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Research Article

Impact of Pharmacist-Led Intervention on Adherence, Quality of Life, and Self-efficacy Among Iraqi Patients with Systemic Lupus Erythematosus

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Abstract

Background: The prevalence of systemic lupus erythematosus (SLE) patients is rising in Iraq. Adherence to medications among SLE patients remains a significant problem, and nonadherence can lead to decreased quality of life (QoL) and poor disease outcomes. ***Objectives***: To determine the efficacy of pharmacist interventions in enhancing medication adherence, QoL, and self-efficacy among SLE patients. In addition, to assess the influence of pharmacist intervention on the uptake and willingness to take the flu vaccine among patients with SLE. ***Methods***: A pharmacist intervention study was conducted at the Rheumatology Unit in Baghdad Teaching Hospital. Participants obtained educational counseling and a self-assembled booklet. Each patient participated in two sessions; the initial session was conducted immediately after the completion of a baseline evaluation of adherence, QoL, and self-efficacy through a face-to-face interview, and the second session was held one month later. Each session continued for approximately 25-35 minutes. The evaluation of adherence, QoL, and self-efficacy was obtained again at the end of the study. ***Results***: The study recruited 90 patients with a mean age of 34.29±9.9 years. The mean scores of adherence, physical, social, and psychological domains of QoL, and self-efficacy were significantly enhanced after the intervention. Still, the environmental domain of quality of life is non-significantly changed. Also, after the intervention, a significant rise was seen in the uptake and willingness to take the flu vaccine. ***Conclusion***: Pharmacist-led intervention significantly improved medication adherence, quality of life, self-efficacy, and the uptake and willingness to take the flu vaccine among SLE patients.

Keywords: Adherence, Pharmacist, Quality of Life, Systemic lupus erythematosus, Self-efficacy.

تأثير تدخل الصيدلي على الالتزام ونوعية الحياة والكفاءة الذاتية بين المرضى المصابين بداء الذئب الاحمراري

الخلاصة

الخلفية: بدأ انتشار مرض داء الذئب الاحمراري بالارتفاع في العراق. يعتبر الالتزام بالعلاج بين المرضى مشكلة كبيرة، ويمكن أن يؤدي عدم الالتزام بالعلاج إلى انخفاض جودة الحياة وسوء نتائج المرض. **الهدف :** تحديد فعالية تدخل الصيدلي في تعزيز الالتزام بالعلاج وجودة الحياة والكفاءة الذاتية بين المرضى البالغين المصابين بداء الذئب الاحمراري. بالاضافة الى ذلك , تقييم اثر تدخل الصيدلي على اخذ والرغبة في اخذ لقاح الافلونزا بين المرضى البالغين المصابين بداء الذئب الاحمراري. **الطريقة:** اجرت وحدة امراض الروماتزم في مستشفى بغداد التعليمي دراسة ماقبل التدخل الصيدلي. وشملت الدراسة مرضى داء الذئب الاحمراري اللذين تلقوا استشارة تعليمية وكتيب تم تجميعه ذاتيا. شارك كل فرد في دورتين. وعقدت الجلسة الاولى بعد استكمال الاستبيانات لقياس الالتزام بالعلاج والكفاءة الذاتية وجودة الحياة من خلال المقابلة وجها لوجه, وعقدت الجلسة الثانية بعد شهر واحد. استمرت كل جلسة لمدة 35- 25 دقيقة تقريبا. وتم اعادة ملئ الاستبيانات مرة اخرى عند نهاية الدراسة. **النتائج:** تم تسجيل 90 مريضا في الدراسة, متوسط اعمارهم 9.9 ±34.29 . في نهاية الدراسة, متوسط درجات الالتزام بالعلاج والمجالات الجسدية والنفسية والاجتماعية لجودة الحياة والكفاءة الذاتية قد ازدادت بشكل ملحوظ بعد تدخل الصيدلي, بالاضافة الى ذلك, لوحظ ارتفاع كبير في معدل اخذ والاستعداد لاخذ لقاح الافلونزا بعد تدخل الصيدلي. **الاستنتاج:** يعمل التدخل التعليمي بقيادة الصيدلي على تحسين الالتزام بالعلاج وجودة الحياة والكفاءة الذاتية بشكل كبير. بالاضافة الى ذلك يحسن تدخل الصيدلى على اخذ والرغبة في اخذ لقاح الافلونزا.

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INTRODUCTION

The prevalence of systemic lupus erythematosus (SLE) in Central Asia is about 1.18 per 100,000 people in the general population [1]. In Iraq, the prevalence of SLE is about one case per 1867 population, with the first case reported in 1971. SLE is the third most frequent inflammatory rheumatic disease with damage across several organ systems [2]. Treatment adherence denotes the degree to which individuals conform to the prescribed drug regimens established by their healthcare providers [3]. The level of adherence to SLE medication was found to be low. Anxiety, depression, concerns regarding SLE medication, and the notion that medications are overprescribed or detrimental were linked to non-adherence. Non-adherence to SLE medications can result in adverse disease outcomes, including a heightened risk of exacerbation, morbidity, hospitalization, and poor renal outcomes [4].

According to a study conducted on a sample of Iraqi patients with SLE, many of them had burdens associated with their medications [5]. The WHO defines the quality of life as "an individual's evaluation of their life circumstances, taking into account the cultural and value systems in which they exist, as well as their objectives, benchmarks, priorities, and obstacles" [6]. The persistent manifestation of pain has been associated with levels of exhaustion, worry, and depression, which, together with other symptoms, ultimately diminishes everyday activities and the quality of life of SLE patients [7]. In addition, stress levels are negatively associated with quality of life indices, encompassing psychological well-being, physical health, social interactions, and environmental elements [8]. Self-efficacy denotes an individual's conviction in their ability to accomplish a goal; it profoundly impacts their decisions, perseverance, work performance, and cognitive and emotional states, and it facilitates improved management of chronic diseases [9]. Research demonstrates that increased self-efficacy in managing symptoms, drugs, therapies, and social contacts correlates with enhanced mental and physical domains of quality of life among patients with SLE [10]. The flu vaccine uptake among SLE patients was found to be low, potentially attributable to several factors, including limited medical guidance, vaccine safety and efficacy concerns, and prevalent vaccine hesitation among patients [11]. Pharmacist-led health education interventions were found to significantly increase influenza vaccine uptake among those with immune-mediated diseases [12]. Pharmaceutical care (PC) was found to significantly promote medication adherence for lupus nephritis, with most patient complaints resolved during the initial visit [13]. Clinical pharmacists' intervention can greatly help in the initial finding and adequate management of drug-related problems in systemic autoimmune disorder patients [14]. A systematic review study found that pharmacists' interventional programs in treating diabetes patients in Arab countries improved patient understanding, medication adherence, and glucose management, leading to better treatment [15]. A pre-post interventional study demonstrated that clinical pharmacist involvement significantly improves breast cancer patients' knowledge, attitudes, and practices towards chemotherapy, thereby mitigating treatment difficulties [16]. Pharmacists were found to aid patients in complying with their pharmacotherapeutic schedules and monitoring strategies by offering information besides counseling [17,18]. A qualitative study demonstrated that patient education, psychological support, and improved conversation among health care providers and patients improve patient adherence to SLE medications [19]. A randomized controlled trial demonstrated that pharmacist-led, interdisciplinary care for individuals with SLE significantly improved quality of life and diminished disease activity [20]. A systematic evaluation demonstrated enhanced treatment adherence and improved quality of life for many chronic diseases by pharmacist intervention counseling [21]. Patients with SLE who consistently exhibit nonadherence demonstrate diminished self-efficacy in drug management [22]. The pharmacist was found to significantly improve self-efficacy in patients with SLE by delivering pharmaceutical care and offering personalized counseling to identify medication-related problems, execute care plans, optimize treatment, educate patients, and resolve concerns, thereby enhancing adherence and effective management [23]. No prior research has been conducted in Iraq to evaluate the effectiveness of pharmaceutical interventions (PI) on adherence, quality of life, and self-efficacy. This research intends to assess the impact of PI on adherence, self-efficacy, and quality of life among adult patients with SLE and estimate the efficacy of the PI on their uptake and willingness to receive the flu vaccine.

METHODS

Study design

This was interventional research involving patients with SLE who received treatment at the Rheumatology Unit at Baghdad Teaching Hospital from November 2024 to March 2025. This facility serves as a referral center in Baghdad province.

Sample selection

The study population comprised a convenient sample of SLE patients who attended the Rheumatology Unit at Baghdad Teaching Hospital. The inclusion criteria included that the participant had to be at least 18 years old and diagnosed with SLE according to the American College of Rheumatology criteria for at least 6 months, having been taking at least one particular SLE medicine alongside NSAIDs and corticosteroids for a minimum duration of 6 months. They were proficient in Arabic and consented to participate in the study. The exclusion criteria included patients with cognitive, hearing, or speech impairments that could impede their comprehension of the questions; pregnant or breastfeeding women due to potential effects on disease activity; and patients who provided inadequate responses.

Study procedure

The pre- and post-interventional study consists of two phases: Baseline Assessment and Intervention: Initially, patients' verbal consent was obtained, and sociodemographic and clinical data were gathered. Thereafter, each patient's baseline level of adherence, self-efficacy, and quality of life was evaluated. In addition, the physician used the systemic lupus erythematosus disease activity index (SELENA-SLEDAI) to assess disease activity. Afterward, the patients received educational counseling. The necessary counseling was provided to the patient, including the subsequent matters: 1) Information regarding the SLE and its symptoms, 2) Education regarding the importance of adherence and how to avert nonadherence 3) Information regarding the medications that the patient utilized (importance, side

effects, and how to prevent/reduce them, and 4) Educate the patient about the benefits of the flu vaccine. Subsequently, a booklet was provided to the patients as written educational content. It was produced and subsequently translated into formal Arabic for the patients' comprehension. The booklet was reviewed by five academic staff members with PhD degrees from the Clinical Pharmacy Department at the College of Pharmacy/University of Baghdad in conjunction with the scientific committee, utilizing the face validation method, alongside three rheumatologists from the Rheumatology Unit at Baghdad Teaching Hospital in Baghdad City. The booklet included the following information: 1) information on SLE (symptoms of disease, complications, and how to avoid it) and medications (steroids, antimalarials, immunosuppressants, biologics, and non-steroidal anti-inflammatory drugs), 2) Purpose of medications, 3) Adverse effects of medications and how to deal with them, 4) Lifestyle change and preventative measures (sun protection, diet, and exercise), 5) Cautions and drug interactions, and 6) Benefits of vaccination, especially the flu vaccine: refutes prevalent misunderstandings and offers practical advice on obtaining the vaccination. Educational counseling comprises face-to-face psychological support facilities delivered by clinical pharmacists. Each patient participated in two sessions, each around 25-35 minutes in duration; the first session was held after the baseline assessment of adherence, self-efficacy, and quality of life was completed, and the second session happened one month later. Furthermore, the clinical pharmacist maintained constant communication with patients via mobile phones, allowing patients to engage in conversation whenever necessary. Post-Intervention (Follow-Up and Evaluation): Two months after the baseline encounter, the extent of change in adherence, quality of life, self-efficacy, and flu vaccine uptake was assessed. The study flowchart is illustrated in Figure 1.

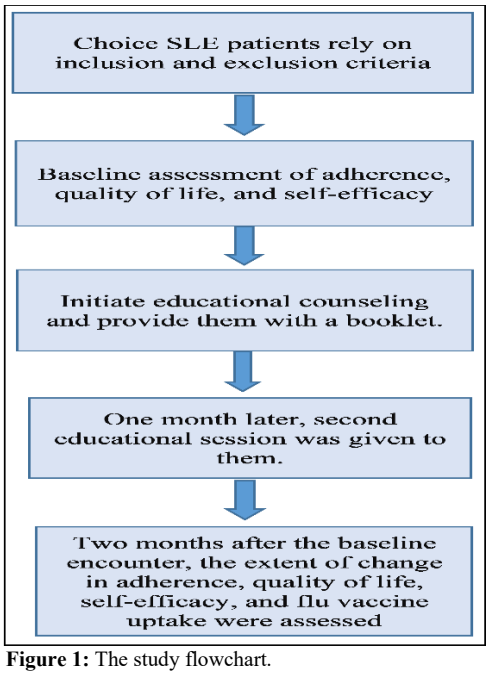

Figure 1: The study flowchart.

Data Collection and study instruments

Data were obtained via face-to-face interviews with individuals after obtaining their consent. A data-collecting sheet was employed to obtain demographic and clinical parameters. Adherence was assessed by utilizing a version of the Compliance Questionnaire for Rheumatology (CQR) in Arabic [24]. This was a 19-item questionnaire that classified as "low" adherers those who take less than 80% of their medication as prescribed. Patients indicate their level of agreement or disagreement with each statement with a Likert scale from 1 to 4 (1 = strongly disagree, 2 = disagree, 3 = agree, and 4 = highly agree). Items 4, 8, 9, 11, 12, and 19 represent negative claims signifying a reversal scoring [24]. The Arabic version of the World Health Organization Quality of Life (WHOQOL-BREF) questionnaire was utilized to evaluate quality of life [25]. The 26-item questionnaire assessed four dimensions of quality of life: physical, psychological, social interactions, and environment. It used a Likert scale to assess responses over two weeks, with domain scores determined by multiplying the mean of each domain by four. Higher ratings signified an enhanced quality of life [6]. The Arabic version of the Self-Efficacy for Managing Chronic Diseases 6-Item Scale (SEMCD) was utilized to assess self-efficacy [26]. The scale created by Lorig et al. in English evaluates the confidence of patients with chronic diseases in controlling their conditions. The scale measures confidence in six components, with each item scored on a scale from 1 (not confident) to 10 (very confident), resulting in a total score. An increase in a score signifies an enhancement in self-efficacy. A median threshold of 33 was utilized for scoring, where scores below 33 indicated poor self-efficacy and scores of 33 or above denoted strong self-efficacy [27,28]. A physician assessed the activity of the disease utilizing the Safety of Estrogens in Lupus Erythematosus National Assessment and the Systemic Lupus Erythematosus Disease Activity Index score (SELENA-SLEDAI). The assessment examines 24 disease characteristics, producing a value of 105, which signifies a maximum score, where 0-3 signifies inactive disease and a value exceeding 3 indicates active disease. This indicator is essential for clinical practice and research, as it indicates variations in disease activity over time and is responsive to therapy effects. The evaluated key components comprise renal function, neurological symptoms, and hematological data [29].

Ethical considerations

The Research Ethics Committee at the College of Pharmacy, University of Baghdad, and the Directorate of Medical City have granted ethical approval. A formal correspondence from the College of Pharmacy was sent to the Rheumatology Unit at Baghdad Teaching Hospital. Before the study participants were included, verbal consent was obtained from them.

Statistical analysis

The research employed the Statistical Package for the Social Sciences program (SPSS) version 25.0 for analysis of data, reporting continuous parameters as mean and standard deviation besides categorical parameters as percentage and frequency. Changes before and after the intervention were evaluated using paired t-tests, Wilcoxon signed-rank tests, and McNemar tests, with a significance threshold set at a *p*-value of less than 0.05.

RESULTS

The study recruited 90 patients with SLE (94.4% females). The average age of the participants was 34.29±9.9 years. Over three-quarters (76.7%) were married, 77.8% lived in urban areas, and 75.6% were unemployed. Approximately 43.3% possessed a primary school education. Approximately 71.1% of them were individuals with low income, earning less than 500,000 IQD monthly (Table 1). Approximately 95.6% of patients failed to take the flu vaccine in the preceding year, while 91.1% expressed unwillingness to receive it this year, and 85.6% consulted a rheumatologist regularly.

Table 1: Sociodemographic characteristics of the participants (n=90)

Characteristics	Subgroup	Results
Sex	Male	5(5.6)
	Female	85(94.4)
Social status	Married	69(76.7)
	Unmarried	21(23.3)
Educational level	Illiterate	1(1.1)
	Primary school	39(43.3)
	Secondary school	38(42.2)
	College degree	12(13.3)
Residency	Rural	20(22.2)
	Urban	70(77.8)
Employment	Yes	22(24.4)
	No	68(75.6)
Exercise	Yes	23(25.6)
	No	67(74.4)
Cigarette smoking	Yes	5(94.4)
	No	85(5.6)
Alcohol consumption	No	90(100)
Monthly income (Iraqi dinars)	Less than 500,000	64(71.1)
	500,000-1000,000	24(26.7)
	More than 1000,000	2(2.2)
Age (year)		34.29±9.9
BMI (kg/m^2)		28.8±7.9

Values were expressed as number, percentage, and mean±SD.

Approximately 46.7% of them had one or two additional chronic conditions. The patients exhibited severe disease activity, with an average SELENA_SLEDAI score of 15.19±14.07 (Table 2).

Table 2: Clinical variables of study participants (n=90)

Variables	Subgroup		Results
Received flu vaccine in the past year	Yes		4(4.4)
	No		86(95.6)
Willingness to take flu vaccine this year	Yes		8(8.9)
	No		82(91.1)
Doctor (Rheumatologist)visit	On need		13(14.4)
	Regularly		77(85.6)
No. of other chronic diseases	0		48(53.3)
	1		28(31.1)
	2		14(15.6)
SLE medications	Antimalarial	Hydroxychloroquine	81(90)
	Steroids	Prednisolone	60(66.7)
		Methylprednisolone	3(3.3)
	Immunosuppressants	Mycophenolate mofetil	28(31.1)
		Azathioprine	22(24.4)
		Methotrexate	14(15.6)
	Biologic	Rituximab	12(13.3)
	NSAID		6(6.7)
Disease duration (year)			6.58±4.95
Disease activity (SELENA-SLEDAI value)			15.19±14.07
Other chronic medications			1.38±1.57

Values were expressed as number, percentage, and mean±SD.

The predominant medicine utilized for the treatment of SLE among the participating patients was hydroxychloroquine (90.0%). In this study, 81 patients were non-adherent to their medicine, while only nine individuals demonstrated adherence to their prescribed treatments. The count of non-adherent patients reduced from 81 to 46 post-PI, while the count of adherent patients increased from 9 to 44 after PI, as illustrated in Table 3. The educational intervention led by a clinical pharmacist significantly improved the adherence levels (Table 3). Post-intervention, significant enhancements were detected in the physical, social, and psychological domains of QoL. In addition, a significant improvement in the mean of overall QoL and general health satisfaction was found after pharmacist counseling (Table 4).

Table 3: Change in adherence level prior and post pharmacist intervention

CQR score	Before PI	After PI	*p*-value
Patients with good adherence	9(10)	44(49)	<0.001*
Patients with poor adherence	81(90)	46(51)	
CQR total score	65.21±12.87	76.82±9.62	<0.001†

Values were expressed as number, percentage, and mean±SD. *Significant at $p<0.05$ level according to the McNemar test. † Significant at $p<0.05$ level according to the Wilcoxon signed rank test. PI: Pharmacist Intervention.

Post-intervention, the self-efficacy score was significantly enhanced, demonstrating a distinct rise in participants' self-efficacy in treating chronic conditions (Table 5).

Table 4: Variation in the four domains of the QoL prior and post the pharmacist intervention (PI)

Parameters	Before PI	After PI	*p*-value
Physical domain	10.56±3.53	13.21±3.05	< 0.001†
Psychological domain	9.82±2.97	10.67±2.01	0.005*
Social Domain	12.19±3.38	14.25±2.57	<0.001†
Environment domain	10.36±2.74	10.93±1.31	0.08†
Overall QOL	2.64±1.1	3.39±0.84	<0.001†
General Health Satisfaction	2.56±1.26	3.41±1.03	<0.001†

Values were expressed as mean±SD. *Significant at p<0.05 level according to Paired t-test. † Significant at *p*<0.05 level according to Wilcoxon signed rank test. PI: Pharmacist Intervention.

Table 5: Variation in self-efficacy pre- and post-pharmacist counselling

	Before PI	After PI	*p*-value*
SEMCD score	39.48±9.98	42.78±7.24	0.003

Values were expressed as mean±SD. * Significant at *p*<0.05 level according to Wilcoxon signed rank test. PI: Pharmacist intervention.

The flu vaccine uptake in the previous year exhibited a significant enhancement following the implementation of PI. Only 4.4% (4 individuals) had administered the flu vaccine in the prior year; nevertheless, the percentage increased to 13.3% (12 participants) after the implantation of PI (Table 6). In addition, the willingness to take the flu vaccine this year increased significantly after the PI. 8.9% (8 individuals) indicated a desire to take the flu vaccine this year; however, this rose to 48.9% (44 participants) after the implantation of PI (Table 6).

Table 6: Change in the uptake and willingness to take the flu vaccine prior and post pharmacist intervention

Characteristics	Subgroup	Before PI	After PI	*p*-value*
Received flu vaccine in the past year	Yes	4(4.4)	12(13.3)	0.02
	No	86(95.6)	78(86.7)	
Willingness to take flu vaccine this year	Yes	8(8.9)	44(48.9)	<0.001
	No	82(91.1)	46(51.1)	

Values were expressed as number and percentage. * Significant at *p*<0.05 level according to McNemar test. PI: Pharmaceutical intervention.

DISCUSSION

An earlier Iraqi study examining factors influencing medication adherence found low medication adherence among Iraqi female patients with SLE, highlighting the need for intervention to enhance adherence and patient outcomes [30]. In addition, a cross-sectional study revealed that Iraqi patients with SLE experienced a decrease in all aspects of quality of life [31]. Medication nonadherence is common in SLE, with factors such as reduced patient self-efficacy playing a role in this issue [22]. This study evaluated the impact of PI on adherence, quality of life, and self-efficacy among adult patients with SLE, as well as its effectiveness in promoting flu vaccine uptake and willingness to take it. The current study revealed that medication adherence significantly improved following pharmacist intervention. This may be because pharmacists were capable of providing detailed information about SLE medication, their side effects, and the importance of adherence and cooperation with their treatment regimens [32]. These results aligned with a prospective randomized controlled trial performed in India, showing that a well-structured counseling intervention by clinical pharmacists for SLE patients enhanced drug awareness and improved medication adherence [33]. The importance of pharmaceutical care in enhancing adherence to treatment, clinical outcomes, and addressing drug-related complications has been confirmed in a systematic review study conducted among individuals diagnosed with autoimmune illnesses [34]. In addition, a prospective observational trial in South India found that clinical pharmacist intervention effectively reduces drug-related problems in patients with SLE, proving their therapeutic efficacy and aiding in reducing these problems [35]. Furthermore, clinical pharmacists in rheumatology clinics play a crucial role in patient counseling, drug information, and procurement, improving medication adherence and safety and potentially reducing acute disease flare-ups and hospitalization [36]. Regarding QoL, the present study found a significant enhancement in the mean QoL across the physical, social, and psychological domains after implementing PI. Still, pharmacist counseling did not affect the environmental domain of QoL. These observations may be related to environmental factors such as living conditions, access to resources, finances, transportation, and health services that the clinical pharmacist cannot interfere with or affect and were beyond the pharmacist's ability. Several studies have evaluated the influence of pharmacist education on QoL [37-44]. One of these studies was conducted in France to assess pharmaceutical care in SLE, which showed a statistically significant enhancement in QoL [37]. In addition, a quasi-experimental study conducted in Egypt indicated that the continuous care model significantly enhanced the quality of life and knowledge of SLE patients [38]. In contrast, a study conducted in Indonesia demonstrated that pharmacists' counseling could significantly enhance the knowledge scores of SLE outpatients, but it does not improve their QoL [39]. Furthermore, a previous study conducted in Cairo demonstrated that establishing clinical pharmacists' roles in managing patients with rheumatoid arthritis was essential for improving quality of life and reducing drug-related problems and disease activity for this patient population [43]. The result of the present study found a significant increase in participants' self-efficacy in treating chronic conditions following the implementation of pharmacist intervention. This may be due to pharmacist educational interventions enhancing self-efficacy in managing chronic diseases like SLE by improving patients' knowledge, awareness, and confidence in self-management practices, medication use, and lifestyle adjustments. A quasi-experimental study conducted in Egypt found a significant difference in self-efficacy levels among patients with SLE before, during, and after following self-care instructions. [45]. A randomized controlled trial done in Turkey demonstrated that educational and counseling interventions positively influenced self-efficacy, awareness, and satisfaction in patients with SLE [46]. Incorporating clinical pharmacy facilities into rheumatology care significantly improves clinical

outcomes and quality of care for the patients [47]. Influenza infection rates were diminished in vaccinated patients with SLE relative to unvaccinated patients, and obstacles to vaccination were the absence of physician recommendations and concerns over the vaccine's safety and effectiveness [48]. The present study's findings showed that the uptake and willingness to receive the flu vaccine heightened after the introduction of PI and increased awareness regarding vaccination. A systematic analysis indicated that pharmacist involvement as immunizers, advocates, or in both capacities significantly improved vaccination rates compared to routine care or initiatives lacking pharmacists [49]. Retrospective cohort research on pharmacist-led health education interventions showed a significant increase in influenza vaccination rates among patients receiving biological medicines for immune-mediated diseases compared to a control group, which showed a smaller increase [12]. The study's limitations comprise a limited sample size, single-center execution, and brief duration, while the face-to-face interview method may bring interviewer bias into the findings.

Conclusion

An educational intervention guided by a clinical pharmacist significantly improved medication adherence, quality of life, and self-efficacy. In addition, pharmacist intervention enhanced the uptake and willingness to take the flu vaccine. The need for the incorporation of pharmacists in SLE management and healthcare systems is highly recommended.

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Conflict of interests

The authors declared no conflict of interest.

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Data sharing statement

Supplementary data can be shared with the corresponding author upon reasonable request.

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