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ORIGINAL ARTICLE

Quality of Life in Patients with Systemic Lupus Erythematosus: Relation with Disease Activity, Severity and Fatigue

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ABSTRACT

Background: The multisystem manifestations of Systemic lupus erythematosus (SLE) individuals greatly affect the patients, physical and psychological functioning and impair their capability to take part in work and social activities. This study aimed to explore SLE disease activity, severity and fatigue impacts on their quality of life (Qol).

Methods: We conducted this cross-section study on 84 SLE patients who were defined as having SLE by the criteria established by the American College of Rheumatology (ACR) in its most recent revision. Assessment of fatigue factors was done via the multidimensional assessment of fatigue (MAF) questionnaire. QoL of the SLE cases was evaluated by the Arabic version of SLE QoL questionnaire.

Results: The mean SLEDAS was 16.64±13.59 with (85.7%) of cases had HLDAS and the others (14.3%) had LLDAS. The mean SLEQoL score was 105.69±32.37 and the mean MAF score was 57.24±28.17. Statistically significant differences were found between lupus patients with HLDAS and those with LLDAS as regards fatigue and QoL. Patients with HLDAS group showed higher mean scores of MAF and SLEQoL while no statistically significant differences were found between patients with HLDAS and those with LLDAS as regards age, duration of disease and LSI.

Conclusions: The inter-relationships between the assessment indices of activity, severity, fatigue and QoL were studied and revealed strong positive correlations between MAF and both SLEQoL and SLEDAS. There was a moderate positive correlation between SLEDAS and SLEQoL. There were weak positive correlations between LSI and each of the other indices (SLEQoL, SLEDAS and MAF). Multivariate logistic regression revealed that MAF was the only significant associated factor with SLE disease activity.

Keywords: Quality of Life, Activity; Systemic Lupus Erythematosus,;Severity; Fatigue

INTRODUCTION

Autoantibody generation exaggerated immune complexes formation, immunologically induced tissue damage, and complement activation characterize Systemic Lupus Erythematosus (SLE), which is an autoimmune disorder of uncertain etiology. Viruses, infections, pollutants, toxic chemicals, and genetics have all been speculated to have a part in the etiopathogenesis of the disease, but no definitive link has been established. The disease is chronic and has an uncertain course, both of which have significant negative effects on the patient's

quality of life. In addition to affecting the skin, joints, brain, kidneys, heart, lungs, as well as gastrointestinal system, SLE can also affect any other organ in the body [1].

The general and local features of systemic lupus erythematosus negatively impact QoL because SLE is a lifelong condition. It was shown that over 50% of patients had a poor quality of life [2].

Patients with SLE who are experiencing active disease typically have a lower HRQoL. The plan of care must take into account the varying disease activity and severity statuses in order to effectively address the impact of disease activity on HRQoL aspects [3].

Sixty-seven percent to ninety percent of people with SLE complain of fatigue. It's the worse symptom because it can affect so many facets of people's quality of life [4].

Several new medications are appearing with the potential to control disease activity, reduce damage accumulation, and improve patient quality of life for those who had SLE [5].

This study aimed to explore SLE disease activity, severity and fatigue impacts on their quality of life (Qol) and to improve the comprehensive care for SLE patients by investigating multiple factors affecting patients QOL.

METHODS

We conducted this cross-section study on 84 SLE patients who were defined as having SLE by the criteria established by the American College of Rheumatology (ACR) in its most recent revision in the Rheumatology and Rehabilitation Department, Zagazig University Hospitals, after giving their written consent for ethical consideration.

Inclusion criteria: All SLE cases aged from 18 to 65 years who fulfilled the revised American college of Rheumatology /Systemic Lupus International Collaborating Clinics (ACR/SLICC) classification criteria for SLE [6].

Exclusion criteria: We excluded all who had any of the following conditions: The coexistence of another debilitating disease (cancer –organ failure-other C.T diseases), pregnancy or any disease affecting QoL as (osteoporosis, Diabetes Mellitus, Inflammatory Bowel Disease).

This study followed the guidelines [the World Medical Association's Code of Ethics (Declaration of Helsinki) for human studies]. All participants provided informed and written consent. The Institutional Review Board has approved this research (#8089/28-9-2021).

All patients were subjected to full history taking with special emphasis on (onset, course, duration of the disease, mucocutaneous, musculoskeletal manifestations or other systems affection), thorough clinical examination involving: (general examination of vital signs, general appearance, hair, lymph node, neurological, mucocutaneous, cardiac and chest examinations) and local examinations involving locomotor system affection.

Laboratory investigations included: Complete blood count (CBC), kidney function tests, liver function tests, protein in 24-hour urine collection, creatinine clearance, antinuclear antibody (ANA), anti-dsDNA antibodies, Complement C3 and C4 were measured.

Activity of systemic lupus was assessed by SLE-DAS [7], All SLE patients were divided into two groups according to Cut-off of SLE-DAS: [8], Lupus Low Disease Activity State (LLDAS): ≤ 2.48, and High lupus Disease Activity Status (HLDAS): >2.48, while the severity of disease was assessed by lupus severity index (LSI) [9]. Assessment of fatigue factors was evaluated by Multidimensional Assessment of Fatigue (MAF) questionnaire [10]. QoL for SLE patients was assessed by Arabic version of SLE QoL questionnaire [11].

STATISTICAL ANALYSIS

SPSS (Statistical Package for the Social Sciences) version 26 was used for the data analysis. Categorical variables were defined using absolute frequencies, and independent samples were used. Both the Student's t-test and the Mann Whitney U-test were used to compare two groups with normally distributed data. The Chi-square test was used to analyse the difference in frequency of categorical variables. In order to determine the degree of association between the study's variables, researchers used both the Pearson and Spearman's rank correlation coefficients. The strength of correlation was measured between 0 and 1. 0.00-0.19 was a very weak correlation, 0.2-0.39 was a weak correlation, 0.4-0.59 was a strong correlation, and 0.8-1 was a very strong correlation.

RESULTS

The mean age of patients was 33.01±10.10 years ranging from 18 to 59 years. There were 4 males (4.8%) and 80 females (95.2%). The duration of the disease ranged from 2 to 7 years with a mean of 5.76±5.21 years, the most common clinical manifestations were mucocutaneous in 46.4% of patients and musculoskeletal affection in 41.7% of

patients. The least common clinical manifestations were cardiopulmonary affection and fever. The most common medications received by patients were hydroxychloroquine and corticosteroids in 91.7% and 88.1% of cases respectively (Table 1).

Table (2) showed that regarding hematologic affection, hemolytic anemia was present in 2.4 % of cases, 6% of patients had leucopenia and 13.1% had lymphopenia. Patients with proteinuria represented 36.9% of SLE patients. The mean anti dsDNA titre was 24.51±8.55 and positive anti dsDNA was found in 56% of patients. Most of the patients had positive ANA (96.4%). Regarding serum complement levels, the mean C3 levels was 11.51±31.08 (g/L) and the mean C4 was 1.25±3.88 (g/L) and hypocomplementemia was present in (38.1%) of patients.

As shown in Table (3), the mean LSI was 6.37±3.25. The mean SLEDAS was 16.64±13.59 with (85.7%) of cases had HLDAS and the others (14.3%) had LLDAS. The mean SLEQoL score was 105.69±32.37 and the mean MAF score was 57.24±28.17.

We found that LSI was significantly higher among SLE patients suffering from serositis and nephritis. SLEQoL and MAF were significantly higher among SLE patients suffering from musculoskeletal, cardio-pulmonary affection, mucocutaneous affection, serositis and nephritis (Table 4). There were significantly higher LSI, SLEQoL, and MAF scores among SLE patients who had hypocomplementemia than patients without hypocomplementemia (p=0.001, 0.001. and 0.011 respectively) (Table 4).

Table (5) showed that there were statistically significant differences between HLDAS and LLDAS patients regarding fatigue and QoL (p<0.001). Cases with HLDAS showed higher mean scores of MAF and SLEQoL than LLDAS patients (p<0.001).

The inter-relationships between the assessment indices of activity, severity, fatigue and QoL were studied and revealed strong positive correlations between MAF and both SLEQoL and SLEDAS. There was a moderate positive correlation between SLEDAS and SLEQoL. There were weak positive correlations between LSI and each of other indices (SLEQoL, SLEDAS and MAF) as shown in Figure (1).

In addition, multivariate logistic regression was performed to examine the association between the examined factors and disease activity; as found in Table (6), MAF was the only significant associated factor with SLE disease activity.

MAF: Multidimensional Assessment of Fatigue**, SLEQoL:** systemic lupus erythematosus quality of life, **LSI:** lupus severity index, **SLEDAS:** systemic lupus erythematosus disease activity score.

Table (1): Basic and clinical characteristics of SLE patients

Characteristic		**SLE patients (No=84)**
Age (years) Mean ±SD Range		 33.01±10.10 (18-59)
Duration (years) Mean ±SD Median (IQR)		 5.76±5.21 4 (2-7)
Sex	**Male** No. (%)	4 (4.8%)
	Female No. (%)	80 (95.2%)

Characteristic	**No.**	**%**
Neuropsychiatric	**15**	**17.9**
Psychosis	0	0
Seizure	1	1.2
Headache	14	16.7
Polyneuropathy	2	2.4
Vasculitis	**18**	**21**
mucocutaneus vasculitis	13	15.5
systemic vasculitis	11	13.1

Musculoskeletal		**35**	**41.7**
Arthritis		34	40.5
Arthralgia		13	15.5
Myositis		2	2.4
Cardiopulmonary affection		**3**	**3.6**
cardiac affection		4	4.8
pulmonary affection		5	6
Serositis		**12**	**14.3**
Pleurisy		11	13.1
Pericarditis		4	4.8
Mucocutaneous manifestations		**39**	**46.4**
mucosal ulcer		**16**	**19**
generalized skin rash		**12**	**14.3**
Malar rash		**20**	**23.8**
Discoid rash		**4**	**4.8**
Photosensitivity		**16**	**19**
hair loss		**27**	**32.1**
Fever		**3**	**3.6**
Medical treatment	Hydroxychloroquine	77	91.7
	Immunosuppressive*	52	61.9
	Corticosteroids	74	88.1
	Cyclophosphamide	18	21.4

SD: Standard deviation**, IQR:** interquartile range**. No:** number**.*Immunosuppressive treatment included:** azathioprine, mycophenolate mofetil, cyclosporine

Table (2): Assessment of disease activity, severity, QoL and fatigue among SLE patients.

Characteristic	Study group (No=84)
LSI	
Mean ±SD	6.37±3.25
Range	5.8 (4.6-7.9)
SLEDAS	
Mean ±SD	16.64±13.59
Median (IQR)	13.5 (6.2-23.2)
LLDAS≤2.48 No (%)	12 (14.3)
HLDAS>2.48 No (%)	72 (85.7)
SLEQoL	
Mean ±SD	105.69±32.37
Median (IQR)	(82.25-126)
MAF	
Mean ±SD	57.24±28.17
Median (IQR)	56 (36.25-72.75)

SD: Standard deviation **No:** number**, IQR:** interquartile range **LSI:** lupus severity index**, SLEDAS:** systemic lupus erythematosus disease activity score**, LLDAS:** lupus low disease activity state, **HLDAS:** high lupus disease activity state**, SLEQoL:** systemic lupus erythematosus quality of life, **MAF:** Multidimensional Assessment of Fatigue**.**

Table (3): Laboratory characteristics of SLE patients.

Characteristic			
Hematologic affection	Hemoglobin (g/dl)	Mean±SD Range	11.65±2.36 (7-15.8)
	Hemolytic anemia	No (%)	2 (2.4)
	WBCs (103/ µl) lecopenia	Mean±SD Median (IQR)	7±4.21 6.25 (4.3-9.1)
		No (%)	5(6)
	Lymphocytes (103 /µl)	Mean±SD Median (IQR)	2.17±2.12 1.9 (1.4-2.6)
	lymphopenia	No (%)	11 (13.1)
	platelets (103/ µl) thrombocytopenia	Mean±SD Range	271.43±85.63 (118-480)
		No (%)	0
Liver function tests	Albumin(g/dL)	Mean ±SD Median (IQR)	20.98±33.29 12.6 (10.4-22)
	total bilirubin(mg/dl)	Mean ±SD Median (IQR)	27.14±79.7 15.4 (12.6-20)
	ALT(u/l)	Mean ±SD Median (IQR)	8.23±32.04 3.9 (3.5-4.44)
	AST(u/l)	Mean ±SD Median (IQR)	1.16±4.57 0.35(0.23-0.64)
Renal function tests	BUN (mg/dl)	Mean ±SD Median (IQR)	19.21±15.88 15 (11-23)
	Serum Creatinine	Mean ±SD Median(IQR)	0.76±0.55 0.64 (0.56-0.8)
	Creatinine clearance(mL/min)	Mean ±SD Median (IQR)	123.68±74.21 118 (95-150)
	Protein in 24h urine	Mean ±SD Median (IQR)	590.8±597.1 335.5(141977.75)
	Proteinuria	No (%)	31 (36.9)
Anti dsDNA	anti dsDNA titer Positive anti dsDNA	Mean ±SD Range No (%)	24.51±8.55 (10-50) 47 (56)
serum complement levels	C3 (g/L)	Mean ±SD Median (IQR)	11.51±31.08 0.96 (0.8-1.3)
	C4 (g/L)	Mean ±SD Median (IQR)	1.25±3.88 0.12 (0.08-0.2)
	hypocomplementemia	No (%)	32 (38.1)
Positive ANA		No (%)	81 (96.4)

(SD): Standard deviation**, No:** number**, IQR:** interquartile range**, BUN:** blood urea nitrogen**, dsDNA:** double strand DNA**, ALT:** alanine transaminase**, AST:** aspartate aminotransaminase**, WBC:** white blood cells**, g:** gram**, dl:** deciliter**, u/l:** unit /liter**, µl:** microliter, **ml:** milliliter**, mg:** milligram

Table (4): Relation of clinical manifestations with disease severity, fatigue, and QoL.

Characteristic		LSI Mean±SD	SLEQoL Mean±SD	MAF Mean±SD
Age	r	-0.028	-0.168	-0.082
	P	0.800	0.127	0.458
Disease duration	r	0.012	-0.168	0.080
	P	0.910	0.472	0.472
Neuro-psychiatric affection	Absent(No 69)	6.06±1.79	103.26±32.38	55.72±27.36
	Present(No 15)	7.78±6.66	116.86±30.9	64.20±31.69
P		0.426	0.141	0.307
Vasculitis	Absent(No 64)	6.42±3.63	102.23±32.38	54.73±27.17
	Present(No 20)	6.21±1.57	116.75±30.51	65.25±30.51
P		0.724	0.08	0.155
Musculo-skeletal	Absent(No 49)	6.13±1.71	98.45±31.84	48.2±26.61
	Present(No 35)	6.70±4.63	115.83±30.74	69.89±25.60
P		0.495	0.014*	<0.001*
Cardio-pulmonary affection	Absent(No 81)	6.31±3.29	103.06±29.62	54.88±25.72
	Present (No 3)	7.87±1.27	176.67±23.46	121±12.17
		0.052	0.001*	0.004*
Serositis	Absent(No 72)	5.92±1.74	101.61±30.38	53.60±25.15
	Present(No 12)	9.06±7.14	130.17±34.45	79.08±36.04
P		0.01*	0.004*	0.006*
Mucocutaneous	Absent(No 45)	6.49±4.17	95.53±28.10	45.8±24.02
	Present (No39)	6.23±171	117.41±33.34	70.44±27.05
P		0.426	0.002*	<0.001*
Hematologic affection	Absent(No 67)	5.96±1.71	105±32.86	56.36±28.51
	Present(No 17)	7.97±6.27	108.41±31.15	60.71±27.34
P		0.19	0.7	0.49
Nephritis	Absent(No 53)	5.51±3.72	97.36±29.54	49.72±24.60
	Present(No31)	7.84±1.29	119.94±32.46	70.1±29.59
P		<0.001*	0.002*	0.002*

SD: Standard deviation**, No:** number**, LSI:** lupus severity index**, SLEQoL:** systemic lupus erythematosus quality of life**, MAF:** Multidimensional Assessment of Fatigue.

***P<0.05:** significant

Table (5): Relation of serologic activity markers with LSI, MAF and SLEQoL.

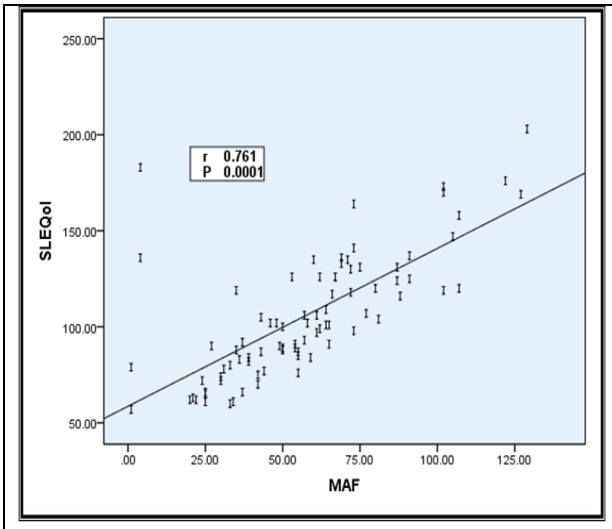
		LSI Mean±SD	MAF Mean±SD	SLEQOL Mean±SD
Anti-dsDNA positivity	**Absent (No 37)**	5.81±1.77	52.9±20.8	101.8±37.4
	Present (No 47)	6.8±4.02	60.6±20.6	108.7±27.7
P		0.167	0.214	0.33
Hypocomplementemia	**Absent (No 52)**	5.48±1.62	51.13±24.05	96.48±27.51
	Present (No 32)	7.81±3.53	67.16±31.77	120.66±34.45
P		**0.001***	**0.011***	**0.001***

LSI: lupus severity index**, SLEQoL:** systemic lupus erythemastosus quality of life**, MAF:** Multidimensional Assessment of Fatigue**, dsDNA:** double strand DNA**, SD:** standard deviation**, No:** number**.**
***P<0.05:** significant.

Table (6): Multivariate logistic regression for associated factors with the disease activity among SLE patients.

Variables	regression coefficient	S.E.	Wald	p value	OR (95%CI)
Age	-0.003	0.055	0.003	0.958	0.997 (0.895-1.110)
Disease duration	0.179	0.127	1.986	0.159	1.196 (0.932-1.535)
LSI	0.129	0.376	0.117	0.732	1.137 (0.544-2.376)
SLEQoL	-0.053	0.029	3.440	0.064	0.948 (0.896-1.003)
MAF	-0.143	0.048	8.990	**0.003***	0.867 (0.790-0.952)

SE: standard error**, OR:** odds ratio**, CI:** confidence interval**, LSI:** lupus severity inde**x, SLEQoL:** systemic lupus erythematosus quality of life**, MAF:** Multidimensional Assessment of Fatigue.



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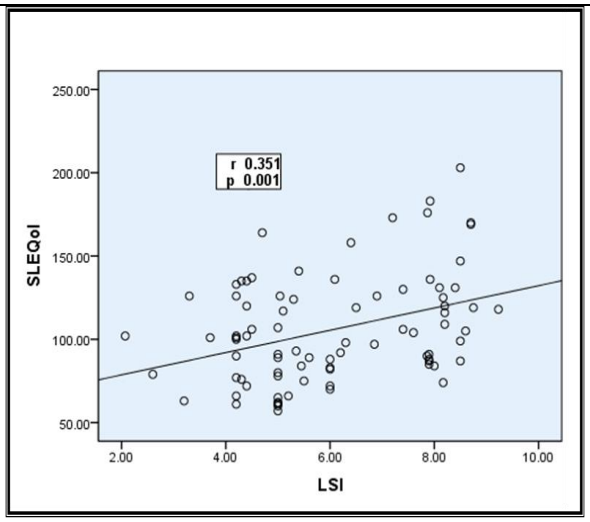

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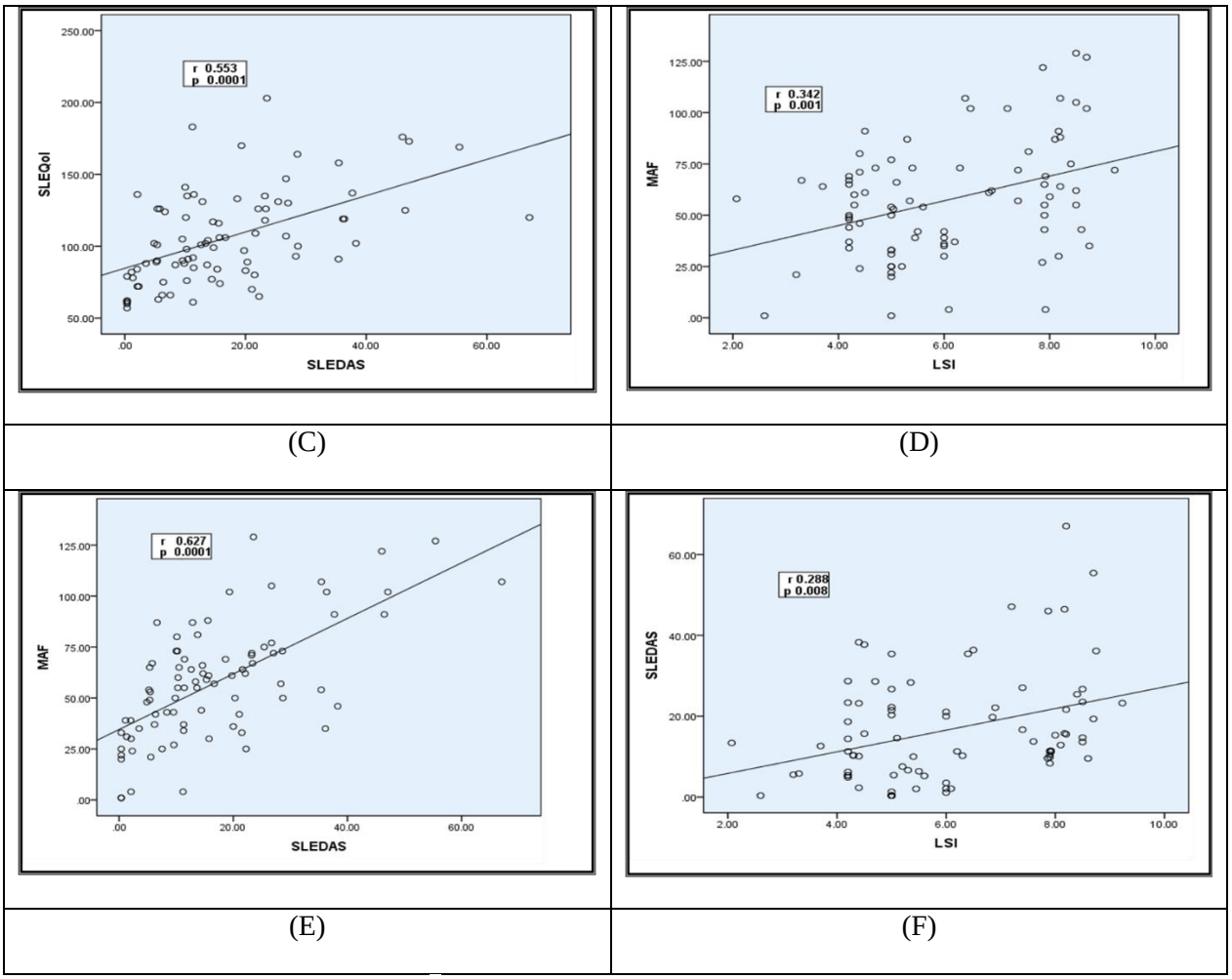

MAF: Multidimensional Assessment of Fatigue**, SLEQoL:** systemic lupus erythematosus quality of life, **LSI:** lupus severity index, **SLEDAS:** systemic lupus erythematosus disease activity score.

Figure 1:Scatter dots of: (A) correlation between MAF and SLEQoL among SLE patients, (B): correlation between LSI and SLEQoL among SLE patients, (C): correlation between SLEDAS and SLEQoL among SLE patients, (D): correlation between LSI and MAF among SLE patients, (E): correlation between SLEDAS and MAF among SLE patients, (F): correlation between LSI and SLEDAS among SLE patients.

DISCUSSION

SLE affects the patient's physical, psychological, and social well-being due to its generalized and chronic character. The median survival for SLE patients has considerably increased over the past few years thanks to advancements in diagnosis and treatment. Numerous elements like body image, weariness, family dynamics, and the impact of illness on one's career and social life affect one's quality of life. While patient-reported outcome evaluation is now a standard part of SLE pharmaceutical research studies, it is still not routinely employed in clinical settings [12].

Our study showed that the SLE patients were predominantly females (95.2 %) with mean age of 33.01±10.10 years. This was consistent with other studies regarding the female predominance (97.1% and 85% respectively) and the mean age (34±10 and 30.9±8.2% respectively) [13,14].

Our study showed that the most common system affection among SLE patients was muco-cutaneous (46.4%) then musculoskeletal affection (41.7%). A Chinese study reported that the mucocutaneous system was the most frequently involved organ in patients with SLE (90.7%) [15].In addition, an Egyptian study stated that

mucocutaneous manifestations represented 75% of involved SLE patients and musculoskeletal manifestations affected 65% of patients [13].

We stated that the least common manifestations were cardiopulmonary manifestations. On the other hand, other studies revealed that cardiovascular manifestations in SLE are very common even when clinically asymptomatic and develop in the majority of the SLE patients at any time during the course of their illness [16].

Regarding nephritis, our study recorded that it affected 31% of patients that agreed with a previous study which showed that nephritis represented 38.3% of patients [17].

Our study showed that lymphopenia was the most frequent hematologic affection (13.1%) followed by leucopenia (6%) then autoimmune hemolytic anemia (2.4 %). On the other hand, a Saudi study recorded lymphopenia in 40.3% of included SLE patients, leukopenia in 30.0% of patients and autoimmune hemolytic anemia in 4.6% [18].

The current study revealed that QoL was not associated with age and disease duration among patients with SLE. Pereira et al. [19] conducted a study that agreed with our results. However, other study showed contradictory results regarding the influence of age and disease duration on QoL, emphasizing the importance of the effect of disease duration on QoL among SLE patients [14].

Also, we noticed that SLEDAS was not associated with age and disease duration. On the contrary, other study found that there was a significant relation between SLE disease activity and age of patients and reported that patients with old age had more disease activity than patients with young age [20]. Other studies indicated that there was a significant relation between SLE disease activity and disease duration. [20,21].

In this study, MAF and LSI had no significant association with age and disease duration. Moreover, fatigue scores were found to be irrespective of age and disease duration [22]. On the other hand, lupus severity was observed to be inversely influenced by age in multiple study cohorts [9].

In our study, LSI was significantly higher among SLE patients suffering from serositis and nephritis. Contrary to our results, The LSI and the following symptoms were found to have a statistically significant correlation by Peralta et al. [23]: general malaise, loss of appetite, skin rash, joint pain as well as difficulty breathing. There was no agreement about stomach issues such serositis and nephritis.

SLEQoL and MAF scores were significantly higher among SLE patients suffering from musculo-skeletal, cardio-pulmonary affection, muco-cutaneous affection, serositis and nephritis. Louthrenoo et al. [24] examined the correlation between organ-specific disease activity and SLEQoL and found that CNS, vasculitis, musculoskeletal, renal, and cutaneous symptoms were all strongly linked to lower quality of life.

Golder et al. [21] showed a similar correlation between disease manifestations and fatigue in a large multi-center cross-sectional research. In accordance with the current study, Researchers found that more severe illness symptoms were associated with increased fatigue [25].

In the current work, hypocomplementemia represented 38.1% of the studied patients while there were significantly higher LSI, SLEQoL, MAF scores among SLE patients with hypocomplementemia than patients without hypocomplementemia. In agreement with us, some studies found that there was significantly higher severity of disease and level of fatigue among SLE patients with hypocomplementemia [26]. In addition, another study added Qo score and found it had also significantly higher scores among SLE patients with hypocomplementemia [24].

In this study, increased anti dsDNA represented 56% of patients and there was no significant relation between LSI, SLEQoL, MAF and anti-dsDNA positivity in the studied patients. On the other hand, Garcia et al. [26] cleared that there was a relation between severity of the disease, QoL, fatigue and anti-dsDNA in the studied patients**.** Additionally, the data of Peralta et al. [23] showed that the LSI is sensitive to detect a period of exacerbation evaluated by the three parameters (C3, C4, and anti-DNA).

In our study disease activity was assessed by SLEDAS and patients were categorized into LLDAS (SLEDAS≤2.48) and HLDAS (SLEDAS> 2.48). The majority of the studied patients had HLDAS (85.7%). Our results showed that there was a significant difference between patients with LLDAS and those with HLDAS regarding SLEQoL. In addition, there was a significant moderate correlation between SLEDAS and SLEQoL. In the same line with our findings, some studies indicated a significant association between disease activity and HRQoL [20,26,27]**.**

This could be attributed to that disease activity partially mediates the link between self-perception and emotional well-being. A lower psychological quality of life (QoL) may be predicted for patients with body image dissatisfaction due to an increased likelihood of perceiving the existence and severity of SLE activity [20,27].

Disease activity of SLE was not highly correlated with health-related quality of life [28]. Therefore, the association between disease activity and HRQoL in SLE patients is still debatable, likely as a result of the wide range of study designs, measures of disease activity, and illness states seen in SLE patients [28].

Our results showed a significant difference between patients with LLDAS and those with HLDAS regarding fatigue. Also, there was a significant strong correlation between SLEDAS and MAF. Furthermore, regression analysis revealed that fatigue was the only significant associated factor with SLE disease activity. Many studies have also found a strong link between fatigue and disease severity [21,26]. Also, the disease activity was a frequently described factor that influences the feeling of fatigue [25].

On the other hand**,** some previous studies stated that the relationship between disease activity and fatigue was found to be not clinically significant as fatigue in SLE is multifactorial including non-disease activity components such as depression and fibromyalgia [29,30]. This was consistent with an American study which assessed disease activity and quality of life outcomes and classified fatigue as the dependent variable and found that disease activity was not significantly related to fatigue among SLE patients [31].

Our study showed a weak correlation between LSI and SLEDAS. In addition, there was non-significant difference between LLDAS and HLDAS patients regarding LSI. However, an Australian study stated that high disease activity was associated with more severe disease. This contrary may be explained by using a different measure of disease severity which included corticosteroid exposure and damage accrual [32].

In addition, weak correlations between LSI and both MAF and SLEQoL were observed. On the other hand, lupus severity was reported to be strongly correlated with fatigue and QoL [33]. Furthermore, worse mean HRQOL scores were related with higher SLE disease severity [34].

Our work showed that there was a strong correlation between MAF and SLEQoL. Fatigue was found to be associated with lower fitness levels, reduced exercise capacity, and greater disability which negatively impacted QoL, so it can be used as a predictor for QoL in SLE patients [35]. Tench et al. [36] also noted that fatigue was a significant predictor of QoL in patients with SLE,

It is important to note both the strengths and drawbacks of our study. We were unable to compare SLE patients' QoL and fatigue levels to those of the general population because of the way the study was set up. Furthermore, numerous significant factors that potentially influence QoL were not investigated in this study. These factors include income level, anxiety, stress, and depression. Self-reporting measures were also used for the assessment of various factors, including physical activity and fatigue. The most important strength of this study was the investigation of inter-relationships between different measures of disease activity, severity, fatigue, and QoL among patients with SLE in a suitable sample size.

CONCLUSIONS

The inter-relationships between SLEDAS, SLEQoL, MAF and LSI revealed significant positive correlations between each other. Furthermore, strong correlations were observed between MAF and both SLEQoL and SLEDAS. Statistically significant differences were found between patients with LLDAS and those with HLDAS regarding fatigue and QoL. In addition, regression analysis revealed that fatigue was the only significant associated factor with the disease activity.

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Figure legend

Figure 1 Scatter dots of: (A) correlation between MAF and SLEQoL among SLE patients, (B): correlation between LSI and SLEQoL among SLE patients, (C): correlation between SLEDAS and SLEQoL among SLE patients, (D): correlation between LSI and MAF among SLE patients, (E): correlation between SLEDAS and MAF among SLE patients, (F): correlation between LSI and SLEDAS among SLE patients.

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