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EFFECTIVENESS OF CORTISONE USE ON SYSTEMATIC LUPUS ERYTHEMATOSUS PATIENTS: A CROSS-SECTIONAL STUDY

Dr. Manhal Nabeel Redwan1, Dr. Hoda Jehad Abousada2, Dr. Yara Abdulrahman Fatani3, Dr. Bandar Musaad Alanazi4, Dr. Lara Yousef Sabban5, Dr. Tasneem Ahmed Bahrawi5, Moayad Saleh Alhejaili6, Hibah Talal Gazzaz7, Mansour Masad Almutairi8, Mnawer Abdullah Alsehemi8, Ghaida khalaf Almutairi9, Abdullah Jameel Alhassani10, Dalal Mohammed Alsikhan11, Noor Moh'd Alessa12 and Fatimah Jassim Al Salim13

1 Internist &Adult endocrinologist consultant, AlNoor specialist hospital, Mecca, KSA
dr.redwan04@gmail.com
2 Corresponding Author: obstetric & Gynecology Doctor, KFSHRC, Jeddah, KSA
Dr.huda1992@outlook.com
3 Medical resident, Althagher general hospital, Jeddah,KSA
4 General practice , Riyadh,KSA
5 Medical Intern , Ibn Sina National College, Jeddah ,KSA
6 Pharmacist, King Abdulaziz Medical City, Ministry of National Guard Health Affairs, Jeddah, KSA
7 Pharmacist,security forces hospital,Makkah.KSA
8 Pharmacist , Prince Sultan Armed Forces Hospital, Madinah, KSA.
9 Pharmacist ,Hafr Al batin university, Hafr Albatin , KSA .
10 Pharmacist,Alnahdi Medical Company, Makkah, KSA.
11 Laboratory Specialist, Diriyah Hospital, Riyadh, KSA
12 Laboratory Specialist , Ministry of Health, (Dammam Regional Laboratory), Dammam , KSA
13 Laboratory technician , Ministry of Health, (Dammam Regional Laboratory), Dammam , KSA

ABSTRACT

Objective: This research aims to determine the Effectiveness of Cortisone Use on Systematic Lupus Erythematosus Patients.

Methods: The study will be conducted in multiple rheumatology clinics and hospitals across KSA, where SLE patients receive regular care. These facilities are selected to ensure a diverse and representative sample of SLE patients with varying treatment regimens.

Results: The study included 650 participants. The study included 650 participants. The most frequent gender among them was female (n= 380, 58.4%) and male (n= 270, 41.5%). Figure 1 shows the gender distribution among study participants. The most frequent age among study participants was less than 25 years (n= 207, 31.8%) followed by 25-30 years (n= 132, 20.3%), then 31-35 years (n=115, 17.7%), 36-40 years (n=109, 16.8%) and at least 40 years and more (n=87, 13.4%). Figure 2 shows the age distribution among study participants. The most frequent marital status among study participants was married (n= 233, 35.8%), followed by single (n= 179, 27.5%), then divorced (n=135, 20.8%), and widow (n=103, 15.8%). Nationality among study participants, with most being Saudi (n= 608, 93.5%) and non-Saudi (n= 42, 6.4%).

Conclusion:

Based on the study results, it can be concluded that using cortisone for treating systemic lupus erythematosus patients demonstrates high effectiveness in reducing the frequency of symptoms, improving quality of life, and alleviating swelling and pain associated with the condition. However, specific side effects, such as weight gain and mood changes, were noted, emphasizing the need to educate patients about the risks and benefits of cortisone. The findings highlight the importance of offering alternative treatment options alongside cortisone to reduce dependency and minimize its side effects.

INTRODUCTION

Systemic lupus erythematosus (SLE) and other inflammatory and auto-immune diseases are mostly treated with oral glucocorticoids, sometimes known as steroids. Even if they have a lot of positive impacts on patients' health, there are certain negative side effects, both immediate and later on, and the severity of these symptoms grows with dosage and time on the drug [1-5]. A decline in quality of life (QoL) and the development of potentially fatal adverse events (AEs) are two consequences of using steroids for an extended period of time [6].

Patients and doctors may all have different views on the pros and cons of steroids ("payers"). The viewpoint or experience of patients, in particular, is not always well understood or recorded. Patients with SLE believed their doctor should take into account the psychological challenges and pressures they experience while making treatment choices, according to a recent research [7]. In clinical studies, the effects of steroids and the benefits of steroid sparing have only been partly investigated. In clinical trials, we can study the short-term effects of steroid sparing in a controlled setting. However, we still don't fully understand how safety, efficacy, and quality of life interact with each other, and we don't always capture how these negative outcomes moderate the overall benefit to patients. While many doctors recognize the need to avoid using steroids altogether, others may consider them as a viable therapy option with tolerable side effects, according to a Scientific Advisory Board meeting ('The impact of corticosteroids in SLE'; March 2014; sponsored by GSK) that included both doctors and payers. Payers may also be hesitant to pay a premium for innovative medicines that replace or lower the dosage of steroids in the lack of data to illustrate

what steroid-sparing would bring in terms of minimizing side effects, QoL improvements, and/or cost savings (meeting minutes on file).

The clinical community has come to an agreement about the management of SLE: steroids should be avoided or used at very low doses [7, 8]. The discussion around the usefulness and optimal use of steroids in therapy might be informed by a better understanding of the dangers and benefits of steroid treatment, which vary according to illness, dosage, and duration of usage. Both physicians and patients need to manage steroid usage effectively, which include thinking about whether alternative treatments are more suitable, how steroid-induced adverse events may affect the patient, and how much healthcare will be needed in the future. Because steroids may have a confounding influence on effectiveness measurements, it can be difficult to evaluate the impact and value of main SLE therapies without also considering their effects. The real worth of sparing steroids in long-term clinical practice can only be determined when steroid prescription is based on strong data.

It is unable to find any suitable, fit-for-purpose measures in our literature and background review that might be used as patient-reported outcome (PRO) instruments to evaluate the effects of steroids on SLE patients. A total of 113 references were located in the databases searched, including ClinicalTrials.gov, PubMed, EMBASE, PROQOLID, and conference abstracts. We found one instrument, and it counts the frequency and severity of 33 symptoms that patients have encountered over the last four weeks. It was originally designed for use with patients who take oral steroids for immune thrombocytopenic purpura [9]. The recall time was too lengthy to address the frequent variations associated with symptoms and steroid treatment in individuals with SLE, and the study's emphasis on symptoms alone made it inappropriate. It is crucial for a PRO measure to be responsive to changes over time since SLE symptoms and treatment responses might alter frequently [10].

METHODS

Study design

This study will utilize a cross-sectional design to evaluate the effectiveness of cortisone use in patients with systemic lupus erythematosus (SLE). The design allows for the collection of data at a single point in time to explore the relationship between cortisone treatment and its impact on various patient outcomes.

Study approach

The study will be conducted in multiple rheumatology clinics and hospitals across KSA, where SLE patients receive regular care. These facilities are selected to ensure a diverse and representative sample of SLE patients with varying treatment regimens.

Study population

The target population will include patients diagnosed with systemic lupus erythematosus (SLE) who have been prescribed cortisone as part of their treatment regimen. Participants will be recruited from rheumatology clinics and hospitals.

Study sample

A convenience sampling technique will be used to select a sample size of approximately 350 patients, based on the prevalence of SLE in the study region and the estimated effect size. The sample will include adult male and female SLE patients who meet the eligibility criteria.

Study tool

For the current study, the questionnaire was adopted for data collection, which was also categorized as a study tool.

Data collection

Data will be collected using structured questionnaires and patient medical records. The questionnaire will gather information on patient demographics, disease history, cortisone dosage and duration, SLE symptoms, flare-ups, and reported side effects. Medical records will provide additional clinical data, such as laboratory results and imaging reports.

Data analysis

Data will be analyzed using SPSS software. Descriptive statistics will summarize patient demographics, cortisone dosage, and disease characteristics. Inferential statistics, including chi-square tests for categorical variables and t-tests or ANOVA for continuous variables, will assess the relationship between cortisone use and patient outcomes. A multivariate regression analysis will be performed to control for potential confounders such as age, sex, and disease duration.

Ethical considerations

Ethical approval will be obtained from [Institutional Review Board or Ethics Committee], and all participants will provide written informed consent. Confidentiality of patient information will be maintained, and participation will be voluntary, with the right to withdraw at any point without consequences to their care.

RESULTS

The study included 650 participants. The most frequent gender among them was female (n= 380, 58.4%) and male (n= 270, 41.5%). The most frequent age among study participants was less than 25 years (n= 207, 31.8%), followed by 25-30 years (n= 132, 20.3%), then 31-35 years (n=115, 17.7%), 36-40 years (n=109, 16.8%) and at least 40 years and more (n=87, 13.4%). The most frequent marital status among study participants was married (n= 233, 35.8%), followed by single (n= 179, 27.5%), then divorced (n=135, 20.8%), and widow (n=103, 15.8%). Participants were asked if they smoked. There most of them were smoking (n=357, 54.9%), followed by non-

smoking (n=247, 38%), then Ex-smokers (n=46, 7.1%). Participants were asked whether they had been diagnosed with systemic lupus erythematosus (SLE). Their responses and results are No (n=348, 53.5%) and Yes (n=302, 46.4%).

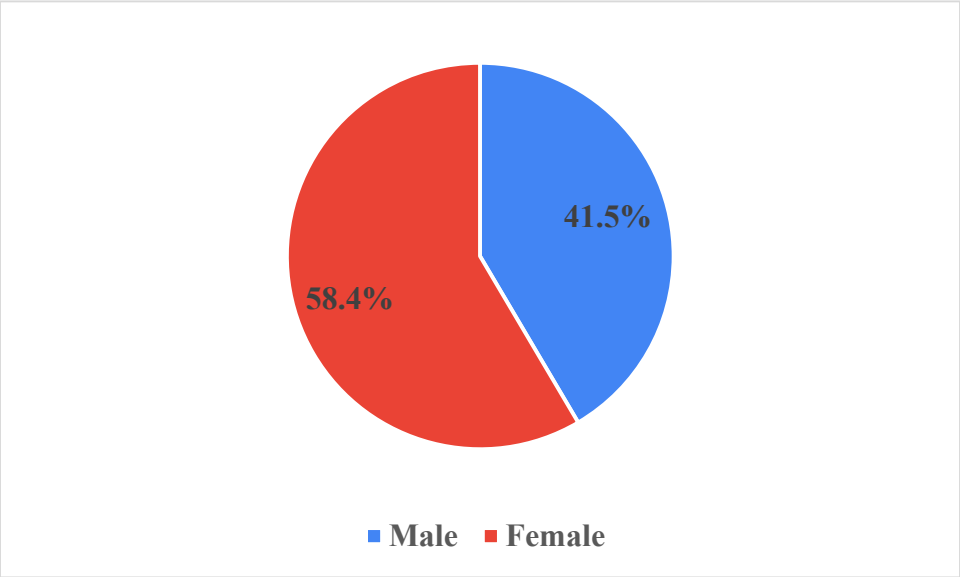

Figure 1: Gender distribution among study participants

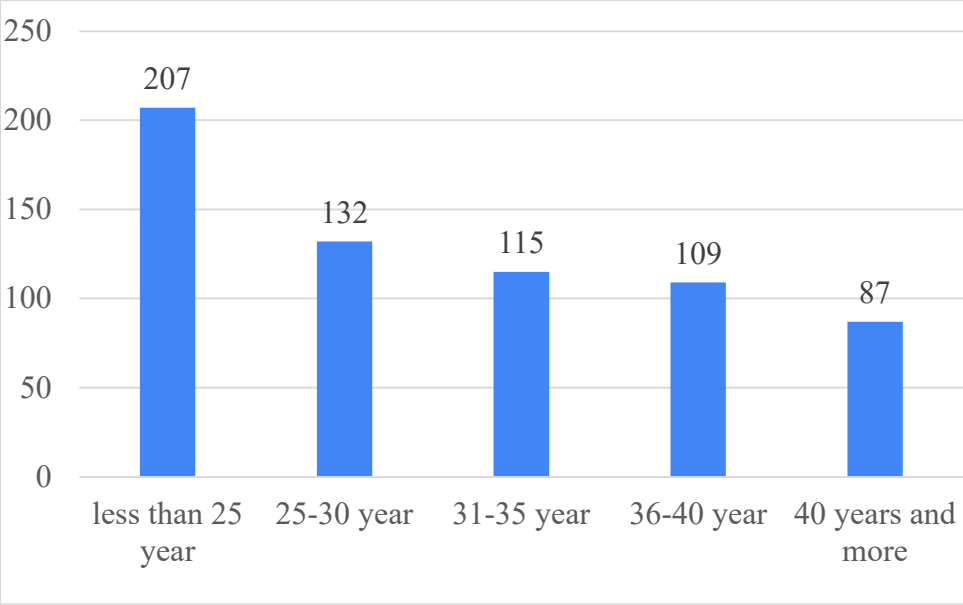

Figure 2: Age distribution among study participants

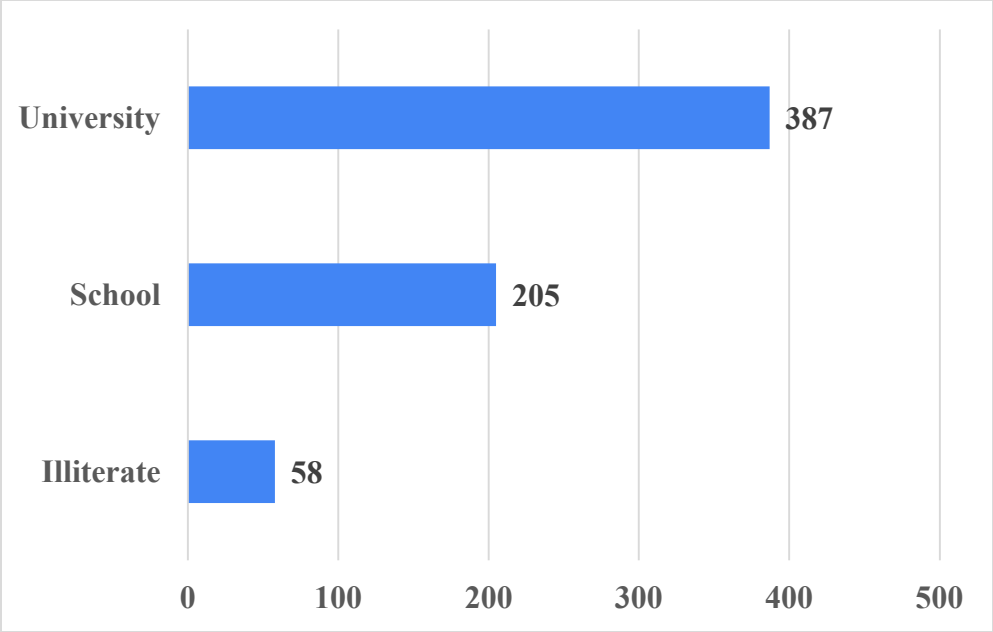

Figure 3: Marital status distribution among study participants

Participants were asked if they smoked. There most of them were smoking (n=357, 54.9%), followed by non-smoking (n=247, 38%), then Ex-smokers (n=46, 7.1%).

Nationality among study participants, with most being Saudi (n= 608, 93.5%) and non-Saudi (n= 42, 6.4%). Figure 4 shows the nationality distribution among study participants.

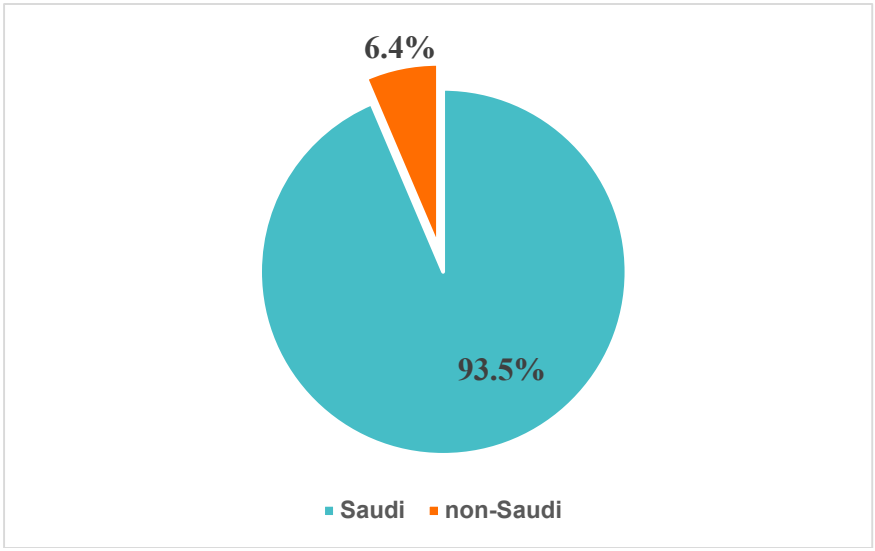

Figure 4: Nationality distribution among study participants

Participants were asked whether they had been diagnosed with systemic lupus erythematosus (SLE). Their responses and results are No (n=348, 53.5%) and Yes (n=302, 46.4%). Figure 5 shows the distribution of SLE among study participants.

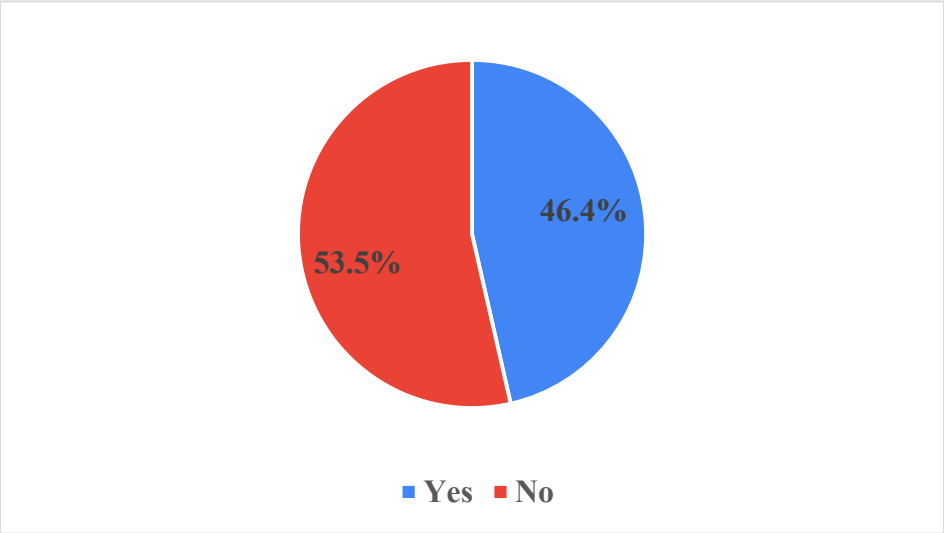

Figure 4: SLE distribution among study participants

Participants were asked about the effectiveness of cortisone in treating systemic lupus erythematosus (SLE). Their responses and results are presented in Table 1.

Table 1: effectiveness of cortisone among study participants

Item	Yes	No
Has cortisone helped reduce the frequency of your SLE flare-ups?	584 (89.8%)	66 (10.2%)
Do you feel that cortisone has effectively controlled the progression of your SLE symptoms?	600 (92.3%)	50 (7.7%)
Has cortisone improved your ability to carry out daily activities despite having SLE?	626 (96.3%)	24 (3.7%)
Do you experience a reduction in pain after starting cortisone treatment?	634 (16%)	16 (2.5%)
Has your joint swelling improved since starting cortisone therapy?	621 (95.5%)	29 (4.5%)
Do you feel that cortisone has helped control your SLE flare-ups?	625 (96.2%)	25 (3.8%)
Have you experienced any side effects from cortisone use?	615 (94.6%)	35 (5.4%)
Did your doctor provide you with information about the possible long-term effects of cortisone use?	603 (92.8%)	47 (7.2%)
Have you noticed weight gain since starting cortisone treatment?	599 (92.2%)	51 (7.8%)

Do you believe that cortisone has improved your overall quality of life?	573 (88.2%)	77 (11.8%)
Have you experienced mood changes while on cortisone?	605 (93.1%)	45 (6.9%)
Has your doctor suggested alternative treatments in addition to cortisone?	615 (94.6%)	35 (5.4%)
Do you find it difficult to adhere to the prescribed dosage of cortisone?	616 (94.8%)	34 (5.2%)
Have you needed to increase your cortisone dosage over time?	630 (96.9%)	20 (3.1%)
Do you feel that the benefits of cortisone outweigh its side effects in managing your SLE?	551 (84.8%)	99 (15.2%)

DISCUSSION

Glucocorticoids (GCs) are the go-to for treating inflammatory and autoimmune diseases because of their strong anti-inflammatory and immunosuppressive properties. Multiple medical fields often use GCs, such as dermatology, rheumatology, nephrology, gastroenterology, pneumology, and neurology. When it comes to lowering inflammation and immunological activation, they are the therapy of choice for many dermatological problems, inflammatory bowel diseases, systemic autoimmune diseases, allergic responses, and allotransplantation. Side effects restrict the length of therapy and the amount employed, however GCs have powerful and rapid activities that ease certain symptoms and cut mortality in some life-threatening disorders.

Environmental and hereditary variables contribute to systemic lupus erythematosus (SLE), an autoimmune disorder characterized by the overproduction of autoantibodies and the dysfunction of T cells, B cells, and dendritic cells [11]. Corticosteroids and immunosuppressive drugs are the mainstays of modern therapy. There are worries about the toxicity of these drugs. A novel strategy is offered by two monoclonal antibodies that have been employed in the previous several decades: Rituximab and Belimumab.

Corticosteroids exert their effects via genetic and non-genomic mechanisms. Because various modes of action have diverse side effects, understanding them is important from a therapeutic perspective. Both the dosage and the kind of corticosteroid determine which route is activated.

Once a medicine binds to the intracellular cytoplasmic glucocorticoid receptor (cGR), it sets in motion a cascade of events that alters gene expression over time. A conformational change is brought about by the binding of the drug to the receptor, and the receptor is then activated. As a result, alterations in gene expression are brought about by a chain reaction of intracellular signaling cascades. The binding of corticosteroids to their receptors triggers the transcription of genes that code for the generation of cytokines. Transrepression refers to the reduction in transcription of

genes producing inflammatory cytokines while transactivation refers to the increase in transcription of genes expressing anti-inflammatory factors. In contrast, the non-genomic route is characterized by more rapid alterations. The medication binds directly to an intracellular receptor in these pathways. Alterations to cell membranes, phospholipase A2 enzyme inactivation, and contact with membrane glucocorticoid receptors (mGR) are the mechanisms by which non-genomic effects are mediated. Reduced lymphocyte activity and proliferation is the end result [12,13].

The genomic effects are activated by daily dosages of prednisone that range from 7.5 mg to 30 mg (equivalent). Saturation of cGRs occurs progressively at dosages over 30–50 mg daily [14]. Over 50 mg of prednisone daily, the cGR saturation point is reached, and there is no more anti-inflammatory effectiveness and an increased risk of adverse effects. The duration and peak dosage of GC are two factors that influence the occurrence of some of these adverse effects [15]. Glucocorticoids are believed to have anti-inflammatory and immunosuppressive effects due to transrepression, while most of their deleterious effects seem to be due to transactivation [16].

Historically, glucocorticoids have served as maintenance treatment in SLE in addition to inducing remission and treating acute situations. While there have been advancements in SLE management in recent decades, corticosteroids remain an integral component of all treatment plans. More and more research is confirming the link between drugs and cumulative damage in SLE patients, and there is mounting evidence of adverse consequences associated with steroid usage and addiction.

CONCLUSION

Based on the study results, it can be concluded that using cortisone for treating systemic lupus erythematosus patients demonstrates high effectiveness in reducing the frequency of symptoms, improving quality of life, and alleviating swelling and pain associated with the condition. However, specific side effects, such as weight gain and mood changes, were noted, emphasizing the need to educate patients about the risks and benefits of cortisone. The findings highlight the importance of offering alternative treatment options alongside cortisone to reduce dependency and minimize its side effects.

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ANNEX 1: DATA COLLECTION TOOL

Age (years)			**Gender**		Male	Female
Marital Status	Single		Married		Divorced	Widow
Educational level	Illiterate		School		University	
Nationality	Saudi	Non-Saudi	**Smoking**		Yes	No	Ex-smoke
chronic diseases	Yes	No	**Systemic Lupus Erythematosus (SLE)**		Yes	No
Number of years	5 years or less		6 – 10 years		More than 10	

Effectiveness of Cortisone

Item	Yes	No
Has cortisone helped reduce the frequency of your SLE flare-ups?		
Do you feel that cortisone has effectively controlled the progression of your SLE symptoms?		
Has cortisone improved your ability to carry out daily activities despite having SLE?		
Do you experience a reduction in pain after starting cortisone treatment?		
Has your joint swelling improved since starting cortisone therapy?		
Do you feel that cortisone has helped control your SLE flare-ups?		
Have you experienced any side effects from cortisone use?		
Did your doctor provide you with information about the possible long-term effects of cortisone use?		
Have you noticed weight gain since starting cortisone treatment?		
Do you believe that cortisone has improved your overall quality of life?		
Have you experienced mood changes while on cortisone?		
Has your doctor suggested alternative treatments in addition to cortisone?		
Do you find it difficult to adhere to the prescribed dosage of cortisone?		
Have you needed to increase your cortisone dosage over time?		
Do you feel that the benefits of cortisone outweigh its side effects in managing your SLE?		

APPENDIX 2: Participants responses to scale items

gender

	Frequency	Percent
Male	270	41.5
Female	380	58.5
Total	650	100.0

age

	Frequency	Percent
less than 25 year	207	31.8
25-30 year	132	20.3
31-35 year	115	17.7
36-40 year	109	16.8
40 years and more	87	13.4
Total	650	100.0

Marital status

	Frequency	Percent
Single	179	27.5
Married	233	35.8
Divorced	135	20.8
Widow	103	15.8
Total	650	100.0

Educational level

	Frequency	Percent
Illiterate	58	8.9
School	205	31.5
University	387	59.5
Total	650	100.0

Nationality

	Frequency	Percent
Saudi	608	93.5
non-Saudi	42	6.5
Total	650	100.0

Smoking

	Frequency	Percent
Yes	357	54.9
No	247	38.0
Ex-smoker	46	7.1
Total	650	100.0

Chronic diseases

	Frequency	Percent
Yes	208	32.0
No	442	68.0
Total	650	100.0

Item	Yes	No
Has cortisone helped reduce the frequency of your SLE flare-ups?	584 (89.8%)	66 (10.2%)
Do you feel that cortisone has effectively controlled the progression of your SLE symptoms?	600 (92.3%)	50 (7.7%)
Has cortisone improved your ability to carry out daily activities despite having SLE?	626 (96.3%)	24 (3.7%)
Do you experience a reduction in pain after starting cortisone treatment?	634 (16%)	16 (2.5%)
Has your joint swelling improved since starting cortisone therapy?	621 (95.5%)	29 (4.5%)
Do you feel that cortisone has helped control your SLE flare-ups?	625 (96.2%)	25 (3.8%)
Have you experienced any side effects from cortisone use?	615 (94.6%)	35 (5.4%)
Did your doctor provide you with information about the possible long-term effects of cortisone use?	603 (92.8%)	47 (7.2%)
Have you noticed weight gain since starting cortisone treatment?	599 (92.2%)	51 (7.8%)
Do you believe that cortisone has improved your overall quality of life?	573 (88.2%)	77 (11.8%)
Have you experienced mood changes while on cortisone?	605 (93.1%)	45 (6.9%)
Has your doctor suggested alternative treatments in addition to cortisone?	615 (94.6%)	35 (5.4%)
Do you find it difficult to adhere to the prescribed dosage of cortisone?	616 (94.8%)	34 (5.2%)

Have you needed to increase your cortisone dosage over time?	630 (96.9%)	20 (3.1%)
Do you feel that the benefits of cortisone outweigh its side effects in managing your SLE?	551 (84.8%)	99 (15.2%)

Chi-Square Test

Frequencies

SLE

	Observed N	Expected N	Residual
Yes	302	325.0	-23.0
No	348	325.0	23.0
Total	650		

gender

	Observed N	Expected N	Residual
Male	270	325.0	-55.0
Female	380	325.0	55.0
Total	650		

age

	Observed N	Expected N	Residual
less than 25 year	207	130.0	77.0
25-30 year	132	130.0	2.0
31-35 year	115	130.0	-15.0
36-40 year	109	130.0	-21.0
40 years and more	87	130.0	-43.0
Total	650		

marital.status

	Observed N	Expected N	Residual
Single	179	162.5	16.5
Married	233	162.5	70.5
Divorced	135	162.5	-27.5
Widow	103	162.5	-59.5
Total	650		

Educational.level

	Observed N	Expected N	Residual
Illiterate	58	216.7	-158.7

School	205	216.7	-11.7
University	387	216.7	170.3
Total	650		

Nationality

	Observed N	Expected N	Residual
Saudi	608	325.0	283.0
non-Saudi	42	325.0	-283.0
Total	650		

Smoking

	Observed N	Expected N	Residual
Yes	357	216.7	140.3
No	247	216.7	30.3
Ex-smoker	46	216.7	-170.7
Total	650		

Test Statistics

	SLE	gender	age	Marital status	Educationallevel	Nationality	Smoking
Chi-Square	3.255[a]	18.615[a]	64.985[b]	58.702[c]	250.729[d]	492.855[a]	229.572[d]
df	1	1	4	3	2	1	2
Asymp. Sig.	.071	<.001	<.001	<.001	<.001	<.001	<.001

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 325.0.

b. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 130.0.

c. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 162.5.

d. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 216.7.

Regression

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.631[a]	.398	.383	.392

a. Predictors: (Constant), a15, a6, a7, a8, a9, a4, a14, a2, a1, a13, a10, a11, a12, a3, a5

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	64.304	15	4.287	27.909	<.001[b]
	Residual	97.383	634	.154		
	Total	161.686	649			

a. Dependent Variable: SLE
b. Predictors: (Constant), a15, a6, a7, a8, a9, a4, a14, a2, a1, a13, a10, a11, a12, a3, a5

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.816	.221		8.218	<.001
	Has cortisone helped reduce the frequency of your SLE flare-ups?	-.336	.071	-.203	-4.750	<.001
	Do you feel that cortisone has effectively controlled the progression of your SLE symptoms?	-.581	.077	-.310	-7.589	<.001
	Has cortisone improved your ability to carry out daily activities despite having SLE?	.273	.270	.103	1.011	.313
	Do you experience a reduction in pain after starting cortisone treatment?	.168	.153	.052	1.097	.273
	Has your joint swelling improved since starting cortisone therapy?	.316	.253	.131	1.251	.211
	Do you feel that cortisone has helped control your SLE flare-ups?	-.394	.186	-.152	-2.112	.035
	Have you experienced any side effects from cortisone use?	.729	.126	.330	5.787	<.001
	Did your doctor provide you with information about the possible long-term effects of cortisone use?	.323	.060	.168	5.364	<.001

	Have you noticed weight gain since starting cortisone treatment?	-.472	.072	-.255	-6.588	<.001
	Do you believe that cortisone has improved your overall quality of life?	-.547	.094	-.355	-5.814	<.001
	Have you experienced mood changes while on cortisone?	.065	.115	.033	.560	.576
	Has your doctor suggested alternative treatments in addition to cortisone?	.334	.158	.151	2.116	.035
	Do you find it difficult to adhere to the prescribed dosage of cortisone?	.254	.129	.113	1.970	.049
	Have you needed to increase your cortisone dosage over time?	-.054	.139	-.019	-.388	.699
	Do you feel that the benefits of cortisone outweigh its side effects in managing your SLE?	-.250	.065	-.180	-3.872	<.001

a. Dependent Variable: SLE