Patient Preference and Adherence

Dovepress
Taylor & Francis Group

Open Access Full Text Article

REVIEW

The Impact of Self-Management Interventions on Behavioral and Clinical Outcomes in Individuals with Systemic Lupus Erythematosus: A Systematic Review of Empirical Evidence From 2003-2024

Sirikarn Hanrop[1], Nirunya Narupan[2], Nattaya Praha[1], Lalipat Phianhasin[1,3], Suebsarn Ruksakulpiwat[1]

[1]Department of Medical Nursing, Faculty of Nursing, Mahidol University, Bangkok, Thailand; [2]Department of Mental Health and Psychiatric Nursing, Faculty of Nursing, Mahidol University, Bangkok, Thailand; [3]Department of Biobehavioral Nursing and Health Informatics, School of Nursing, University of Washington, Seattle, WA, USA

Correspondence: Suebsarn Ruksakulpiwat, Email suebsarn.ruk@mahidol.ac.th

Aim: To evaluate and synthesize evidence on the impact of self-management interventions in improving behavioral and clinical outcomes among individuals with systemic lupus erythematosus (SLE).

Methods: A comprehensive search was conducted across eight electronic databases—CINAHL Plus with Full Text, ProQuest, PubMed, Medline with Full Text, SAGE, ScienceDirect, Scopus, and Web of Science—to identify studies published from inception to 2024. Randomized controlled trials and quasi-experimental studies assessing self-management interventions in individuals with SLE were included. Methodological quality was evaluated using the Joanna Briggs Institute critical appraisal tools. Data synthesis followed a convergent integrated analysis framework to identify recurring themes and subthemes.

Results: A total of 15 studies met the inclusion criteria, consisting of 10 randomized controlled trials (66.67%) and 5 quasi-experimental studies (33.33%). The interventions targeted physical, mental, and behavioral health through various strategies. The most common interventions included counseling and education (7 studies, 22.58%), followed by physical activity programs (2 studies, 6.45%), and self-management sessions (2 studies, 6.45%). Other interventions, such as cognitive-behavioral therapy, strengthening exercises, and digital health tools, were also implemented. In-person interventions (46.67%) were the most common delivery format, followed by digital platforms (26.67%). Self-management interventions led to significant improvements in physical health (eg, reduced fatigue and improved functional capacity), mental health (eg, reduced anxiety and depression), and health behaviors (eg, enhanced adherence to treatment and self-care practices). Furthermore, the interventions contributed to an improved quality of life by addressing the physical, psychological, and social challenges faced by individuals with SLE.

Conclusion: Self-management interventions positively impact behavioral and clinical outcomes in individuals with SLE. Future research should explore long-term sustainability, integration of digital health strategies, and personalized approaches. Expanding access to self-management programs, particularly in low-resource settings, may further enhance outcomes for individuals with SLE.

Keywords: systemic lupus erythematosus, self-management, intervention, systematic review

Background

Systemic lupus erythematosus (SLE) is a chronic autoimmune disease characterized by multisystem involvement and is associated with significant morbidity and mortality. SLE results from an abnormal hypersensitivity of the immune system, leading to inflammation in connective tissues. This inflammation can cause chronic damage across multiple body systems, including the joints, skin, kidneys, blood cells, brain, heart, and lungs.[1] In recent years, this number has significantly increased to approximately 20 to 150 cases per 100,000 individuals, with higher rates observed among women, particularly those of African, Hispanic, and Asian descent.[2–4] Up to 50% of individuals with SLE not only experience physical

Received: 8 February 2025
Accepted: 28 May 2025
Published: 17 June 2025

comorbidities but also suffer from mental health conditions, particularly depression and generalized anxiety disorder.[5] The peak incidence of SLE is often seen in early adulthood, especially between the ages of 25 and 39 years,[6] which is likely linked to lifestyle factors such as sun exposure, smoking, alcohol consumption, and stress.[7] Given the reciprocal relationship —where lifestyle factors influence SLE symptom expression and disease progression, and SLE symptoms, in turn, impact daily functioning—there is a strong rationale for comprehensive management strategies that support this dynamic interplay.

Despite advancements in the treatments of SLE, including the use of corticosteroids, antimalarials, immunosuppressants, and biologic agents like belimumab and rituximab, many patients with SLE continue to experience significant impacts from active disease. While modern treatments aim to control inflammation, reduce flares, and minimize organ damage, they still face challenges due to the disease's heterogeneous nature and variable response to therapy. Flares in SLE can be attributed to factors such as inadequate treatment response or suboptimal management of comorbidities, all of which contribute to ongoing symptoms and reduced quality of life.[8] Thus, managing the long-term effects of SLE, including chronic inflammation, organ damage, and side effects from treatment, remains a significant challenge.[9]

The application of self-management behaviors in SLE is gaining increasing attention. Recently, the European Alliance of Associations for Rheumatology emphasized the importance of tailored interventions, including exercise, diet, weight management, education, digital health tools, and psychological support, to enhance self-management and prevent disease flares.[9,10] While previous systematic reviews have primarily focused on physical lifestyle interventions,[11,12] this review integrates and summarizes evidence on more comprehensive self-management strategies. Moreover, this systematic review addresses that gap by incorporating a broader range of intervention types, including psychological therapies, digital health tools, and multi-component programs, published between 2003 and 2024. Its novelty lies in examining both randomized controlled and quasi-experimental studies through a convergent integrated synthesis approach, emphasizing behavioral outcomes (eg, treatment adherence, self-care) in addition to clinical outcomes (eg, fatigue, disease activity). The findings aim to inform future self-management designs that are more comprehensive and patient-centered.

Objective

To evaluate and synthesize existing evidence on the impact of self-management interventions in improving behavioral and clinical outcomes among individuals with SLE.

Methods

Identify Relevant Studies

We adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines[13] to illustrate the process of literature identification, screening, exclusion, and inclusion in this systematic review. A comprehensive search was conducted across eight electronic databases—CINAHL Plus with Full Text, ProQuest, PubMed, Medline with Full Text, SAGE, ScienceDirect, Scopus, and Web of Science—to identify relevant studies published from inception (2003) to 2024.

We targeted randomized controlled trials and quasi-experimental studies assessing the impacts of self-management on behavioral or clinical outcomes in individuals with SLE. Behavioral outcomes were defined as those related to self-care practices and psychosocial functioning, including medication adherence, stress management, coping skills, disease-related knowledge, self-efficacy, and decision-making. Clinical outcomes were defined as measures of physical or mental health status, such as fatigue, pain, depression, anxiety, sleep quality, cognitive function, BMI, disease activity or flare frequency, and overall quality of life.

The search strategy combined the terms "systemic lupus erythematosus", "intervention", and "self-management" using Boolean operators. Additionally, reference lists of included studies were manually screened to identify further relevant research. All references were managed using EndNote.

Study Selection

Titles and abstracts were initially screened to identify studies meeting the eligibility criteria. Subsequently, the full texts of selected studies were assessed for relevance. To ensure the inclusion of studies directly aligned with our objectives, specific inclusion criteria were applied, while exclusion criteria were used to remove studies outside the scope of the review (Table 1).

Quality Assessment

The quality assessment aimed to evaluate the methodological rigor of each study and determine how well potential biases were addressed in their design, execution, and analysis. In this review, two researchers independently assessed the methodological quality of the included studies using the Joanna Briggs Institute (JBI) critical appraisal tools, specifically developed for systematic reviews.[14]

Data Extraction

A standardized data extraction chart will be developed for this review, capturing the following information for each study: reference, year, country, setting, quality assessment, target population, sample size, age, sex, study aims, study design, providers involved, intervention delivery format, intervention details, main findings, themes and implications for further research. Outcomes such as fatigue, depression, anxiety, and quality of life were often assessed using validated patient-reported outcome (PRO) instruments. These measures were extracted directly from the included studies and integrated into the thematic synthesis under behavioral and clinical outcome domains (Supplementary Table 1).

Data Synthesis

For this review, we applied the convergent integrated analysis framework, as suggested by the JBI for systematic reviews, to synthesize the data from the included studies.[15] In the synthesis process, we identified recurring themes by analyzing the main findings for commonalities and differences. When relevant, sub-themes were developed to highlight more specific elements of the findings, following an approach akin to that used in qualitative research for theme development.

Table 1 Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
No time restrictions on publication.	Studies without full-text availability.
Randomized controlled trials (RCTs) or quasi-experimental studies.	Review articles (eg, systematic reviews, meta-analyses).
Participants aged 18 years or older.	Pilot studies, conference proceedings, abstracts, and protocol studies.
Individuals diagnosed with SLE.	Studies where SLE is a secondary complication rather than the primary disease.
Studies published in English.	Studies involving combined interventions that do not specifically focus on self-management.
Studies assessing the impact of self-management on behavioral or clinical outcomes in individuals with SLE. Self-management interventions were operationally defined in this review as structured programs aimed at enhancing individuals' ability to manage symptoms, treatments, emotional and psychological consequences, and lifestyle changes associated with SLE. These interventions may include—but are not limited to—behavioral self-management strategies. This broad definition allowed the inclusion of multifaceted programs incorporating educational, psychological, physical, or digital components that support self-care and disease management in daily life.	

Results

Search Results

A total of 3,623 records were identified from the following databases: CINAHL Plus with Full Text (n = 32), ProQuest (n = 591), PubMed and Medline with Full Text (n = 150), SAGE (n = 1,087), ScienceDirect (n = 18), Scopus (n = 1,450), and Web of Science (n = 295). No additional records were found through other resources. Records with abstracts were exported to EndNote. After removing 3,174 duplicates, 449 records were screened for eligibility. Following the application of inclusion and exclusion criteria, 426 articles were excluded due to irrelevance, leaving 23 articles for full-text screening. Eight articles were further excluded for the following reasons: a literature review (n = 1), study protocol (n = 1), combined interventions not involving self-management (n = 1), pilot studies (n = 4), and non-experimental study design (n = 1). As a result, 15 articles met the eligibility criteria and were included in the review (Figure 1).

Characteristics of the Included Studies

Table 2 presents the characteristics of the 15 included studies. Four studies (26.67%) were published in 2023, followed by three studies (20%) in 2021 and two studies (13.33%) in 2018. One study (6.67%) was published in each of the

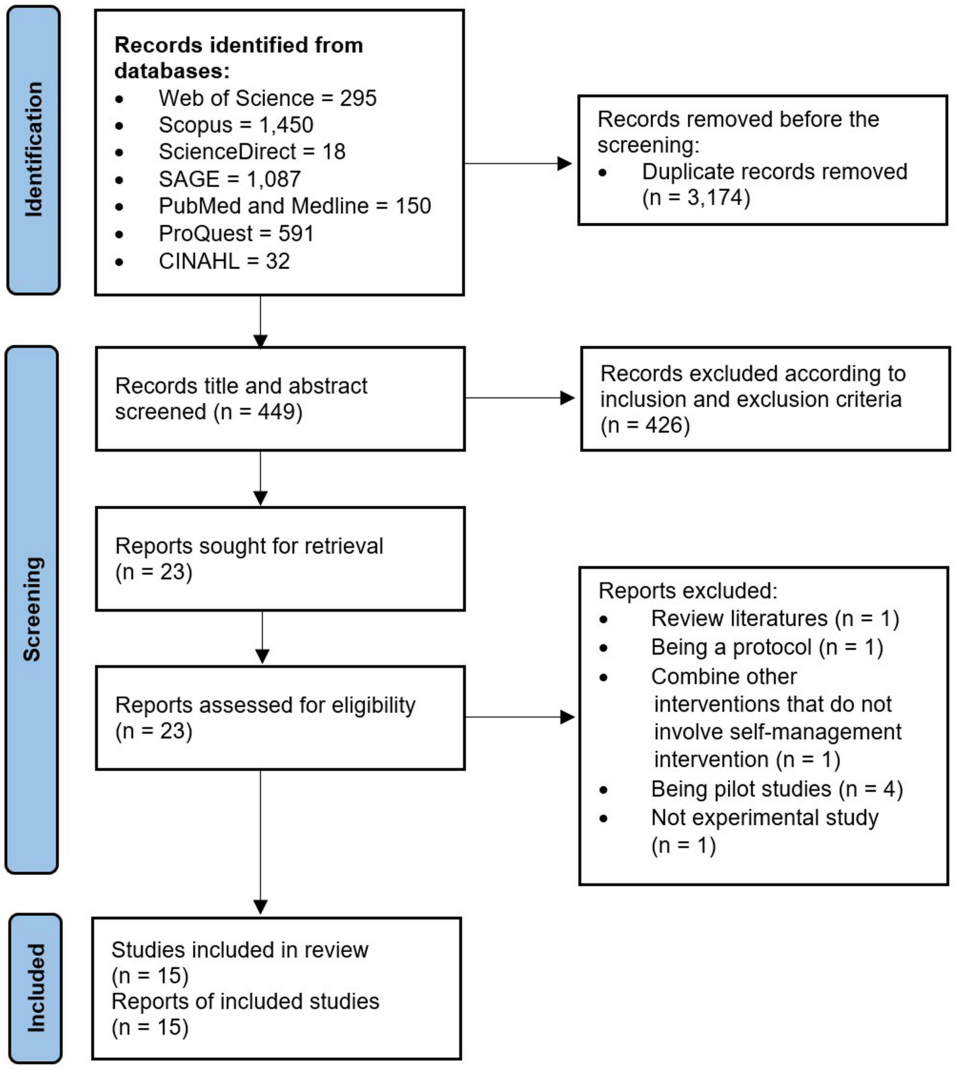

Figure 1 PRISMA Flow Chart.
Note: Adapted from Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71.[16]

Table 2 Characteristics of the Included Studies

Characteristics	Number of included Studies (n)*	Percentage (%)
Publication Year		
2003	1	6.67
2010	1	6.67
2016	1	6.67
2017	1	6.67
2018	2	13.33
2019	1	6.67
2021	3	20
2022	1	6.67
2023	4	26.67
Country		
United States	3	20
Spain	2	13.33
Sweden	1	6.67
Canada	1	6.67
Iran	1	6.67
Egypt	1	6.67
Turkey	1	6.67
South Korea	1	6.67
China	1	6.67
India	1	6.67
Thailand	1	6.67
Indonesia	1	6.67
Study Design		
Randomized control trial	10	66.67
Quasi-experimental	5	33.33
Sample Size		
1–50	7	46.67
>50-100	5	33.33
>100	3	20

(*Continued*)

https://doi.org/10.2147/PPA.S521546

Table 2 (Continued).

Characteristics	Number of included Studies (n)*	Percentage (%)
Professional Involved in Intervention		
Nurses	4	26.67
Rheumatologists	1	6.67
Physiotherapists	2	13.33
Psychologists	2	13.33
Physicians	2	13.33
Multidiscipline	2	13.33
Not specify	4	26.67
Delivery Format		
In-person	7	46.67
Telephone	3	20
Online platform (WhatsApp, Zoom, YouTube, LINE application, and web-based)	4	26.67
Digital platform (computer, tablet, and video game)	4	26.67
Patient self-directed	1	6.67

Note: *One study may report more than one characteristic.

following years: 2003, 2010, 2016, 2017, 2019, and 2022. The United States conducted three studies (20%), while Spain conducted two studies (13.33%). Sweden, Canada, Iran, Egypt, Turkey, South Korea, China, India, Thailand, and Indonesia each conducted one study (6.67%).

Regarding study design, 10 studies (66.67%) were randomized controlled trials (RCT), and 5 studies (33.33%) were quasi-experimental designs. The majority of studies recruited between 1 and 50 participants (n = 7, 46.67%), followed by studies with 51 to 100 participants (n = 5, 33.33%) and more than 100 participants (n = 3, 20%).

In terms of professionals involved in the interventions, nurses and unspecified professionals were each reported in four studies (26.67%). Physiotherapists, psychologists, physicians, and multidisciplinary teams were reported in two studies (13.33%) each, while rheumatologists were involved in one study (6.67%). For delivery format, in-person sessions were the most frequently reported (n = 7, 46.67%), followed by online platforms and digital platforms (n = 4, 26.67% each).

Types of Self-Management Interventions in Included Studies

Table 3 presents the types of self-management interventions identified across 15 included studies. Some studies reported more than one intervention, which is reflected in the total count. The interventions range from physical activity programs to digital tools and educational sessions. The most commonly used interventions were Counseling and Education, which were implemented in 7 studies (22.58%). This was followed by Phone Sessions for Lifestyle and Self-Management, reported in 6 studies (19.35%). Physical Activity Programs and Self-Management Sessions were each reported in 2 studies (6.45%), along with Educational PowerPoint and Booklet, Online Social Support and Workshops, and Web-based Education and Counseling, each appearing in 2 studies (6.45%). Other interventions, such as Orthotic Intervention, Cognitive Behavioral Therapy (CBT), Strengthening Exercises, Case Management, Web-based Self-Management, Digital Therapeutic Games, Patient Decision-Aid for Immunosuppressive Therapy, and Tablet-based Self-care Model, were each implemented in one study (3.23%).

Table 3 Type of Self-Management Interventions in Included Studies on Systemic Lupus Erythematosus

Intervention Type	Count (n)*	Percentage (%)
Physical Activity Program	2	6.45%
Orthotic Intervention	1	3.23%
Counseling and Education	7	22.58%
Cognitive Behavioral Therapy	1	3.23%
Strengthening Exercises	1	3.23%
Self-Management Sessions	2	6.45%
Case Management	1	3.23%
Educational PowerPoint and Booklet	2	6.45%
Phone Sessions for Lifestyle and Self-Management	6	19.35%
Web-based Self-Management	1	3.23%
Digital Therapeutic Games	1	3.23%
Online Social Support and Workshops	2	6.45%
Web-based Education and Counseling	2	6.45%
Patient Decision-Aid for Immunosuppressive Therapy	1	3.23%
Tablet-based Self-care Model	1	3.23%
Total	**31**	**100%**

Notes: *One study may report more than one intervention. Count (n) = Number of studies for each intervention type.Study Number(s) = Corresponding study numbers for each intervention.Percentage (%) = Proportional percentage for each intervention type.

Assessment of Methodological Quality

The methodological quality of the included studies was evaluated using the JBI critical appraisal checklist.[14] The findings indicated that the methodological quality components were well reported across the studies, with an average of 90.49%. Detailed information regarding the quality assessment for each study is provided in Supplementary Table 1.

Impacts of Self-Management Interventions on Behavioral and Clinical Outcomes in Individuals with SLE

Figure 2 visualizes the impacts of self-management interventions on outcomes in individuals with SLE, and Table 4 summarizes the key findings. Data synthesis revealed four major themes:[1] Physical Health Dimensions,[2] Mental Health Dimensions,[3] Health Behaviors, and[4] Quality of Life, which reflect specific domains of the broader behavioral and clinical outcomes framework used in this review. A detailed discussion of each theme is presented below.

Physical Health Dimensions

Physical Fitness, Physical Activity, Foot Pain, and Fatigue

The effects of self-management interventions on physical health outcomes, including physical fitness, physical activity, foot pain, and fatigue, have been found in our included studies.[17,18,21,22,25,27,29] One randomized controlled trial examined a one-year physical activity program and reported increased physical fitness and activity intensity among women with SLE.[16] Another randomized controlled trial compared the effects of custom-made functional foot orthoses (intervention group) with flat cushioning insoles (control group), finding that participants in the intervention group

https://doi.org/10.2147/PPA.S521546

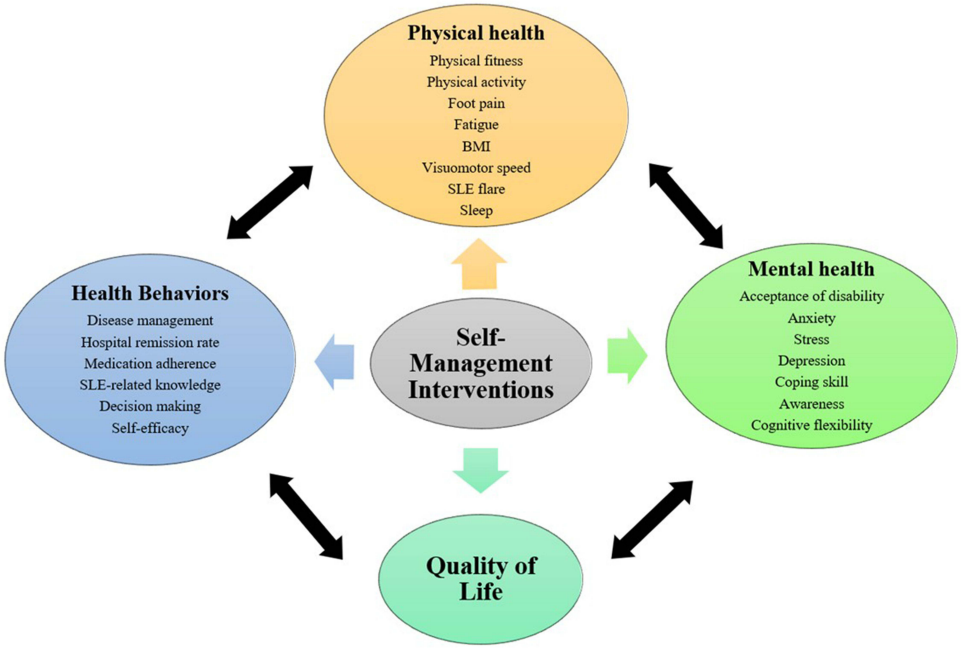

Figure 2 The Impact of Self-Management Interventions on Outcomes in Individuals with SLE.

experienced a significant reduction in foot pain.[18] Three studies investigated the impact of various interventions on fatigue, including strengthening exercises, self-management sessions with an educational focus, and web-based education and counseling.[21,22,29] All three interventions were found to reduce fatigue levels in individuals with SLE.

BMI, Visuomotor Speed, SLE Flare, and Sleep

Our review found that self-management interventions also influence BMI,[21] visuomotor speed,[27] SLE flare-ups,[25] and sleep quality.[28] One study examined the effects of strengthening exercises on fatigue, depression, and quality of life in individuals with SLE compared to a sedentary control group. The results showed a significant decrease in BMI in both the intervention and control groups post-intervention.[21] Another study[27] assessed the sensitivity of a digital platform in evaluating attentional and executive functions in individuals with SLE and examined the impact of an at-home interactive digital intervention on cognitive dysfunction. Findings indicated that the intervention significantly improved visuomotor reaction speed, enhancing ability to execute rapid and precise movements in response to visual stimuli, which is crucial for daily functioning. Additionally, self-management interventions were found to reduce SLE flare-ups and improve sleep quality. One study[25] demonstrated that structured patient education and symptom-monitoring strategies helped mitigate disease exacerbations. Another study[28] reported that behavioral and lifestyle modifications, including relaxation techniques and sleep hygiene education, contributed to better sleep quality among individuals with SLE.

Mental Health Dimensions

Anxiety

Anxiety is a prevalent concern among individuals with SLE. Our review indicates that many of them experience heightened anxiety levels,[19,20,28] which can be effectively managed through psychological interventions, including supportive counseling,[19] CBT, and online mental health programs.[28] Studies found that anxiety levels were significantly lower in participants who participated in these interventions compared to those receiving standard care. Notably, counseling interventions delivered via smartphones ($p < 0.001$)[19] and face-to-face CBT sessions targeting disease activity and psychological distress ($p < 0.001$)[20] demonstrated significant reductions in anxiety.

Table 4 The Impact of Self-Management Interventions on Individuals with SLE Outcomes

Ref (N = 15)	Physical Health Dimensions								Mental Health Dimensions							Health Behaviors						Quality of life
	Physical Fitness	Physical Activity	Foot Pain	Fatigue	BMI	Visuomotor Speed	SLE flare	Sleep	Anxiety	Stress	Depression	Awareness	Cognitive Flexibility	Coping Skill	Acceptance of Disability	Disease Management	Hospital Remission rate	Medical Adherence	SLE-Related Knowledge	Decision Making	Self-Efficacy	
[17]	x	x																				x
[18]			x																			
[19]									x						x							
[20]									x	x	x											x
[21]				x	x						x					x						x
[22]				x							x			x							x	
[23]																	x					
[24]												x										
[25]							x									x					x	
[26]														x				x			x	
[27]						x							x									
[28]								x	x	x						x			x			x
[29]				x																	x	
[30]																				x		
[31]																					x	
N (%)	1 (6.7)	1 (6.7)	1 (6.7)	3 (20)	1 (6.7)	1 (6.7)	1 (6.7)	1 (6.7)	3 (20)	2 (13.3)	3 (20)	1 (6.7)	1 (6.7)	2 (13.3)	1 (6.7)	3 (20)	1 (6.7)	1 (6.7)	1 (6.7)	1 (6.7)	5 (33.3)	4 (26.7)

https://doi.org/10.2147/PPA.S521546

Stress

Our review indicates that stress levels significantly decreased following group-supportive interventions.[20,28] Navarrete-Navarrete et al (2010) assessed the effectiveness of CBT interventions, incorporating physician-led cognitive-behavioral training and face-to-face group sessions to reduce psychological distress. Among 40 participants, stress levels showed a statistically significant decline 15 months post-intervention ($p < 0.001$).[20] Similarly, Ratanasiripong et al (2023) evaluated the e-Wellness Program, which included an online support group via the Line smartphone application and lifestyle and stress management workshops. This intervention effectively reduced stress within three months ($p < 0.001$).[28]

Depression

Our review indicates that both mental and physical management through regular in-person programs play a crucial role in reducing depression among individuals with SLE.[20–22] Navarrete-Navarrete et al (2010) demonstrated a statistically significant reduction in depression symptoms ($p = 0.003$) after implementing cognitive-behavioral strategies across 10 weekly sessions, focusing on emotional regulation and management.[20] A quasi-experimental study by Youssef et al (2021) showed significant improvements in depressive symptoms in the intervention group, who participated in a self-management program focused on exercise three months post-intervention ($p < 0.001$).[21] Similarly, a study by Sohng (2003) found significant improvements in depressive symptoms after a comprehensive self-management program, which included pharmacological management, SLE symptom management, exercise, and interpersonal relationship enhancement six weeks post-intervention ($p = 0.025$).[22]

Awareness

Our review indicates that educational programs combined with group support significantly contribute to better awareness of disease management in individuals with SLE.[24] Mary et al (2021) conducted a quasi-experimental study assessing an education-based self-management intervention using audio-recorded PowerPoint presentations. Participants who received the intervention in small groups and were provided with self-management guidelines in a booklet showed a significant increase in awareness levels. Awareness levels increased from 38.2% at baseline to 94.5% after 30 days ($p = 0.01$).[24]

Cognitive Flexibility

Our review shows the substantial impact of interactive digital training on cognitive flexibility in individuals with SLE, particularly those aged 18–65.[27] A study by Kozora et al (2022) assessed the efficacy of digital training sessions facilitated by a multidisciplinary team using remote digital video. The study included 30 participants and found that those in the intervention group exhibited significantly greater cognitive flexibility than those in the control group (mean = 52.33 ± 13.24 vs mean = 47.90 ± 9.55, $p = 0.018$) by week 4 of the intervention.[27] These findings suggest that digital training programs can positively influence executive functions, such as cognitive flexibility, in individuals with SLE.

Coping Skills

Our review indicates that supportive self-management programs, both in-person and online, are crucial for improving mental health outcomes in SLE, particularly in enhancing coping skills.[22,26] Sohng (2010) assessed an SLE self-management course that covered SLE management and interpersonal relationships, delivered through in-person sessions led by nurses. This study demonstrated a significant improvement in coping skills among 21 SLE participants, measured six weeks after the intervention ($p = 0.007$).[22] Similarly, a study by Fortin et al (2023) examined an online self-management program that included symptom management and social support sessions. The study found a statistically significant improvement in coping skills by the sixth month of the intervention ($p < 0.01$).[26]

Acceptance of Disability

Our review highlights the crucial role of disability acceptance in the mental health of individuals with SLE. One study found that supportive counseling interventions, incorporating motivational and educational activities, significantly encouraged them to actively engage in accepting their condition. Participants in these interventions reported greater psychological well-being, with the experimental group showing significantly higher levels of disability acceptance ($p < 0.001$) compared to the control group receiving routine nursing care.[19]

Health Behaviors

Disease Management

Self-management interventions have been shown to improve disease management in individuals with SLE.[21,25,28] For example, the exercise program in Egypt aimed to help individuals with SLE perform strengthening exercises for three months, targeting both upper and lower joints. These exercises were designed to reduce symptoms such as depression and fatigue while enhancing disease management.[21] In another study, the program utilized mobile phones and Email to deliver the interventions. This 12-week intervention supported individuals with SLE in managing their disease by introducing the program, helping them control lifestyle behaviors, manage medications, and incorporate complementary medicine treatments. It also promoted healthy communication with family and friends, provided guidance on nutrition, helped with stress relaxation, assisted in coping with lupus pain, addressed the effects of physical appearance changes, and supported them in managing the emotional challenges of living with lupus.[25]

Hospital Remission Rate

One of the included studies found that self-management interventions reduced the hospital remission rate in individuals with SLE.[23] The study emphasized that the intervention, which consisted of a transitional care program, covered three main domains: problem classification, intervention strategies, and problem rating. The intervention was tailored to each individual's specific issues and provided education on treatments and health behaviors over 12 weeks, with four telephone follow-ups. The results showed a reduction in the remission rate when comparing the intervention group to the control group ($p < 0.05$).[23]

Medication Adherence

One of the included studies found that medication adherence in individuals with SLE significantly improved after the implementation of a self-management intervention.[24] The intervention, delivered through the My LupusGuide web-based program, provided valuable information. A multidisciplinary team, including rheumatologists and other healthcare professionals, helped improve medication adherence in individuals with SLE through this web-based approach over a period of 6 months.[26]

SLE Related Knowledge

Our review indicates that the self-management intervention, the E-wellness program, which uses social support through smartphones, improves knowledge in individuals with SLE.[28] The program included providing participants with knowledge through group support. Participants attended online courses on lifestyle and stress management via Zoom, where they learned about SLE diagnosis and treatments, self-management, and available resources. Additionally, they could use YouTube to review the information.[28]

Decision Making

Sigh et al (2017) conducted a program to support individuals with SLE during a current flare or at risk of future flares, helping them make informed decisions.[30] The program included providing educational materials, including pamphlets on immunosuppressive drugs. This intervention effectively improved decision-making ($p \leq 0.05$). Follow-up occurred at 3 months via phone or in person and at 6 months through a medical record review.

Self-Efficacy

Several included studies consistently reported significant improvements in self-efficacy as a result of self-management interventions.[22,25,26,29,31] For example, Sohng (2003) evaluated the effectiveness of a six-week SLE self-management program consisting of two-hour weekly sessions and found significant improvements in self-efficacy among participants in the intervention group compared to the control group ($p = 0.001$).[22] White et al (2021) reported that self-management education delivered via 12 weekly phone sessions significantly improved self-efficacy in individuals with SLE, with the intervention group showing an increase in the mean self-efficacy score from baseline (359.86) after the intervention (461.09).[25] Additionally, Fortin et al (2023) demonstrated that web-based self-management education led to significant improvements in self-efficacy after six months ($p = 0.03$).[26] Similarly, Kanlaya et al (2019) conducted a quasi-experimental study and found that participants who underwent a six-month, professional-led, online education and counseling program showed statistically significant improvements in self-efficacy and mental well-being, with the intervention group demonstrating higher levels compared to the control group ($p \leq 0.002$).[29]

Quality of Life

Our review indicates that self-management programs significantly improved the quality of life (QoL) in individuals with SLE, as indicated by four included studies.[17,20,21,28] One RCT evaluated the impact of a physical activity program with in-person coaching and telephone support on physical aerobic capacity, physical activity, and QoL in women with SLE. The intervention group's QoL improved significantly, particularly in the mental health domain, after six months ($p = 0.002$).[17] Similarly, after three months of implementing a strengthening activity program, QoL improved in both the intervention ($p < 0.001$) and control ($p < 0.001$) groups.[21] Another RCT investigated the efficacy of a CBT program delivered through face-to-face group meetings on physical, psychological, and overall QoL in individuals with SLE. The results showed that the intervention group had significant improvements in QoL, particularly in the social ($p = 0.026$), mental ($p = 0.034$), and health ($p = 0.025$) domains, compared to the control group.[20] Additionally, a one-group, pretest-posttest quasi-experimental study assessed how an e-wellness program (eWP) via Line, Zoom, and YouTube impacted SLE-related knowledge and health behaviors, mental health, and QoL among individuals with SLE. The findings showed significant improvement in QoL after three months across various domains, including pain, planning, intimate relationships, burden of others, emotional health, and fatigue ($p < 0.05$).[28]

Discussion

Physical Health Dimensions

Several interventions provided for individuals with SLE showed significantly improved physical health dimensions as follows. The physical activity program, including providing aerobic exercise, showed increased participants' physical fitness and intensity of physical activity, as exercise helped reduce the inflammation process from SLE, leading to improved vascular functions, according to the evidence from the Lupus Foundation of America, 2024.[32] Likewise, exercises, especially aerobic and resistance training programs, were recommended by a consensus of an international task force that included multidisciplinary experts in SLE (ie, rheumatology, rehabilitation medicine, physiotherapy, exercise physiology, and sports sciences).[33] The next intervention is providing custom-made functional foot orthoses, which showed a significant decrease in foot pain among individuals with SLE.[18] Individuals with SLE experienced musculoskeletal alterations that led to foot pain, and the foot orthoses provided a cushioning effect.[18] This is consistent with an RCT study that studied the effectiveness of insole use in patients with rheumatoid arthritis, a multisystem inflammatory disease that affects joints, suggesting that insole use helps reduce foot pain.[34]

In terms of the effects of the interventions on fatigue, strengthening exercises, self-management sessions focusing on education, and web-based education and counseling interventions were reported.[21,22,29] Exercises help reduce the inflammation resulting from SLE, which reduces fatigue, as shown in a report from the Lupus Foundation of America[32] (2024). However, a sequential explanatory mixed-method study of fatigue and activity management education for individuals with SLE reported no significant improvements in fatigue.[35] The mean age of participants in this mixed methods study was 48.1, which is approximately 10–16 years[35] higher than that of participants from the two included studies.[22,29] This might affect the disease progression and health decline from older age. Moreover, one included study measured fatigue using the Multidimensional Assessment of Fatigue scale,[22] which contains seven more items and a higher range of scale than the Fatigue Severity Scale used in the mixed method study.[35]

Our review also revealed a significant reduction in SLE flare-ups following self-management interventions.[25] This finding is particularly important, given the unpredictable nature of SLE and the substantial physical and psychological burden associated with disease flares. Interventions that empower participants to monitor and manage their symptoms more effectively may improve disease stability, thereby enhancing their quality of life and reducing healthcare utilization.[25] This aligns with a previous study by Elghareeb (2022), which evaluated the influence of self-management instruction on health outcomes and self-efficacy in individuals with SLE.[36] The study demonstrated that self-management strategies, such as patient education and counseling, significantly improved self-efficacy. This improvement in self-efficacy is crucial for effective disease management, as it helps participants gain better control over their condition, ultimately reducing the frequency and severity of lupus flares.[36] Furthermore, improved sleep quality, as reported in the study,[28] highlights the critical role of sleep in the overall health of individuals with SLE. Poor sleep is a common yet often under-recognized issue in SLE, contributing to

increased fatigue, pain, and mood disturbances.[37] Interventions focusing on sleep hygiene and relaxation techniques could serve as integral components of comprehensive self-management programs to address these challenges. Previous research has also investigated the impact of SLE interventions, such as wearing blue light-blocking glasses and practicing relaxation techniques, particularly in older adults.[38] The findings demonstrated significant reductions in sleep problems, along with decreased incidence of depressive and anxiety symptoms. These results emphasize the importance of incorporating targeted sleep education and relaxation training into self-management programs to enhance overall well-being and quality of life in individuals with SLE.[38]

Mental Health Dimension

Depression is a common comorbidity among individuals with SLE due to the chronic and unpredictable nature of the disease. Pain, fatigue, and disability significantly impact the quality of life and contribute to emotional distress.[39] Psychological stress resulting from disease flare-ups and concerns about progressive disability further increase the risk of depression.[40] Despite the high prevalence of depression in SLE, multi-faceted interventions have demonstrated effectiveness in alleviating depressive symptoms. Our review found that cognitive behavioral therapy (CBT) targeting emotional regulation significantly reduced depression.[20] Additionally, structured mental and physical management programs delivered in person play a crucial role in managing depression in individuals with SLE.[21,22]

Self-management programs that address emotional distress also offer benefits for individuals with SLE.[20] Specifically, CBT has been shown to help participants challenge negative thought patterns associated with chronic illness, thereby improving their ability to manage both physical and emotional symptoms.[41] These findings align with research on other chronic autoimmune diseases, such as rheumatoid arthritis and multiple sclerosis, where CBT and similar interventions have been effective in reducing depression and inflammatory responses.[42–44] This highlights the importance of early mental health interventions in chronic disease management to enhance overall quality of life.

Furthermore, integrating physical activity with psychological support in self-management programs has been shown to improve depressive symptoms in individuals with SLE.[21,22] Exercise-based interventions have yielded similar benefits in individuals with other non-communicable diseases, such as type 2 diabetes, by alleviating depression.[45] Physical activity not only provides a distraction from chronic pain but also enhances mood through endorphin release[46] and reduces fatigue, ultimately contributing to improved mental well-being.[47] These findings underscore the importance of incorporating exercise into self-management programs to address both the psychological and physical challenges faced by individuals with SLE.

This review highlights the benefits of multi-faceted interventions that integrate psychological and physical strategies for managing depression in SLE. Psychological interventions, particularly CBT, should be considered an essential component of standard care, as they improve quality of life and promote emotional well-being, especially in newly diagnosed individuals. Exercise programs further contribute to both mental and physical health outcomes. However, additional research involving larger randomized controlled trials is necessary to validate these findings and assess the long-term impact of such interventions.[20–22] Future studies should also explore the feasibility and effectiveness of digital or remote delivery methods to increase accessibility for a broader population of individuals with SLE.

Health Behaviors Dimension

Several programs have been shown to improve health behaviors in individuals with SLE. For example, exercise interventions,[21] mobile health (mHealth) interventions,[25] and the e-wellness program, an online application, further aid in lifestyle modifications and stress management to promote better disease control.[25] Moreover, this review identified multiple intervention formats designed to enhance self-care among individuals with SLE. For instance, one RCT implemented a group-based self-management program to improve disease management skills.[48] Another self-management program provided disease-related education both in person and via telephone, helping individuals with SLE enhance their self-care agency.[23] These findings are consistent with similar programs in individuals with heart failure, where structured self-management interventions have improved self-care capabilities.[49] Furthermore, digital programs incorporating social support through smartphone-based platforms have been shown to enhance disease-

related knowledge among individuals with SLE.[28] This is consistent with systematic reviews and meta-analyses in individuals with diabetes, where digital interventions significantly increased their knowledge.[50]

Multidisciplinary interventions also contribute to improved medication adherence in individuals with SLE. A web-based intervention over six months effectively enhanced adherence to prescribed treatments.[26] Similarly, a patient support program for hypertension management demonstrated success in improving medication adherence.[51] Additionally, Singh et al (2017) implemented a decision-making support program for individuals with lupus nephritis, which improved decision-making abilities in four different scenarios.[30] This aligns with findings in chronic kidney disease, where self-management programs have helped patients make informed healthcare decisions.[52]

Beyond adherence and decision-making, this review highlights the significant role of self-management interventions in enhancing self-efficacy among individuals with SLE. Both in-person and online self-management programs have been shown to improve their confidence in managing their condition, which is crucial for maintaining long-term disease control.[22,25,26,29,31] When comparing intervention formats, in-person programs demonstrated improvements in self-efficacy within a relatively short period (approximately six weeks),[22] while online interventions required a longer duration to achieve comparable results.[25,26,29,31] This finding aligns with a study by Oh et al (2024), which reported that an eight-week mHealth self-management program improved self-efficacy and symptom control in individuals with rheumatoid arthritis, although it did not significantly impact disease activity or quality of life.[53] These results suggest that the interactive nature of face-to-face support may accelerate improvements in self-efficacy, while digital interventions may require extended durations to yield similar benefits.[54,55]

Despite these differences, both in-person and online interventions have demonstrated effectiveness in improving self-efficacy. Importantly, this review highlights the role of social support elements, such as interpersonal skill development[22,25,26] and counseling,[29,31] in enhancing participants' confidence and self-management abilities.[56,57] These components are essential for fostering emotional resilience and long-term engagement with disease management strategies.

Thus, self-management programs, whether delivered in person or through digital platforms, serve as valuable tools for improving self-efficacy and health behaviors in individuals with SLE. The incorporation of social support elements further strengthens these interventions by boosting patient confidence and emotional well-being. Given the differences in timeframes for observed benefits, future research should explore strategies to optimize digital interventions, ensuring their effectiveness aligns with in-person programs. Comparative studies assessing the long-term impact of various intervention modalities will provide valuable insights for clinicians in selecting the most appropriate strategies to enhance patient outcomes in SLE management.

Quality of Life

This review highlights the positive impact of self-management programs on improving QoL in individuals with SLE. Physical activity programs,[17,21] CBT,[20] and social support interventions incorporating lifestyle modifications and stress management[28] demonstrated significant improvements across multiple QoL domains.

Structured physical activity, including aerobic and resistance exercises, enhances both physical and psychological well-being by reducing fatigue, anxiety, and depression while improving functional capacity.[12,16,47] Similarly, a self-management program incorporating CBT[20] effectively addressed psychosocial challenges, leading to improvements in social, mental, and overall health aspects, consistent with prior findings in individuals with metabolic syndrome.[58,59] Moreover, an online self-management program integrating social support and stress management[27] further improved QOL by enhancing emotional resilience and disease control, aligning with previous research on the effectiveness of lifestyle interventions in improving physical function and reducing disease activity.[60]

These findings suggest that both in-person and digital self-management programs are valuable strategies for improving QOL in individuals with SLE by addressing physical, psychological, and social challenges associated with the disease. Moving forward, future research should focus on optimizing digital self-management interventions to ensure their effectiveness is on par with in-person programs, particularly in terms of engagement and long-term outcomes. Additionally, exploring the integration of personalized interventions, such as tailoring physical activity or CBT programs to individual needs, could further enhance the impact on QoL. Investigating the long-term sustainability of these interventions and their effects on disease progression and patient empowerment will also be crucial for refining self-management strategies and supporting individuals with SLE in maintaining optimal health.

Study Limitation

This review has several limitations that should be noted. First, the included studies were predominantly from high-income countries, which may limit the generalizability of the findings to low- and middle-income settings. Second, the heterogeneity in intervention designs, delivery formats, and outcome measures across studies made it difficult to draw definitive conclusions regarding the most effective self-management strategies. Additionally, by including only studies published in English, the review may have excluded relevant research in other languages. Lastly, the majority of studies had short follow-up periods, limiting the ability to assess the long-term sustainability of interventions on clinical outcomes and quality of life.

Conclusion

This systematic review synthesized evidence on the effects of self-management interventions on behavioral and clinical outcomes in individuals with SLE. The findings suggest that such interventions—including physical activity, psychological support, and digital health tools—may contribute to improvements in physical health, mental well-being, treatment adherence, and quality of life. While in-person interventions were the most commonly reported, digital platforms show potential for increasing accessibility. However, variability in intervention types, outcome measures, and study designs limits the generalizability of these findings. Future research should explore long-term effectiveness, tailoring of interventions to individual needs, and integration of self-management strategies into routine clinical practice, particularly in low-resource settings.

Disclosure

No potential conflict of interest was reported by the authors.

References

1. Ameer MA, Chaudhry H, Mushtaq J, et al. An Overview of Systemic Lupus Erythematosus (SLE) pathogenesis, classification, and management. *Cureus*. 2022;14(10):e30330.
2. Stojan G, Petri M. Epidemiology of systemic lupus erythematosus: an update. *Curr Opin Rheumatol*. 2018;30(2):144–150. doi:10.1097/BOR.0000000000000480
3. Izmirly PM, Ferucci ED, Somers EC, et al. Incidence rates of systemic lupus erythematosus in the USA: estimates from a meta-analysis of the centers for disease control and prevention national lupus registries. *Lupus Sci Med*. 2021;8(1):e000614. doi:10.1136/lupus-2021-000614
4. Tian J, Zhang D, Yao X, Huang Y, Lu Q. Global epidemiology of systemic lupus erythematosus: a comprehensive systematic analysis and modelling study. *Ann Rheum Dis*. 2023;82(3):351–356. doi:10.1136/ard-2022-223035
5. Gergianaki I, Garantziotis P, Adamichou C, et al. High comorbidity burden in patients with SLE: data from the community-based lupus registry of Crete. *J Clin Med*. 2021;10(5):998. doi:10.3390/jcm10050998
6. Chung MK, Park JS, Lim H, Ch L, Lee J. Incidence and prevalence of systemic lupus erythematosus among Korean women in childbearing years: a nationwide population-based study. *Lupus*. 2021;30(4):674–679. doi:10.1177/0961203320984845
7. Chen J, Liao S, Pang W, et al. Life factors acting on systemic lupus erythematosus. *Front Immunol*. 2022;13:986239. doi:10.3389/fimmu.2022.986239
8. Fava A, Petri M. Systemic lupus erythematosus: diagnosis and clinical management. *J Autoimmun*. 2019;96:1–13. doi:10.1016/j.jaut.2018.11.001
9. Arnaud L, Tektonidou MG. Long-term outcomes in systemic lupus erythematosus: trends over time and major contributors. *Rheumatology*. 2020;59(Suppl5):v29–v38. doi:10.1093/rheumatology/keaa382
10. Parodis I, Girard-Guyonvarc'h C, Arnaud L, et al. EULAR recommendations for the non-pharmacological management of systemic lupus erythematosus and systemic sclerosis. *Ann Rheum Dis*. 2024;83(6):720–729.
11. Rodríguez Huerta MD, Trujillo-Martín MM, Í R-F, Cuellar-Pompa L, Quirós-López R, Serrano-Aguilar P. Healthy lifestyle habits for patients with systemic lupus erythematosus: a systemic review. *Semin Arthritis Rheum*. 2016;45(4):463–470. doi:10.1016/j.semarthrit.2015.09.003
12. Blaess J, Goepfert T, Geneton S, et al. Benefits & risks of physical activity in patients with Systemic Lupus Erythematosus: a systematic review of the literature. *Semin Arthritis Rheum*. 2023;58:152128. doi:10.1016/j.semarthrit.2022.152128
13. Moher D, Liberati A, Tetzlaff J, Altman DG, Group P. Reprint—preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *Phys Ther*. 2009;89(9):873–880. doi:10.1093/ptj/89.9.873
14. JBI. Critical appraisal tools: the Joanna Briggs Institute, Faculty of Health and Medical Sciences, The University of Adelaide; 2024. Available from: https://jbi.global/critical-appraisal-tools. Accessed June 9, 2025.
15. Moola S, Munn Z, Tufanaru C, et al. Chapter 7: systematic reviews of etiology and risk. *Joanna Briggs Institute Reviewer's Manual Joanna Briggs Institute*. 2017;5.
16. Page MJ, McKenzie JE, Bossuyt PM, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *Int J Surg*. 2021;88:105906. doi:10.1016/j.ijsu.2021.105906
17. Boström C, Elfving B, Dupré B, Opava CH, Lundberg IE, Jansson E. Effects of a one-year physical activity programme for women with systemic lupus erythematosus - a randomized controlled study. *Lupus*. 2016;25(6):602–616. doi:10.1177/0961203315622817

18. Palomo-Toucedo IC, Domínguez-Maldonado G, Reina-Bueno M, et al. Effectiveness of custom-made functional foot orthoses versus flat cushioning insoles on pain in patients with systemic lupus erythematosus. *Clin rehabilitat*. 2023;37(1):86–97. doi:10.1177/02692155221111927
19. Pasyar N, Sam A, Rivaz M, Nazarinia M. A smartphone-based supportive counseling on health anxiety and acceptance of disability in systemic lupus erythematosus patients: a randomized clinical trial. *Patient Educ Couns*. 2023;110:107676. doi:10.1016/j.pec.2023.107676
20. Navarrete-Navarrete N, Peralta-Ramírez MI, Sabio-Sánchez JM, et al. Efficacy of cognitive behavioural therapy for the treatment of chronic stress in patients with lupus erythematosus: a randomized controlled trial. *Psychotherapy Psychosomatics*. 2010;79(107):–15. doi:10.1159/000276370
21. Youssef MK, editor. *Effect of Exercises Training on Fatigue, Depression and Physical Activity in Patients with Systemic Lupus Erythematosus2019*
22. Sohng KY. Effects of a self-management course for patients with systemic lupus erythematosus. *J Adv Nurs*. 2003;42(5):479–486. doi:10.1046/j.1365-2648.2003.02647.x
23. Xie X, Song Y, Yang H, Nie A, Chen H, Li JP. Effects of transitional care on self-care, readmission rates, and quality of life in adult patients with systemic lupus erythematosus: a randomized controlled trial. *Arthritis Res Ther*. 2018;20(1):184.
24. Mary S, Geetha P, Sathiya K, Rajeswari S. Education-based self-management intervention on awareness among patients with systemic lupus erythematosus at tertiary care hospital. *J Clin Diagnostic Res*. 2021;20(1):184.
25. White AA, Ba A, Faith TD, et al. The care-coordination approach to learning lupus self-management: a patient navigator intervention for systemic lupus inpatients. *Lupus Sci Med*. 2021;8(1):e000482. doi:10.1136/lupus-2021-000482
26. Fortin PR, Neville C, Julien AS, et al. Measuring the impact of mylupusguide in Canada: results of a randomized controlled study. *Arthritis Care Res*. 2023;75(3):529–539.
27. Kozora E, Zell JL, Baraghoshi D, Smith RM, Strand M. Improved executive function in patients with systemic lupus erythematosus following interactive digital training. *Lupus*. 2022;31(8):910–920. doi:10.1177/09612033221098534
28. Ratanasiripong NT, Cahill S, Crane C, Ratanasiripong P. The outcomes of an e-wellness program for lupus patients in Thailand: a participatory action research approach. *J Prev Med Public Health*. 2023;56(2):154–163. doi:10.3961/jpmph.22.491
29. Kankaya H, Karadakovan A. Effects of web-based education and counselling for patients with systemic lupus erythematosus: self-efficacy, fatigue and assessment of care. *Lupus*. 2020;29(8):884–891. doi:10.1177/0961203320928423
30. Singh JA, Shah N, Green C. Individualized patient decision-aid for immunosuppressive drugs in women with lupus nephritis: study protocol of a randomized, controlled trial. *BMC Musculoskelet Disord*. 2017;18(1):53. doi:10.1186/s12891-017-1408-5
31. Kusnanto K, Sari N, Harmayetty H, Efendi F, Gunawan J. Self-care model application to improve self-care agency, self-care activities, and quality of life in patients with systemic lupus erythematosus. *J Taibah Univ Med Sci*. 2018;13(5):472–478. doi:10.1016/j.jtumed.2018.07.002
32. Five benefits of exercise for managing lupus: lupus Foundation of America; 2024. Available from: https://www.lupus.org/resources/five-benefits-of-exercise-for-managing-lupus#:~:text=Exercise%20can%20strengthen%20parts%20of,involved%20in%20the%20inflammation%20process. Accessed June 9, 2025.
33. Blaess J, Geneton S, Goepfert T, et al. Recommendations for physical activity and exercise in persons living with Systemic Lupus Erythematosus (SLE): consensus by an international task force. *RMD Open*. 2024;10(2):e004171. doi:10.1136/rmdopen-2024-004171
34. Pabón-Porras MA, Molina-Ríos S, Flórez-Suárez JB, Coral-Alvarado PX, Méndez-Patarroyo P, Quintana-López G. Rheumatoid arthritis and systemic lupus erythematosus: pathophysiological mechanisms related to innate immune system. *SAGE Open Med*. 2019;7:2050312119876146. doi:10.1177/2050312119876146
35. O'Riordan R, Doran M, Connolly D. Fatigue and activity management education for individuals with systemic lupus erythematosus. *Occupational Ther Int*. 2017;2017:4530104. doi:10.1155/2017/4530104
36. Elghareeb SM, Mahmoud HM. Influence of self-management instruction on outcomes of health for systemic lupus erythematosus patients. *Egyptian J Nurs Health Sci*. 2022;3(1):391–408.
37. Meidan R, Elalouf O, Tauman R, et al. Systemic lupus erythematous and obstructive sleep apnea: a possible association. *Life*. 2023;13(3):697. doi:10.3390/life13030697
38. Urbanová L, Vaníček O, Červená K, Bartoš A, Evansová K. The impact of sleep education, light intervention and relaxation on sleep and mood in the elderly. *Chronobiol Int*. 2024;41(4):567–576. doi:10.1080/07420528.2024.2337007
39. Narupan N, Seeherunwong A, Pumpuang W. Prevalence and biopsychosocial factors associated with depressive symptoms among patients living with systemic lupus erythematosus in clinical settings in urban Thailand. *BMC Psychiatry*. 2022;22(1):103. doi:10.1186/s12888-022-03739-z
40. Faria R, Guimarães de Oliveira D, Alves R, et al. Psychological impact of life events in systemic lupus erythematosus patients – differences between flares and remission. *Lupus*. 2024;33(10):1139–1144. doi:10.1177/09612033241266987
41. Nakao M, Shirotsuki K, Sugaya N. Cognitive-behavioral therapy for management of mental health and stress-related disorders: recent advances in techniques and technologies. *Biopsychosoc Med*. 2021;15(1):16. doi:10.1186/s13030-021-00219-w
42. Nagy Z, Szigedi E, Takács S, Császár-Nagy N. The effectiveness of psychological interventions for rheumatoid arthritis (RA): a systematic review and meta-analysis. *Life*. 2023;13(3):849. doi:10.3390/life13030849
43. Shen B, Li Y, Du X. Effects of cognitive behavioral therapy for patients with rheumatoid arthritis: a systematic review and meta-analysis. *Psychol Health Med*. 2020;25(10):1179–1191. doi:10.1080/13548506.2020.1736312
44. Turner AP, Knowles LM. Behavioral Interventions in multiple sclerosis. *Fed Pract*. 2020;37(Suppl 1):S31–s5.
45. Arsh A, Afaq S, Carswell C, Bhatti MM, Ullah I, Siddiqi N. Effectiveness of physical activity in managing co-morbid depression in adults with type 2 diabetes mellitus: a systematic review and meta-analysis. *J Affect Disord*. 2023;329:448–459. doi:10.1016/j.jad.2023.02.122
46. O'Dwyer T, Durcan L, Wilson F. Exercise and physical activity in systemic lupus erythematosus: a systematic review with meta-analyses. *Semin Arthritis Rheum*. 2017;47(2):204–215. doi:10.1016/j.semarthrit.2017.04.003
47. Frade S, O Neill S, Greene D, Nutter E, Cameron M. Exercise as adjunctive therapy for systemic lupus erythematosus. *Cochrane Database Syst Rev*. 2023;4(4):Cd014816. doi:10.1002/14651858.CD014816.pub2
48. Khunti K, Highton PJ, Waheed G, et al. Promoting physical activity with self-management support for those with multimorbidity: a randomised controlled trial. *Br J Gen Pract*. 2021;71(713):e921–e30. doi:10.3399/BJGP.2021.0172
49. Tung HH, Lin CY, Chen KY, Chang CJ, Lin YP, Chou CH. Self-management intervention to improve self-care and quality of life in heart failure patients. *Congest Heart Fail*. 2013;19(4):E9–e16. doi:10.1111/chf.12014
50. Nkhoma DE, Soko CJ, Bowrin P, Iqbal U. Digital health interventions for diabetes self-management education/support in type 1 & 2 diabetes mellitus. *Stud Health Technol Inform*. 2020;270:1263–1264. doi:10.3233/SHTI200393

51. Sungkhao M, Thaniwattananon P. Effect of self-management supporting program on medication adherence and blood pressure level among the older patients with uncontrolled hypertension. *J Res Nurs-Midwifery Health Sci*. 2020;40(1):84–100.
52. Kanagaratnam R, Zwi S, Webster AC, et al. Interventions to support decision-making, health literacy and self-management in ethnic-minority adults living with chronic kidney disease: a systematic review. *Clin Kidney J*. 2023;16(6):914–927. doi:10.1093/ckj/sfac276
53. Oh H, Suh C-H, Kim J-W, Boo S. mHealth-based self-management program for patients with rheumatoid arthritis: a pilot randomized controlled study. *Nursing & Health Sciences*. 2024;26(4):e13187. doi:10.1111/nhs.13187
54. Farley H. Promoting self-efficacy in patients with chronic disease beyond traditional education: a literature review. *Nurs Open*. 2020;7(1):30–41. doi:10.1002/nop2.382
55. Dinh TTH, Bonner A. Exploring the relationships between health literacy, social support, self-efficacy and self-management in adults with multiple chronic diseases. *BMC Health Serv Res*. 2023;23(1):923. doi:10.1186/s12913-023-09907-5
56. Williams EM, Egede L, Faith T, Oates J. Effective self-management interventions for patients with lupus: potential impact of peer mentoring. *Am J Med Sci*. 2017;353(6):580–592. doi:10.1016/j.amjms.2017.01.011
57. Williams EM, Hyer JM, Viswanathan R, et al. Peer-to-peer mentoring for African American Women With Lupus: a Feasibility Pilot. *Arthritis Care Res*. 2018;70(6):908–917. doi:10.1002/acr.23412
58. Sakr B R, Seif E M, Kamel R M and Eleishi H H. (2022). Impact of psycho-educational therapy on disease activity, quality of life, psychological status, treatment satisfaction and adherence in systemic lupus erythematosus patients. The Egyptian Rheumatologist, 44(4), 313–317. 10.1016/j.ejr.2022.04.001
59. Tsoi A, Gomez A, Boström C, Pezzella D, Chow J Weng, Girard-Guyonvarc'h C, Stamm T, Arnaud L and Parodis I. (2024). Efficacy of lifestyle interventions in the management of systemic lupus erythematosus: a systematic review of the literature. Rheumatol Int, 44(5), 765–778. 10.1007/s00296-024-05548-x