
13. Pratama R, Murni AW. Unraveling the Pathways: A meta-analysis exploring the biopsychosocial mechanisms linking psychosomatic symptoms and systemic lupus erythematosus. Bioscientia Medicina. 2025;9(2):6410-24. [DOI :10.37275/bsm.v9i2.1201]
14. Beider S, Stephan M, Seeliger T, Skripuletz T, Witte T, Ernst D. A comparative cross-sectional study of psychological distress, fatigue, and physical activity in patients with rheumatoid arthritis, systemic lupus erythematosus, and Sjögren's disease. Front Med. 2025;11:1507242. [DOI: 10.3389/fmed.2024.1507242] [PMID] [PMCID]
15. Masadeh A, Nofal BM, Masa'deh R. Effect of Benson relaxation response technique on the quality of life among patients with systemic lupus erythematous: quasi-intervention study. Lupus Sci Med. 2025;12(1). [DOI: 10.1136/lupus-2024-001301] [PMID] [PMCID]
16. Chang A, Winquist NW, Wescott AB, Lattie EG, Graham AK. Systematic review of digital and non-digital non-pharmacological interventions that target quality of life and psychological outcomes in adults with systemic lupus erythematosus. Lupus. 2021;30(7):1058-77. [DOI: 10.1177/09612033211005085] [PMID] [PMCID]
17. Xu H, Teng Q, Zeng Y, Tian C, Yang B, Yao X. Psychoeducational intervention benefits the quality of life of patients with active systemic lupus erythematosus. J Nanomaterials. 2021;2021(1):9967676. [DOI:10.1155/2021/9967676]
18. 18.Pakenham KI. Effects of acceptance and commitment therapy (ACT) training on clinical psychology trainee stress, therapist skills and attributes, and ACT processes. Clin Psychol Psychother. 2015;22(6):647-55. [DOI :10.1002/cpp.1924]
19. McCormick EM, Englund TR, Cleveland RJ, Dickson TA, Schiller CE, Sheikh SZ. ACT for lupus: Pilot feasibility and acceptability study of a novel web-based acceptance and commitment therapy program for patients with lupus. ACR Open Rheumatol. 2022;4(7):574-80. [DOI: 10.1002/acr2.11433] [PMID] [PMCID]
20. Echeverría DA, Rubio AB. A brief acceptance and commitment therapy group intervention on systemic lupus erythematosus. Revista de psicoterapia. 2022;33(122):105-27. [DOI:10.33898/RDP.V33I122.1151]
21. Nejat S, Montazeri A, Holakoui Naini K, Mohammad K, Majdzadeh R. The world health qrganization quality of life (WHOQOL-BREF) questionnaire: Translation and validation study of the Iranian version. SJSPH. 2006;4(4):1-12. [Link]
22. Amini P, Maroufizadeh S, Omani Samani R. Evaluating the factor structure, item analyses, and internal consistency of hospital

anxiety and depression scale in Iranian infertile patients. Int J Reprod Biomed 2017;15(5) :287-96. [PMID] [PMCID]

23. Kavvadia M, Saridi M, Toska A, Bakalis V, Zetta S, Paralikas T, et al. The effect of medication adherence and spirituality in quality of life of patients with rheumatic diseases. Healthcare. 2025;13(4):436. [DOI: 10.3390/healthcare13040436] [PMID] [PMCID]
24. Geertsema-Hoeve BC, Sickinghe AA, van Schaik-Mast SJ, Spierings J, van Laar JM, Limper M. The effects of lifestyle interventions on disease activity and quality of life in patients with systemic lupus erythematosus: A systematic review. Autoimmun Rev. 2024 ;33(10):103609. [DOI: 10.1016/j.autrev.2024.103609] [PMID]
25. Hamad AH, Ragab II, Zytoon HK. Effect of non-pharmacological nursing interventions on fatigue, pain and quality of life for patients with systemic lupus erythematosus. Zagazig Nurs J. 2024;20(1):406-20. [DOI:10.21608/znj.2024.358755]
26. Canal-Pérez A, Navas-Otero A, Ortiz-Rubio A, Heredia-Ciuró A, Raya-Benítez J, Martín-Núñez J, et al. E-Health interventions to improve health outcomes in patients with systemic lupus erythematosus: a systematic review. Healthcare. 2024;12(16):1603. [DOI: 10.3390/healthcare12161603] [PMID] [PMCID]
27. Tuna HI, Hakbilen S, Yilmaz S, Unver G. Determining the effect of telehealth intervention for lupus patients on pain, happiness, and life activities: a randomized controlled study. Pain Manag Nurs. 2024;25(3):316-22. [DOI: 10.1016/j.pmn.2024.02.005] [PMID]
28. Yousefzadeh F, Ghahari S, Farrokhi N. Effectiveness of mindfulness-based cognitive therapy on depression and anxiety in women with systemic lupus erythematous. Chronic Dis J. 2022:89-94. [DOI :10.22122/cdj.v10i2.469]
29. Ahmed RA, Saleh Ali WA, Mohamed Elderiny SN. Effect of self-care guidelines on health outcomes and self-efficacy among patients with systemic lupus erythematosus. Egyptian J Nurs Health Sci. 2023;4(3):286-327. [DOI:10.21608/ejnhs.2023.319235]
30. Gavilán-Carrera B, Vargas-Hitos JA, Morillas-de-Laguno P, Rosales-Castillo A, Sola-Rodríguez S, Callejas-Rubio JL, et al. Effects of 12-week aerobic exercise on patient-reported outcomes in women with systemic lupus erythematosus. Disabil Rehabil. 2022;44(10):1863-71. [DOI: 10.1080/09638288.2020.1808904] [PMID]
31. Abdelrahman BM, Fathy AT, Sabry SS. Effect of continuous care model on self-care practices and quality of life of patients with systemic lupus erythematosus. Egyptian J Nurs Health Sci. 2023;4(3):205-32. [DOI:10.21608/ejnhs.2023.319002]
32. Williams E, Ramakrishnan V, Egede L, Boan A, Caldwell T, Dismuke-Greer C, et al. OP0191-HPR someone like me: the efficacy of a peer mentoring intervention on disease self-management and health-related quality of life among African American women with systemic lupus erythematosus (SLE). Ann Rheumatic Dis. 2023;82(s1):127. [DOI :10.1136/annrheumdis-2023-eular.2039]