Effect of Continuous Care Model on Patient's Knowledge and Health Outcome Regarding Systemic Lupus Erythematosus

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Abstract

Background: Systemic Lupus Erythematosus is a chronic autoimmune disease which can impact several body systems or organs, resulting in a range of clinical symptoms. **Aim:** This study aimed to evaluate the effect of continuous care model on Patient's knowledge and health outcome regarding systemic lupus erythematosus. **Research design:** Quasi-experimental research design was utilized to conduct study. **Setting:** The study was conducted at Department of Rheumatology and Outpatient Clinics at Fayoum University Hospital. **Sample:** Purposive sample of 60 patient diagnosed with systemic lupus erythematosus. **Data collection tools:** Tool I: Structured Interview Questionnaire: It consisted of two parts: Part A: The Patient's Demographic Characteristics. Part B: Medical data. Tool II: Patient's Knowledge Regarding Systemic Lupus Erythematosus. **Tool (III) :** Lupus Patient Reported Outcomes (Lupus PRO). **Results:** There was a statistically significant improvement in the patient's total knowledge and health outcomes score post one and three months of continuous care model application compared with pre implementation. **Conclusion:** Continuous care model efficiently improved systemic lupus patients' knowledge and reported outcomes. **Recommendations:** Implementing continuous care model for all individuals with systemic lupus erythematosus to improve their knowledge and their health outcomes.

Key words: Continuous Care Model, Health Outcomes, Knowledge & Systemic Lupus Erythematosus

Introduction

Systemic lupus erythematosus (SLE) is a chronic, inflammatory, autoimmune illness caused by the immune system's aberrant hypersensitivity, which causes inflammation in connective tissues. This inflammation can cause persistent damage to various physiological systems, including the joints, kidneys, blood cells, brain, skin, lungs, central and peripheral nervous system, heart and platelets **(Flouda, & Boumpas, 2025)**.

The disease usually progresses in a relapsing-remitting pattern, with alternating periods of low disease activity and remission. About 20% to 30% of SLE patients have chronically active or persistently illness. Severe and refractory SLE can cause permanent organ damage and higher mortality rates **(Schilirò et al, 2024)**. It affects about 3.4 million people globally, with 400,000 new cases being identified each year. It is most typically seen in women between puberty and menopause **(Dai, Fan, & Zhao, 2025)**.

It's unclear specifically causes SLE. The disease's nature can be explained by the interactions between genetic, environmental, immunological, and hormonal factors. Most typically, a person with SLE inherits the risk from one or both parents and then developed the illness when they exposed to a trigger. Triggers may include being pregnant, undergoing surgery, being ill, or exposed to sunlight **(Amer et al,2024)**.

Fatigue, skin lesions, arthralgia and synovitis, nephritis, hematologic system involvement, and neuropsychiatric symptoms including anxiety and depression are some of the clinical signs. All of these characteristics can reduce SLE patients' health-related quality of life (HRQoL).Remission and minimizing organ damage are the goals of SLE treatment by immunosuppressive medication, and lifestyle changes such as smoking cessation and avoiding UV rays **(Geertsema-Hoeve et al, 2024)**.

Nurses have critical roles in providing care for patients with systemic lupus erythematosus by organizing and monitoring the patients' general health, managing symptom control, giving psychological support to patients and caregivers and offering individualized education based on patient needs **(Yel, Ozer, & Yildirim, 2024)**.

The continuous care model (CCM) represents a theoretical framework consisting of four interdependent stages: orientation, sensitization, control, and evaluation. Nurses that use CCM should accurately determine patients' needs, support them, and integrate both patients and family in problem solving processes. The model is intended to create and implement continuous model care that promote acceptance, build a greater knowledge of health objectives, and control diseases and possible complications **(Moustfa, Mohamed & Mohamed, 2024)**.

Continuous care model plays an important role in improving patient attitudes since it identifies their needs. Continuous care is a regular process that aims to establish effective, interactive, and continuous contact between patients and caregivers in order to detect needs and problems, sensitize patients to accept ongoing health behaviours and help them maintain, improve, and enhance their health. The application of this model promotes accurate diagnosis of patient problems, stimulates patients and their families to solve life problems, and encourages their participation **(Abd El Aliem, Ahmed, & Sharaby, 2023)**.

Significance of the study

Systemic lupus erythematosus is a multisystem heterogenous disease that can potentially lead to serious organ complications, with the potential to cause morbidity and occasional mortality. Patients with SLE have various complications caused by the disease or its treatment **(Talash et al., 2025).**

According to estimates, SLE affect aproximitly 3.4 million people worldwide and the number of newly diagnosed individuals is 400,000 every year. The estimations for men were 1.53 (0.41 to 4.46) per 100 000 person-year and 0.06 million people annually, respectively, while women were 8.82 per 100 000 person-year and 0.34 million people yearly. **Dai et al., (2025)**. Overall, 6.1/100,000 people in Egypt were expected to have adult SLE (1.2/100,000 men and 11.3/100,000 women) **(Sayed et al., 2025).**

The continuous care model is a nursing approach that provides a structured plan to strengthen patients' knowledge, accountability, and engagement in their long-term care, as well as in managing disease and its complications. Since educational programs alone tend to lose effectiveness over time without proper follow-up, integrating continuous monitoring and care with education can encourage SLE patients to adopt healthier behaviors, lower the likelihood of complications, and improve their overall quality of life **(Abdelrahman, Fathy, & Sabry, 2023)**.

Aim of the study

This study aimed to evaluate the effect of continuous care model on Patient's knowledge and health outcome regarding systemic lupus erythematosus.

Research Hypothesis

H1: Patient's knowledge mean scores will be exhibit improvement post implementation of continuous care model.

H2: Health outcome of studied patients will be exhibit improvement post implementation of continuous care model.

Subjects and Methods

Research design

Quasi experimental research design was used to perform the study.

Setting

This study was done at Department of Rheumatology and Outpatient Clinics at Fayoum University Hospital.

Sample

Purposive sample of 60 SLE patient.

Sample Size:

The sample size was determined using Stephen Thompson's equation

$$\boxed{n = \frac{N \times p(1-p)}{[[N - 1 \times (d^2 \div z^2)] + p(1-p)]}}$$

$$n = \frac{70x0.5x(1-0.5)}{\left[(70-1)x\left(\frac{0.05^2}{1.96^2}\right)\right] + 0.5x(1-0.5)}$$

$$= 59.34 \cong 60$$

N = Community size is 70, p = Ratio provides a neutral property is equal to 0.12, d = the error rate is equal to 0.05and z = Class standard responding to the level of significance equal to 1.96. n= the sample size is 60 SLE patients.

- **Inclusion criteria**: Adult patients, age 20-60 years from both sexes, ability to communicate and agree to participate in the study.
- **Exclusion criteria**: Patients with health complications as renal failure, stroke, paralysis, cognitive dysfunction.

Tools of data collection:

Data was collected by using the following three tools:

Tool I: Structured Interview Questionnaire: It was developed by the researcher based on recent and relevant literatures. (**Yousef, et al., 2018 ; Mohamady, Srour, & Saad, 2022**). It consisted of two parts:

Part1:Demographic characteristics such as age, gender, marital status, education status, occupation and residence.

Part 2: Medical data: such as duration of disease, family history, chronic illness, present symptoms, precipitating factors, times of medical follow up etc.

Tool II: Patient's knowledge regarding systemic lupus erythematosus:

It was adopted by **Sullivan (2016)** and adapted by the researcher to assess patient knowledge level about SLE. It includes definition of disease, causes, signs and symptoms, diagnosis, treatment and complications of systemic lupus.

Scoring system:

Each question in knowledge was checked and every correct answer was scored 1 and incorrect answer or don't know scored 0. The total score of each subject was calculated, converted into percentage and interpreted as follows:

4. <50% : Inadequate knowledge
5. 50 - 75% : Moderately adequate knowledge

6. ≥ 75% : Adequate knowledge

Tool (III) : Lupus Patient Reported Outcomes (Lupus PRO):

SLE-specific tool that was adopted from **Jolly (2012)**, to assess the health outcome. This tool has a 43-item questionnaire that includes health related quality of life domains and non health related quality of life.

The Lupus PRO employs a 5-point Likert response scale, with 0 indicating never or not applicable, 1 indicating a little of the time, 2 indicating some of the time, 3 indicating most of the time, and 4 indicating all of the time. Additionally, certain items with reversal score as a negative item. Grades for each item were combined to calculate a percentage score.

Validity and Reliability

A jury of five experts in Medical Surgical Nursing evaluated the instruments' validity. Changes were made based on their feedback. Cronbach's Alpha coefficient test was used to examine tool reliability; patient knowledge was 0.824, while Lupus Patient Reported Outcomes (Lupus PRO) was 0.793.

Pilot study

The pilot study was conducted using 10% of the sample to assess the clarity and applicability of the tools, as well as the time required for data collection. The necessary modifications were made based on the findings of the pilot study. Subjects who participated in the pilot study were included in the study once minor alterations were implemented.

Field work

- An approval was obtained from the director of El-Fayoum University Hospital.
- A oral informed consent was obtained from each participant prior to data collection after the researcher explained the purpose of the study.
- Data was collected from internal rheumatology department and rheumatology clinic at Fayoum University Hospital for 8 months during the period from first November 2024 to last June 2025.
- In this study, the researcher applied the four stages of continuous care model (CCM): orientation, sensitization, control, and evaluation to patients with SLE.
- **The orientation stage**: The first stage involved the researcher meeting the patients, introducing herself to establish a line of communication, explaining the nature and purpose of the study to the patients who participated in the study, identifying available communication channels, such as phone calls or the WhatsApp application, and emphasizing the importance of scheduling phone calls. A 30-45-minute session was held with the patient and her/his family

- The patients who are participated in the study filled out the questionnaire sheet.
- **The first session**: It was used to assess the patient using Tool (I) to assess the patients demographic data, and medical patient history, Tool (II) to assess general knowledge of SLE patients and Tool (III) to assess lupus patient reported outcomes . Patient take 20:30 minute to complete the questionnaire sheet
- The nursing education booklet had been developed; the content meets the patients' needs, and their levels of understanding.
- **Sensitization stage**: The purpose of this stage was to increase patients' engagement in the continuing care process, as well as their understanding health outcomes from SLE, through the distribution of SLE-related educational materials and the preparation of educational programs. Every patient had six sessions, each lasting 45-60 minutes and taking place three days a week in a separate room apart from the rheumatology outpatient clinic or the rheumatology department. Discussion, questions, and responses were all employed as teaching tools. Obtaining comments on what was offered during the previous session and presenting the objectives of the current one, keeping in mind the necessity to use simple language to meet the patients' educational level. The care model sessions were delivered as follows:
- **The second session:** It was done to provide nursing education for patient about disease definition, causes, risk factors, symptoms and complication .
- **The third session:** It was done to provide nursing education for patient about complication, diagnostic methods, treatment modalities, pregnancy and contraception method
- **The fourth session:** It was done to provide nursing education for patient about exercise, importance of maintain healthy weight, balanced diet, avoid smoking, how to manage stress and family role.
- Following sessions often begin with a brief summary of prior discussions in plain Arabic language.
- Each session ended by a summary of what has been taught during the previous session and the objectives of new topics.
- Feedback and reinforcement of nursing education was performed according to patients need to ensure their understanding
- Each patient obtained a copy of the nursing education booklet that included the teaching content.

- **The fifth session** through phone call: After one month was done to assess the effectiveness of continuous care model on improving patient's knowledge using Tool (II), and reported outcomes using Tool (III).
- **Control stage**: The stage's objectives were to evaluate the standard of treatment patients received, promote patient engagement in their own care, and reinforce and integrate healthy self-care habits and practices. For two months, the researchers conducted weekly phone conversations with SLE patients (when permitted by the patient) during this phase. Each call takes ten minutes, however this varies based on the patient's needs and comprehension.
- **Evaluation stage**: Posttest after three months from the education was done to assess the effectiveness of continuous care model on improving patient's knowledge using Tool (II), and reported outcomes using Tool (III). Patient take 10:15 minute to complete the questionnaire sheet.

Ethical considerations:

An official permission to conduct the study was obtained from Fayoum University Supreme Committee for Scientific Research Ethics. Participation in the study was voluntary and subjects had given complete full information about the study before taken oral consent. The ethical considerations included explaining the purpose and nature of the study, stating the possibility to withdraw at any time, confidentiality of the information. Ethics, values, culture and beliefs had be respected.

Statistical design

The statistical software for social science (SPSS) was used to arrange, tabulate, and statistically evaluate the data that had been gathered. ANOVA, T-test, chi square (X2), and percentage range were used in the statistical study.

P > 0.05 Non significant
P ≤ 0.05 significant
P < 0.001 High significant

Results

Table (1): Demographic Characteristics of Patients with Systemic Lupus Erythematosus: shows that the majority of patients were female (90.0%). The mean age was 28.79 ± 12.60 years, with more than one third patients aged 25–<35 years (35.0%). Regarding marital status, 73.3% were married. The table also illustrates that nearly half of the patients had secondary education (45.0%). In terms of occupation, housewives (61.7%). Concerning residence, three quarter participants were from rural areas (75.0%).

Table (2): Frequency and Percentage Distribution of Medical Data Among Patients with Systemic Lupus Erythematosus: presents that the mean disease duration was 2.76 ± 1.89 years, with the largest proportion of patients having the disease for 1–3 years (35.0%). Regarding lupus symptoms, the most frequently reported were fatigue (70.0%), arthritis (66.7%), and myalgia (63.3%). Concerning precipitating factors, both emotional stress (60.0%) and physical stress (58.3%) were dominant, followed by sunlight exposure (50.0%).

Family history of lupus was observed in 21.7% of patients. With respect to chronic diseases, 26.7% reported comorbidities, most commonly involving the heart and blood vessels. Finally, follow-up visits were nearly equally distributed between regular (48.3%).

Figure (1): Percentage distribution of the total knowledge level pre, post, and follow up implementation of the continuous care model among the studied patients with SLE: shows that there was a clear and statistically significant improvement in patients' knowledge following the continuous care model. Regarding total knowledge, adequate responses improved from 11.7% at pre to 81.7% at post, and remained 85.0% at follow-up.

Figure (2): Percentage distribution of the total health outcomes pre, post, and follow up implementation of the continuous care model among the studied patients with SLE: Demonstrate that the heath outcome improved markedly, with high outcome levels rising from 17% at pre to 63% post (p<0.001), and maintained at follow-up 67% (p=0.411).

Table (3) : Relation between Demographic Characteristics of The Studied Patients and Their Total Knowledge Scores Throughout Pre, Post, and Follow-Up Phases: The results revealed no significant relation with gender and occupation at any phase (p>0.05), while age, marital status, educational level, and residence showed highly significant associations with knowledge scores throughout all phases (p<0.001).

Table (4): Relation Between Demographic Characteristics of The Studied Patients and Their Health Outcome Scores Throughout Pre, Post, and Follow-Up Phases: The findings showed no significant differences with gender and occupation at any stage (p>0.05). Conversely, age, marital status, educational level, and residence demonstrated highly significant associations with the total reported outcome during all phases (p<0.001), where older, married, more educated, and urban participants consistently reported higher scores compared with their counterparts.

Table (5): Correlation between Health Outcome and Knowledge among Patients with Systemic

Lupus Erythematosus across Different Phases: showed a statistically significant positive correlation was observed between total health outcome and total Knowledge among patients with systemic lupus erythematosus. At the pre-test, (r=0.588, p<0.001) and still at the follow-up phase (r=0.612, p<0.043).

Table (1): Frequency and Percentage Distribution of Demographic Characteristics of Patients with Systemic Lupus Erythematosus (n=60)

Patients' demographic characteristics	Frequency (N)	Percent (%)
Gender		
- Female	54	**90.0**
- Male	6	10.0
Age		
- <25	19	31.7
- 25- <35	21	**35.0**
- 35- <45	14	23.3
- 45 or more	6	10.0
Mean±SD	**28.79 ± 12.60**	
Marital status		
- Married	44	**73.3**
- Single	14	23.3
- Widow	0	0.0
- Divorce	2	3.3
Educational level		
- Non-educated	14	23.3
- Primary	15	25.0
- Secondary	27	**45.0**
- Bachelor	4	6.7
- Post-graduate	0	0.0
Occupation		
- Housewife	37	**61.7**
- Employee	10	16.7
- Unemployment	5	8.3
- Self-employed	8	13.3
Residence		
- Rural	45	**75.0**
- Urban	15	25.0

Table (2): Frequency and Percentage Distribution of Medical Data Among Patients with Systemic Lupus Erythematosus (N=60)

Items	No.	%
Disease duration		
- < 1 year	15	25.0
- 1-3 years	21	**35.0**
- 3-5 years	14	23.3
- > 5 years	10	16.7
Mean±SD	**2.76 ± 1.89**	
SLE symptoms		
- Fever	25	41.7
- Headache	26	43.3
- Confusion	17	28.3
- Arthritis	40	**66.7**
- Fatigue	42	**70.0**
- Skin rash	31	51.7
- Aching in deep breathing	22	36.7
- Myalgia	38	**63.3**
- Anaemia	27	45.0
Precipitating factors		
- Emotional stress	36	**60.0**
- Physical stress	35	**58.3**
- Sunlight	30	**50.0**
- Irregular eating patterns	4	6.7
- Lack of sleep	10	16.7
- Hormonal changes	15	25.0
Family history		
- Yes	13	**21.7**
- No	47	78.3
Chronic disease		
- Yes	16	**26.7**
- No	44	73.3
If yes:		
- Heart and blood vessels	10	**16.7**
- Joint disease	2	3.3
- Asthma	4	6.7
- DM	6	**10.0**
- Others	10	16.7
Times of follow up		
- Regular	29	**48.3**
- When necessary	31	51.7

Figure (1): Percentage Distribution of The Total Knowledge Level Pre, Post, and Follow up Implementation of The Continuous Care Model among The Studied Patients with SLE

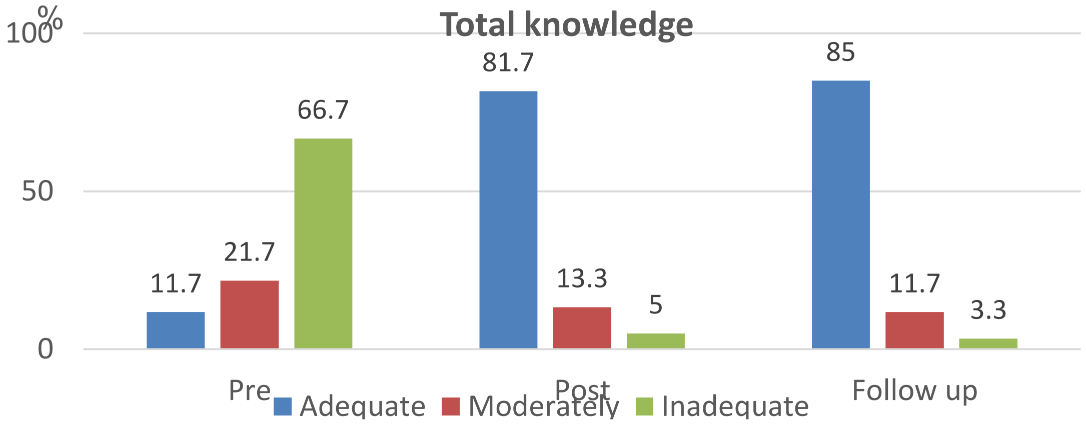

Figure (2): Percentage Distribution of The Total Health Outcomes Pre, Post, and Follow Up Implementation of The Continuous Care Model among The Studied Patients with SLE.

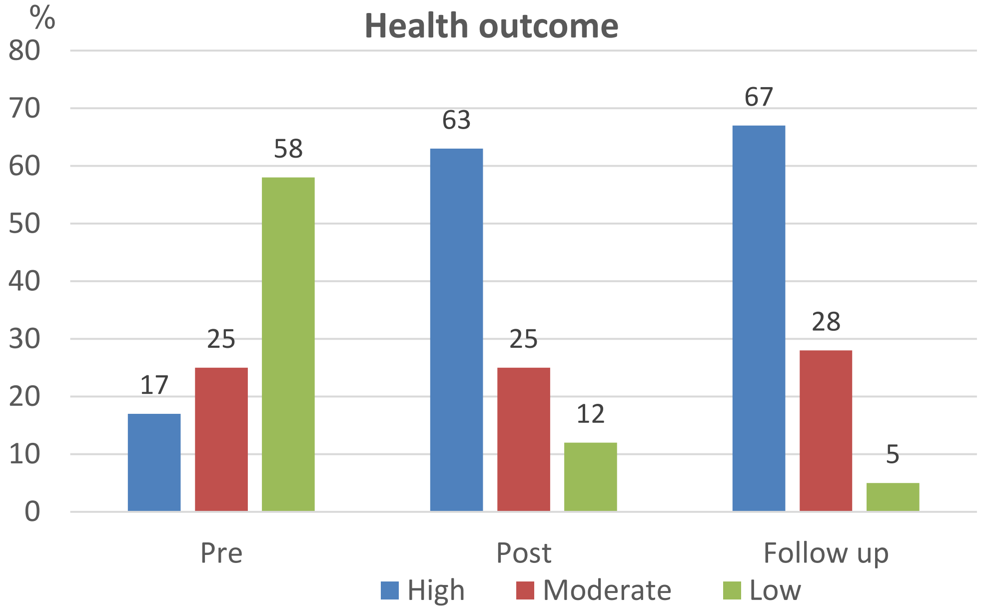

Table (3) Relation Between Demographic Characteristics of The Studied Patients and Their Total Knowledge Scores Throughout Pre, Post, and Follow-Up Phases (N=60)

Demographic Characteristics	Total knowledge											
	Pre		Tests		Post		Tests		Follow up		Tests	
	Mean	SD	t/f	P-value	Mean	SD	t/f	P-value	Mean	SD	t/f	P-value
Gender												
- Female	4.52	1.60	0.258	0.797	13.15	1.99	0.927	0.358	15.22	2.13	0.602	0.549
- Male	4.33	2.25			12.33	2.50			14.67	2.34		
Age												
- <25	3.47	1.22	13.001	<0.001*	11.00	0.75	36.837	<0.001*	12.95	0.91	25.494	<0.001 *
- 25- <35	4.24	1.70			13.05	1.77			15.71	1.95		
- 35- <45	5.21	0.89			14.79	0.80			16.29	1.27		
- 45 or more	7.12	0.75			15.67	0.52			17.67	0.52		
Marital status												
- Married	4.95	1.57		<0.001*	13.86	1.76	21.818	<0.001*	16.07	1.72	28.934	<0.001 *
- Single	3.29	1.20			11.00	0.68			12.79	0.70		
- Divorce	3.00	1.41			10.00	0.00			12.00	0.00		
Educational level												
- Non-educated	3.07	1.14	9.943	<0.001*	10.86	0.77	22.434	<0.001*	12.71	0.73	17.562	<0.001 *
- Primary	4.07	1.28			12.47	1.81			15.13	2.17		
- Secondary	5.26	1.51			14.15	1.49			16.11	1.58		
- Bachelor	6.07	1.41			15.75	0.50			17.50	0.58		
Occupation												
- Housewife	4.27	1.68	1.681	0.181	12.84	2.08	0.784	0.508	15.22	2.10	0.586	0.627
- Employee	4.60	1.07			13.00	2.21			14.80	2.53		
- Unemployment	6.13	1.22			14.20	1.48			16.20	2.05		
- Self-employed	4.50	2.07			13.50	2.00			14.75	1.98		
Residence												
- Rural	4.07	1.56	3.926	<0.001*	12.31	1.76	6.456	<0.001*	14.56	2.08	4.403	<0.001 *
- Urban	5.80	1.21			15.33	0.72			17.00	0.85		

Table (4): Relation Between Demographic Characteristics of The Studied Patients and Their Health Outcome Scores Throughout Pre, Post, and Follow-Up Phases (N=60)

Demographic Characteristics	Total health outcome											
	Pre		Tests		Post		Tests		Follow up		Tests	
	Mean	SD	t/f	P-value	Mean	SD	t/f	P-value	Mean	SD	t/f	P-value
Gender												
- Female	64.28	6.58	0.147	0.884	129.09	3.83	0.428	0.671	129.72	4.28	0.413	0.681
- Male	63.83	10.72			128.33	6.47			130.50	5.28		
Age												
- <25	57.42	3.49	29.397	<0.001*	125.95	3.14	12.885	<0.001*	126.53	2.01	22.201	<0.001*
- 25- <35	64.81	5.31			129.14	3.75			129.05	3.99		
- 35- <45	68.14	4.85			130.57	3.06			132.36	2.90		
- 45 or more	74.67	2.34			134.67	1.21			136.83	1.17		
Marital status												
- Married	66.89	5.94	19.922	<0.001*	130.41	3.59	13.999	<0.001*	131.00	4.37	7.772	<0.001*
- Single	57.36	3.65			125.43	2.90			126.57	2.03		
- Divorce	54.00	0.00			123.50	0.71			126.00	0.00		
Educational level												
- Non-educated	56.50	3.28	21.468	<0.001*	124.71	2.58	13.013	<0.001*	126.50	2.03	12.270	<0.001*
- Primary	62.93	5.19			128.80	2.54			127.80	2.57		
- Secondary	67.52	5.50			130.78	3.83			131.81	4.37		
- Bachelor	74.02	3.27			133.00	2.94			135.25	3.10		
Occupation												
- Housewife	63.97	7.14	0.282	0.838	129.14	3.83	0.530	0.664	129.11	4.38	1.088	0.362
- Employee	64.20	5.61			128.50	2.95			130.30	3.68		
- Unemployment	67.01	8.80			130.80	4.32			132.40	5.37		
- Self-employed	63.75	7.54			128.00	6.35			130.75	4.17		
Residence												
- Rural	61.53	5.74	6.988	<0.001*	127.78	3.73	4.735	<0.001*	128.04	3.32	7.601	<0.001*
- Urban	72.33	2.82			132.73	2.69			135.07	2.25		

Table (5): Correlation between Total Health Outcome and Total Knowledge among Patients with Systemic Lupus Erythematosus across Different Phases.

Total health outcome	Total knowledge	
	r	P-value
Pre	0.182	0.107
Post	0.588	<0.001
Follow up	0.612	<0.043

Discussion

Systemic lupus erythematosus (SLE) is an autoimmune illness that causes extensive inflammation of blood vessels and connective tissue. There is no cure for lupus, although medical treatments and lifestyle changes can help manage it. SLE can be mild or life-threatening. Lupus patients who receive adequate medical care, preventative care, and education can greatly improve their function and quality of life **(Bagare et al., 2024)**.

This study aimed to evaluate the effect continuous care model care on knowledge and health outcomes in systemic lupus patient.

Regarding the age of the studied patients ,the results revealed that more than one third patients aged 25–<35 years with the mean age was 28.79 ± 12.60, as SLE primarily affects young women of childbearing age, this finding was in accordance with **Elmetwaly et al. (2021)** who stated that mean age was 27.54±11.02years. These results similar with **Elsayed, & Mesbah, (2018)** who stated that SLE affects young adults and starts in the second or third decade of life and mean age was 28.76±5.98.

Regarding the gender of the studied patients, the current study found that the most of patients were female, with a ratio of 9 female: 1 male, this consistent finding across studies highlights the effect of endogenous sex hormones, which have multiple impacts on the immune system and cause gender-related differences in the prognosis and outcome of SLE .This study similar with **Arkema et al.,(2023)** which found that majority (87%) of studied patients were females.

In the same line, the study performed by **Gui et al., (2022)** which found that majority of the studied patients 90.9% were females with a female: male ratio of 9.96 :1. These results similar with the result of study performed by **Şahin et al., (2025)** who found that majority of the studied patients (88.1%) were females

Regarding to marital status, the finding of the current study revealed that, less than three quarters were married. These results are in accordance with the studies performed by **Ayad et al., (2024)** which revealed that more than two thirds were married. Moreover, this was in line with the study conducted with **Barakat et al., (2024)** which reported approximately two thirds were married.

In relation to the educational level of the studied patients, it was found that, the current study had different levels of education with dominance of secondary education . As nearly half of the patients had secondary education. This finding may be due to majority of studies patients were females and lived in rural areas. This result was in agreement with the study performed by **Amer et al., (2024)** who reported that half of the studied patients were had secondary education

According to professional level of the patients in the current study the less than two thirds of the patient was housewife and not working. This study agreement with **Mohamad et al., (2020)** who stated that more than two thirds of the patients not working. The predominance of non-working females in SLE cohorts may reflect the diseases functional limitations and its impact on work capacity.

As regarding residence three quarter are rural and in line with the study conducted by **Mohamady et al., (2022)** stated that the majority of the patient were rural. Rural residence may pose additional challenges, including limited access to specialized care, longer travel times, and potential delays in diagnosis and treatment.

As regards to the onset of disease, The present study findings showed that more than one third of studied patients had been diagnosed for less than three years (mean = 2.76 ± 1.89 years), these results supported with the study done by **Rizk et al., (2020)** who found that more than half of patient have disease duration less than four years. Also this result a line with **Zahiri et al.,(2022)** who report almost all patients had disease duration less than three years (mean = 2.06 ± 1.33 , 2.21 ± 1.33 years) in control and study group respectively.

Regarding symptoms of systemic lupus erythematosus as reported by the studied patient, the present study results illustrated the most common symptoms in the current study was more than two thirds fatigue and arthritis, and less than two thirds had myalgia, and almost one half had skin rash, less than half of patient had headache, fever and anaemia.

This result is agree with the study performed by **Farouk et al., (2023)** who stated that less than two thirds had fever and fatigue, more than half of patient arthritis, more than two thirds of patient had skin rash.

Regarding family and disease history, the study found that more than three quarter of the patients did not have family history of SLE or autoimmune disease. This finding was in the same line with **Sheha et al., (2024)** report that more than two thirds of the patients didn't have family history of SLE or autoimmune disease.

Regarding precipitating factors, the present study clarified that, less than two third of studied patient had emotional stress, and physical stress. This finding is consistent with the study done by **Mohamady et al, (2022)** who stated that more than two thirds of studied females had physical and emotional risk factors for SLE respectively.

As regard other chronic diseases the present study results revealed that less than three quarter of patient didn't have other chronic diseases. These results approved with **Ahmed et al.,(2023)** who found that roughly three-quarters of the studied patients didn't have a family history of systemic lupus erythematous. On the contrary, **Kankaya & Karadakovan, (2020)** found that more than half of study sample had other comorbidities.

Follow-up practices revealed that slightly less than half of the patients attended regular visits, while the remainder sought care only when necessary. This finding is contradict with **Mohamad et al., (2020)** who found that more than half of the patient attend follow up visit only when necessary.

According to the total knowledge of the studied patients regarding systemic lupus erythematous, the findings of the current study demonstrated that, a noticeable progress among the studied patients' total score of knowledge pre, one month and three months follow up after continuous care model implementation This result supports the study hypothesis (H1) which stated that the total mean score of knowledge regarding SLE was improved at post and follow-up implementation of continuous care model as compared to pre implementation of continuous care model among patients with SLE.

This result is consistent with **Hamad et al.,(2024)** who report that the degree of satisfactory knowledge increased from 10.0% in the initial evaluation to 91.25% and 88.75%, respectively following non-pharmacological nursing interventions implementation and follow-up.

This study finding was supported by **Faheim et al., (2023)** who demonstrated a noticeable progress among the studied patients' total score of knowledge pre, post and follow up after self- care guidelines implementation.

Similarly, these study findings were supported by **Salem et al., (2024)** who report remarkable effect of the self-care program on adolescents' knowledge towards SLE that result in competent practices and positive attitude after the self-care program.

According to the mean health outcomes scores of the studied patients,The present study revealed substantial improvements in all measured outcomes following the application of the Continuous Care Model (CCM) among patients with systemic lupus erythematosus (SLE). The overall reported outcome score nearly doubled from baseline (64.42 ± 5.53) to post-intervention (128.58 ± 3.67), with gains maintained at follow-up. The absence of significant decline between post-intervention and follow-up underscores the sustainability of the CCM impact.

In this respect, **Ahmed et al.,(2023)** illustrated a highly statistically significant difference between the total mean lupus PRO score pre, post, and follow up implementation of the self-care guidelines among the studied patients with systemic lupus erythematosus.

This result is agreeing with **Hamad et al.,(2024)** who revealed a highly significant difference between the pre/ post and pre/ follow up mean scores for quality of life dimensions include physical functioning, fatigue, general health, pain, emotional well-being and total quality of life after implementation of non-pharmacological nursing interventions.

These findings are consistent with **Mohamady et al., (2022)**, who demonstrates that all Lupus PRO items showed highly statistically significant changes before and one month after self-care management. Furthermore, found that using the self-care model improved SLE flare-ups that were brought on by physical stress in addition to achieving a high quality of life .

A similar result was reported in the study of **Elghareeb, & Mahmoud, (2022)** who reported that there was a highly statistically significant difference in reported health outcome of pain and fatigue score before implementation of self-management instruction, which slightly decreased after implementation of self-management instruction.

Also, this result parallel with **Amer et al., (2024)** who report was reduction in the level of fatigue severity between participants in the study group than participants in the control group on post intervention and follow-up the implementation of self-management guidelines this support that non pharmacological management methods provided by continuous care model such as range of motion exercises, relaxation exercises and improving diet with vitamins which supported by the illustrative colored booklet for reduction in fatigue levels, and improvement in physical fitness, and reported QOL.

Regarding the relation between demographic characteristics and total knowledge, the present study demonstrated that patients total knowledge scores were not significantly associated with gender or occupation across pre, post, and follow-up phases. On contract to this finding **Alkalash et al., (2024)** and **Alrashdi et al., (2022)** showed that knowledge score of participants was significantly associated with only participants gender.

Regarding the relation between occupation and patients total knowledge scores, the present study demonstrated that patients total knowledge scores were not significantly associated with occupation across pre, post, and follow-up phases. This suggesting that health education interventions can minimize the gap between employed and unemployed groups.

Conversely, the study revealed highly significant associations between knowledge scores and patients age, marital status, educational level, and residence across all phases. Younger patients (<25 years) had lower baseline knowledge compared with older groups, while patients aged 45 years or more demonstrated the highest post and follow-up scores. This may be explained by the fact that older patients are usually more motivated to learn due to higher disease burden and experience.

This finding is contradict with the study done by **El Saman et al., (2020)** who found that a highly significant negative correlation between age and the knowledge and awareness score. This means that the older the age, the poorer the knowledge.

Regarding the relation between demographic characteristics and the total reported outcome across pre, post, and follow-up phases. The findings showed no significant differences with gender and occupation at any stage.

Conversely, age, marital status, educational level, and residence demonstrated highly significant associations with the total reported outcome during all phases, where older, married, more educated, and urban participants consistently reported higher scores compared with their counterparts. This agreement with **Katz et al., (2021)** who stated that individuals with limited health literacy had significantly worse patient-reported outcome scores.

Regarding the relation between total knowledge and total heath outcome this study revealed that there was a statistically significant positive correlation was observed between total reported outcome and total knowledge among patients with systemic lupus erythematosus. This result was supported by **Mohamady et al., (2022)** revealed a significant positive correlation among studied females total knowledge, fatigue pain, and total Lupus PRO score at the one month following self-care management.

This result supported the findings of **Elsayed & Mesbah (2018)**, who found a strong positive correlation between the overall knowledge, self-care behaviors, and post-intervention total Lupus Patient Reported Outcomes (PRO) score of the participants under study.

Similarly **Yousef et al., (2018)**. who stated highly statistically significant positive correlations between total lupus awareness and patients' total QOL as reported of physical health, pain, emotional health, body image, and fatigue for SLE patients under the study pre and post implementation of SLE health promotion program.

This result was consistent with **Amer et al., (2024)** who revealed that there was a negative correlation between the total patient's scores of awareness and their total scores of pains for the study group and control group through self-management guidelines phases ($P<0.001$) and support that improving awareness level can result in reducing severity of pain.

Conclusion

It can be concluded that:

The study found that implementing a continuous care model effectively improved patients' knowledge of systemic lupus erythematosus. There was a significant difference in total knowledge scores between pre and post-tests (after one month and three months). As adequate knowledge improved from 11.7% at pre to 81.7% at post, and remained 85.0% at follow-up.

The health outcomes of studied clients were improved significantly after continuous care model implementation. Health outcome score nearly doubled from 64.42 ± 5.53 pre to 128.58 ± 3.67 post ($p<0.001$), with no significant change at follow-up ($p=0.076$).

There was a highly positive association among studied subjects total knowledge Health outcome and score at the post intervention phase

Recommendation

- Implementing continuous care model for all individuals with systemic lupus erythematosus to to improve their knowledge, self-care habits and their health outcomes.
- Provide an illustrated Arabic instructional booklet to all Rheumatology outpatient clinics in Fayoum City for newly admitted SLE patients.
- Further research and replication this study for large number of clients and in different setting are also required.

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