

ORIGINAL ARTICLE

The psychological effect of the coronavirus disease 2019 pandemic and its relationship to disease activity and quality of life of patients with systemic lupus erythematosus disease: a cross-sectional study from Egypt**Mohamed Abdelghani^{a,b}, Dina A. Seleem^a, Yomna Khalil^a, Enas I. Abdelhady^c, Shymaa A. Sarhan^c, Dalia I. Mostafa^c, Mervat S. Hassan^a***Departments of ^aPsychiatry, ^cRheumatology and Rehabilitation, Faculty of Medicine, Zagazig University, Zagazig, Egypt, ^bDepartment of Psychology, Virginia Commonwealth University, Richmond, Virginia, USA.***Correspondence to** Mohamed Abdelghani, MD, Department of Psychiatry, Faculty of Medicine, Zagazig University, Zagazig, Egypt
*e-mail: E-mail: abdelghanim@alumni.vcu.edu***Background**

Patients with autoimmune diseases would be at a higher risk to develop adverse psychological reactions during the coronavirus disease 2019 (COVID-19) pandemic. This study aimed to assess the effect of COVID-19 pandemic on patients with systemic lupus erythematosus (SLE), associated psychological symptoms, disease activity, and quality of life (QoL).

Patients and Methods

A comparative cross-sectional study was conducted including 97 patients diagnosed as having SLE and consecutively recruited from Zagazig University rheumatology and rehabilitation outpatient clinics, Egypt. An equal number of cross-matched controls were also selected. All participants completed a sociodemographic clinical checklist, symptom checklist 90 scale, fear of COVID-19 scale (FCV-19S), and World Health Organization Quality of Life Scale (WHOQOL-BREF). Additionally, an assessment of disease activity was conducted for the patient group using the SLE disease activity score.

Results

Patients with SLE, compared with their controls, were more likely to be unemployed, have histories of organic and mental illnesses, and associated with intensified FCV. They had less QoL (physical, social, and total) and higher somatization and Positive Symptom Distress Index scores. Patients with SLE with intensified FCV were more likely to be older ($P=0.041$), have a history of mental illness ($P=0.006$), and experience less QoL (physical, environmental, and total) ($P=0.046$, 0.014 , and 0.019 , respectively). However, FCV had no association with the disease activity ($P=0.280$).

Conclusions

Patients with SLE experienced higher levels of FCV and somatization and lesser QoL during pandemic. There was a robust association between heightened FCV in those patients and reduced QoL. These results highlight the need for early monitoring and management of the potential psychological symptoms developed among those populations during pandemic.

Keywords

Coronavirus disease 2019 pandemic, Egypt, Quality of life, Systemic lupus erythematosus.
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INTRODUCTION

The initial emergence of the SARS-CoV-2 (COVID-19) outbreak was in December 2019. Later, the WHO declared this disease a global emergency in January 2020 and a

universal pandemic in March 2020 (Wang *et al.*, 2020). During the pandemic, a variety of mental health-related disturbances were reported in various populations,

including, and not limited to, intense mood and sleep-related disturbances, as well as feelings of hopelessness and despair, social isolation, and reduced quality of life (QoL) (Aljemaiah *et al.*, 2021; Hassan *et al.*, 2021; Abdelghani *et al.*, 2022).

Systemic lupus erythematosus (SLE) is an autoimmune inflammatory condition affecting numerous body organs including the central nervous system (Roussou *et al.*, 2013). Patients with SLE may experience psychological distress, which may be attributed to the disease process, complications, and/or drug induced. Moreover, stress may cause exacerbations of SLE itself (Zakeri *et al.*, 2011). During the COVID-19 pandemic, individuals with chronic autoimmune conditions may experience periods of intense psychological comorbidities, like anxiety and depression, which would complicate their physical outcomes (Kasturi *et al.*, 2021). Moreover, those individuals, including patients with SLE, are more vulnerable to developing severe COVID symptoms secondary to intense immune suppression that interfere with an effective antiviral immune response (Zen *et al.*, 2020).

The emergence of COVID-19 pandemic overwhelmed the health care system all over the world, which redirected the medical resources toward the management of acute COVID-19 cases at the expense of chronic cases (Ibarra-Nava *et al.*, 2020). This fact affected the follow-up of chronic cases such as SLE, as most of our patients' services were closed, which resulted in nonadherence of patients and a lack of close monitoring of such cases. Many reports described changes in the patients' behaviors, for example, nonadherence and negative emotions secondary to perceived stress in rheumatic patients, which leads to poorer QoL (Glintborg *et al.*, 2020; Koppert *et al.*, 2021).

Globally, major scientific efforts are directed to clarify the pathogenesis, outcome, treatment, and prevention strategies of COVID-19 virus infection. Similarly, research on the effect of the pandemic on patients with SLE has recently been documented. Nonetheless, studies investigating the COVID-19-related fears and their associated correlates, and their relationship to the QoL and disease activity among individuals with SLE in Egypt, are still lagging. The aim of this study was primarily to investigate the COVID-19-related fears and their associated correlates, and their relationship to the QoL and disease activity among individuals with SLE in Egypt, and to compare these findings with their healthy counterparts.

PATIENTS AND METHODS

Study design and sample selection

This comparative cross-sectional study was conducted from June 1, 2020, to March 31, 2021, in the Rheumatology and Rehabilitation outpatient clinics of Zagazig University Hospitals (ZUHs) in Sharkia Governorate, Egypt. Using the

Epi software 6, the sample size was calculated; according to a 95% confidence interval, at 80% power of the study, the ratio of sample size was 1:1.

A total of 97 patients were consecutively recruited using a convenience sampling method according to the American College of Rheumatology (ACR) revised criteria for SLE (Hochberg, 1997). All individuals who fulfilled four or more of these criteria were diagnosed as patients with SLE and therefore recruited in this study. The control group included an equal number of healthy individuals matched for age, sex, and education and were recruited from patients' relatives who had no history of SLE or other autoimmune disorders. Patients of both sexes, with ages ranging between 18 and 60 years, were included in this study. Individuals who had a history of mental disorders (before the pandemic) based on their medical records were excluded from this study. Likewise, participants with concurrent major neurocognitive disorders, intellectual disabilities, and/or substance use disorders were excluded.

Data collection and assessment tools

Sociodemographic and clinical data related to COVID-19 virus infection were collected from all patients of both groups by using a simple semistructured questionnaire.

Psychometric assessment of both groups

Symptom checklist-90 scale (SCL-90): the SCL-90 was widely applied as a screening measure of current psychological symptoms of the past 1 month, which includes 90 questions. This scale was designed for a broad spectrum of populations, including normal populations and medical patients. Each item of the questionnaire was rated by the patient on a five-point Likert scale of distress ranging from 0 (none) to 4 (extreme). The SCL-90 consisted of nine primary symptom dimensions: somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. There were supplementary three global indices for the SCL-90: Positive Symptom Distress Index, which was the average score of the items scored above 0 and was considered an indicator of the intensity of the disorder; Positive Symptoms Total, which was the number of items scored above 0; and Global Severity Index, which represented the average score of the 90 items, and was suggested to be the best single indicator of the current level of the disorder (El Behairy, 2004; Derogatis and Unger, 2010).

Fear of COVID-19 scale (FCV-19S): FCV-19S was used to assess the FCV. This scale consisted of seven questions, and the participants were asked to select an answer from 'strongly disagree'=1, 'disagree'=2, 'neither agree nor disagree'=3, 'agree'=4, and 'strongly agree'=5, with scores ranging from 1 to 5 for each question. Total

scores on the scale ranged from 7 to 35, with the higher scores indicating higher levels of COVID-19-related fears (Ahorsu *et al.*, 2020). The reliability and validity of the Arabic version of this scale were previously examined (Alyami *et al.*, 2020).

World Health Organization Quality of Life Scale (WHOQOL-BREF): WHOQOL-BREF was applied in this study to assess the QoL. It included 26 items and produced scores for four domains related to the QoL: physical, psychological, social relationships, and environment. Items were answered on a five-point scale about a 2-week timeframe. The mean of items within each domain was multiplied by four to yield the domain score (range, 4–20). Higher scores denoted higher QoL (WHO Group, 1998).

Clinical assessment (for patients with systemic lupus erythematosus only)

Systemic lupus erythematosus disease activity score (SLE-DAS): SLE-DAS was used to evaluate the clinical effect of the pandemic and other related variables on the physical status of patients with SLE by qualitatively assessing the severity of SLE symptoms. This scale was applied to measure the disease activity within the preceding 30 days, with a global index including the sum of 17 weighted objective laboratory and clinical parameters. Examples of laboratory parameters included arthritic joint count, presence of proteinuria, and white blood cells and platelet counts. In addition, SLE-DAS included clinical parameters like cardiopulmonary affection, hemolytic anemia, vasculitis, and neuropsychiatric involvement. Based on their total scores, individuals with SLE were, accordingly, divided into patients with remission, low, mild, or moderate/severe activity (Jesus *et al.*, 2019).

Ethical considerations

The study was carried out in accordance with the Code of Ethics of the World Medical Association (Declaration of Helsinki 1964) for studies involving humans with a research protocol number. Written informed consent was obtained from the participants after a detailed explanation of the objectives and procedures of the study.

Statistical Analysis

Statistical Package for the Social Sciences was used to analyze the data (SPSS, Inc. (2009). SPSS for Windows, Version 18.0. Chicago, USA) software. Qualitative variables were described by frequencies and percentages. χ^2 test was used for categorical data. Paired Student test (*t* test) was used for comparison between two groups for continuous variables, and the Mann–Whitney *U* (MWU) test for non-normally distributed data. Pearson correlation coefficient was used to evaluate the degree of relationship

between two variables with a linear relationship. All results were considered statistically significant when the significant probability was less than 5% ($P < 0.05$).

RESULTS

Characteristics of study participants

This study included 97 Egyptian patients diagnosed with SLE who were registered for follow-up at the Rheumatology and Rehabilitation outpatient clinics of Zagazig University Hospitals, and an equal number of healthy participants representing the control group (matched for age, sex, education, and marital status). The mean age of patients with SLE was 34.1 ± 8.6 years, and most of them were females (97%), married (84%), of lower education (72%), and unemployed (90%). Approximately 38 and 36% of them had histories of organic and mental illnesses, respectively. The mean of perceived FCV among patients with SLE was 19.4 ± 7.2 , which was much higher than that of control (17.4 ± 5.0).

Compared with their control counterparts, patients with SLE were more likely to be unemployed (90 vs. 49%, $P < 0.001$), had histories of organic (38 vs. 20%, $P = 0.004$) and mental illnesses (36 vs. 19%, $P = 0.006$), were compliant with COVID-19 precautions (76 vs. 33%, $P < 0.001$), and experienced intensified FCV (19.4 ± 7.2 vs. 17.4 ± 5.0 , $P = 0.031$). Regarding the QoL and associated psychological symptoms, the means of physical and social domains, as well as the total QoL scores of patients with SLE were significantly lower than those claimed by controls ($P < 0.001$, $P = 0.004$, and $P = 0.001$, respectively). Moreover, they had higher means of somatization and Positive Symptom Distress Index scores ($P = 0.022$ and $P < 0.001$, respectively), as illustrated in Tables 1 and 2.

Perceived fear of coronavirus disease 2019 infection and clinical and psychosocial factors in patients with systemic lupus erythematosus

As shown in Tables 3 and 4, the patients with SLE and reported intensified FCV, compared with those experiencing a normal stress reaction, were more likely to be older (35.5 ± 8.7 vs. 31.8 ± 8.0 , $P = 0.041$), had a history of mental illness (47 vs. 19%, $P = 0.006$), and experienced less QoL (physical, environmental, and total) ($P = 0.046$, 0.014, and 0.019, respectively). Although patients with SLE who reported higher FCV scores experienced more psychological symptoms in all subscore and total score of SCL-90 than those with normal stress reactions, these differences were statistically insignificant. Moreover, FCV had no association with SLE-DAS scores ($r = 0.18$, $P = 0.280$), as shown in Fig. 1.

Table 1: Demographic and coronavirus disease 2019-related factors of patients with systemic lupus erythematosus and controls:

Variables	Control	Patients with SLE	Total	χ^2/t test	P value
	Mean (SD), n (%)				
Age	35.1(8.6)	34.1(8.6)	35.7(9.6)	0.80	0.422
Sex				1.69	0.194
Male	7(7.2)	3(3.1)	10(5.2)		
Female	90(92.8)	94(96.9)	184(94.8)		
Marital status				1.57	0.210
Married	74(76.3)	81(83.5)	155(79.9)		
Not married	23(23.7)	16(16.5)	39(20.1)		
Education				0.11	0.746
Non-to-low	72(74.2)	70(72.2)	142(73.2)		
Moderate-to-higher	25(25.8)	27(27.8)	52(26.8)		
Working status				38.61	<0.001
Working	50(51.5)	10(10.3)	60(30.9)		
Not working	47(48.5)	87(89.7)	134(69.1)		
History of organic diseases				8.13	0.004
No	78(80.4)	60(61.9)	138(71.1)		
Yes	19(19.6)	37(38.1)	56(28.9)		
History of psychiatric diseases				7.50	0.006
No	79(81.4)	62(63.9)	141(72.7)		
Yes	18(18.6)	35(36.1)	53(27.3)		
Satisfied with COVID-19 precautions				35.69	<0.001
No	65(67.0)	23(23.7)	88(45.4)		
Yes	32(33.0)	74(76.3)	106(54.6)		

SLE, systemic lupus erythematosus.

DISCUSSION

As COVID-19 virus infection was increasingly recognized as a rapidly spreading global threat, the urgent need to describe the characteristics and outcomes of patients with chronic diseases became evident. The present study analyzed the effect of the COVID-19 pandemic on patients with SLE. It revealed that individuals with SLE were more likely to be unemployed and had histories of organic and mental illnesses. In line with these results, a previous study stated that ~12% of patients with SLE were unemployed and most of them were not working owing to their health problems (Utset *et al.*, 2015). However, an Egyptian study showed that this percentage increased and most patients with SLE reported that their work was severely affected by the COVID-19 pandemic (Tharwat *et al.*, 2021). Moreover, it was reported that 20% of patients had comorbid psychological symptoms (Unterman *et al.*, 2011). These comorbidities were stressful and would result in a decreased QoL (Shen *et al.*, 2014; Calderón *et al.*, 2017), which supported our results. The associated psychological symptoms would be attributed to the pathophysiology of SLE as an autoimmune disease, drug-induced effect (corticosteroids and other

immunosuppressant medications), or the burden of the disease itself as a chronic condition (Yoon *et al.*, 2019). These findings highlighted the economic and psychological burden of the crisis on chronic patients, particularly those with SLE.

A notable finding of this study was the behavior of patients with SLE. In the present study, patients with SLE were more compliant with COVID-19 precautions. Recommendations of the international and local guidelines indicated that immunosuppression owing to alterations in the immune response secondary to either the disease process itself or treatment medications, or both, was a risk factor for a possible worse outcome of COVID-19 infection (Sawalha *et al.*, 2020; World Health Organization, 2020). Thus, the investigators rationalized these attitudes as the patients became motivated to be more compliant with COVID-19 precautions to minimize the risk of infection and possible complications, and their treating physicians were obliged to optimize the patients’ education to be more adherent to these protective behaviors (Favalli *et al.*, 2020; Ramirez *et al.*, 2020).

Table 2: Associated psychological symptoms and quality of life in patients with systemic lupus erythematosus and controls:

Variables	Control	Patients with SLE	Total	<i>t</i> test	<i>P</i> value
		Mean (SD)			
FCV	17.4(5.0)	19.4(7.2)	18.4(6.3)	-2.18	0.031
QoL					
Physical	63.7(16.6)	50.2(15.1)	56.9(17.2)	5.93	<0.001
Psychological	57.4(16.2)	55.4(15.2)	56.4(15.7)	0.90	0.371
Social	78.4(32.1)	67.8(17.2)	73.1(26.2)	2.89	0.004
Environmental	51.2(15.5)	50.0(12.1)	50.6(13.9)	0.61	0.541
Total	59.8(14.1)	53.6(11.9)	56.7(13.4)	3.30	0.001
SCL-90					
Somatization	16.7(8.3)	19.7(9.3)	18.2(9.0)	-2.31	0.022
Obsessive-compulsive	14.3(5.9)	16.0(7.1)	15.1(6.6)	-1.74	0.084
				MWU	<i>P</i> value
Interpersonal sensitivity	12.0(6.4)	12.1(6.9)	12.0(6.7)	-0.11	0.909
	2–30	3–28	2–30		
Depression	17.3(8.8)	18.2(9.7)	17.7(9.2)	-0.55	0.584
	4–47	1–48	1–48		
Anxiety	11.9(6.8)	12.3(7.2)	12.1(7.0)	-0.48	0.628
	2–27	1–31	1–31		
Hostility	6.2(3.9)	6.7(4.6)	6.5(4.2)	-0.49	0.623
	0–18	1–21	0–21		
Phobic	5.9(4.9)	6.6(5.2)	6.2(5.0)	-0.74	0.461
	1–19	2–22	1–22		
Paranoia	6.0(4.1)	6.5(4.8)	6.3(4.5)	-0.39	0.696
	0–20	0–24	0–24		
Psychoticism	6.9(6.2)	7.5(7.3)	7.2(6.8)	-0.13	0.897
	2–29	3–33	2–33		
				<i>t</i> test	<i>P</i> value
GSI	1.2(0.6)	1.3(0.6)	1.2(0.6)	-1.13	0.261
PST	56.0(18.7)	53.1(21.2)	54.6(20.0)	-0.99	0.320
PSDI	1.8(0.4)	2.1(0.5)	2.0(0.5)	-4.66	<0.001

FCV, fear of COVID-19 infection; GSI, Global Severity Index; MWU, Mann–Whitney U; PSDI, Positive Symptom Distress Index; PST, Positive Symptoms Total; QoL, quality of life; SCL-90, symptom checklist 90; SLE, systemic lupus erythematosus.

Concerning QoL, our study confirmed the earlier several reports stating that patients with rheumatic diseases had a significantly impaired QoL compared with the general population owing to disease activity, comorbidities, and treatment-related adverse effects (Ward, 2004; Walker and Littlejohn, 2007; Russell *et al.*, 2011). These factors contributed to the decreased functioning including physical, emotional, and social dimensions. Moreover, higher levels of COVID-19-related fears were well documented among different groups of populations and were linked to poor QoL (Abdelghani *et al.*, 2020; Zhu *et al.*, 2020; Abdelghani *et al.*, 2021). The current study revealed that patients with SLE who reported intensified FCV were more likely to experience less QoL (physical, environmental, and total) when compared with those with

a normal stress reaction. Similarly, patients with SLE have poor QoL during the COVID-19 pandemic and reported that every QoL dimension would be influenced by the disease itself and might have an additive effect by the COVID-19 pandemic (Guaracha-Basañez *et al.*, 2022). Nevertheless, these authors advised tracking the change of QoL in such patients after the end of the pandemic to determine whether this poor QoL was due to COVID-19 pandemic or can be attributed to the SLE disease itself.

Another essential issue highlighted by this study was the higher prevalence of comorbid psychological symptoms (somatization) among patients with SLE during pandemic. Similar findings are reported in patients with SLE (Koppert *et al.*, 2021) and fibromyalgia (Kharko *et al.*, 2020) during the COVID-19 pandemic. The associated

somatization symptoms in those individuals would be rationalized by pandemic-induced stress, worry of getting infected, changes in daily routines and caregiving, the illness or death of family members or friends, loss of work, and financial concerns (Barzilay *et al.*, 2020; Restubog *et al.*, 2020; Park *et al.*, 2020). Furthermore, for people with chronic conditions, somatic symptoms may also be enhanced by delayed medical evaluations (Choini'ere *et al.*, 2010) and reduced access to health services (Eccleston

et al., 2020; Shanthanna *et al.*, 2020). Moreover, in those patients, a sensitized brain might augment somatic symptoms in response to stress in people with chronic painful conditions (Meeus and Nijs, 2007; Moloney *et al.*, 2016). This finding emphasized the essential need for psychological interventions to cope with the stress induced by crises to minimize the perceived somatic symptoms among those populations.

Table 3: Association between perceived fear of coronavirus disease 2019 infection and demographic and illness-related clinical factors of patients with systemic lupus erythematosus:

Variable	Normal stress reaction	Intensified FCV	Total	χ^2/t test	P value
	Mean (SD), n (%)				
Age	31.8(8.0)	35.5(8.7)	34.1(8.6)	-2.08	0.041
Sex				5.02	0.053
Male	2(5.4)	1(1.7)	3(3.1)		
Female	35(94.6)	59(98.3)	94(96.9)		
Marital status				0.26	0.613
Married	30(81.1)	51(85.0)	81(83.5)		
Not married	7(18.9)	9(15.0)	16(16.5)		
Education				2.37	0.124
No-to-low	30(81.1)	40(66.7)	70(72.2)		
Moderate-to-higher	7(18.9)	20(33.3)	27(27.8)		
Working status				0.66	0.415
Working	5(13.5)	5(8.3)	10(10.3)		
Not working	32(86.5)	55(91.7)	87(89.7)		
History of organic diseases				1.80	0.180
No	26(70.3)	34(56.7)	60(61.9)		
Yes	11(29.7)	26(43.3)	37(38.1)		
History of psychiatric diseases				7.64	0.006
No	30(81.1)	32(53.3)	62(63.9)		
Yes	7(18.9)	28(46.7)	35(36.1)		
SLE-DAS				0.65	0.420
No-to-mild	16(43.2)	31(51.7)	47(48.5)		
Moderate-to-severe	21(56.8)	29(48.3)	50(51.5)		
Medications					
Steroids	31(83.8)	49(81.7)	80(82.25)	0.07	0.790
Hydroxychloroquine	35(94.6)	51(85.0)	86(88.7)	2.10	0.148
Azathioprine	21(56.8)	34(56.7)	55(56.7)	0.01	0.993
Mycophenolate mofetil	9(24.3)	15(25.0)	24(24.7)	0.01	0.940
Cyclophosphamide	2(5.4)	3(5.0)	5(5.2)	0.01	0.930
Cyclosporine	0	3(5.0)	3(3.1)	1.91	0.167
		Mean (SD) range		MWU	P value
Illness duration (years)	5.6(3.9)	5.3(3.7)	5.4(3.7)	-0.44	0.663
	1.0–15.0	0.2–15.0	0.2–15.0		

FCV, fear of COVID-19 infection; MWU, Mann–Whitney U; SLE-DAS, systemic lupus erythematosus disease activity score.

Table 4: Association between perceived fear of coronavirus disease 2019 infection and associated psychological symptoms and quality of life in patients with systemic lupus erythematosus:

Variables	Normal stress reaction	Intensified FCV	Total	t test	P value
	Mean (SD)				
QoL					
Physical	54.1(15.7)	47.8(14.3)	50.2(15.1)	2.02	0.046
Psychological	58.6(15.4)	53.4(14.9)	55.4(15.2)	1.64	0.105
Social	70.7(15.0)	66.0(18.2)	67.8(17.2)	1.33	0.187
Environmental	53.8(11.4)	47.6(12.1)	50.0(12.1)	2.51	0.014
Total	57.2(11.7)	51.4(11.6)	53.6(11.9)	2.38	0.019
SCL-90					
Somatization	18.8(9.4)	20.2(9.3)	19.7(9.3)	-0.71	0.483
Obsessive-compulsive	15.2(7.2)	16.4(7.1)	16.0(7.1)	-0.78	0.440
		Mean (SD) range		MWU	P value
Interpersonal sensitivity	11.0(6.5)	12.8(7.1)	12.1(6.9)	-0.82	0.411
	0–22	1–28	0–28		
Depression	17.3(8.8)	18.2(9.7)	17.7(9.2)	-0.92	0.359
	1–43	0–48	0–48		
Anxiety	11.2(7.0)	13.0(7.3)	12.3(7.2)	-1.09	0.277
	1–26	3–31	1–31		
Hostility	6.9(4.2)	6.6(4.8)	6.7(4.6)	-0.70	0.488
	2–19	1–21	1–21		
Phobic	6.0(5.1)	6.9(5.3)	6.6(5.2)	-0.88	0.379
	1–21	1–22	1–22		
Paranoia	6.3(5.0)	6.6(4.6)	6.5(4.8)	-0.60	0.551
	0–19	2–24	0–24		
Psychoticism	6.4(6.5)	8.3(7.7)	7.5(7.3)	-1.22	0.223
	1–23	3–33	1–33		
GSI	1.2 (0.6)	1.3(0.7)	1.3(0.6)	-0.87	0.387
	0.2–2.6	0.1–3.3	0.1–3.3		
		Mean (SD)		t test	P value
PST	50.4(22.5)	54.8(20.3)	53.1(21.2)	-0.99	0.326
PSDI	2.1(0.5)	2.2(0.5)	2.1(0.5)	-0.12	0.905

FCV, fear of COVID-19 infection; GSI, Global Severity Index; MWU, Mann–Whitney U; PSDI, Positive Symptom Distress Index; PST, Positive Symptoms Total; QoL, quality of life; SCL-90, symptom checklist 90.

Another essential issue highlighted by this study was the higher prevalence of comorbid psychological symptoms (somatization) among patients with SLE during pandemic. Similar findings are reported in patients with SLE (Koppert *et al.*, 2021) and fibromyalgia (Kharko *et al.*, 2020) during the COVID-19 pandemic. The associated somatization symptoms in those individuals would be rationalized by pandemic-induced stress, worry of getting infected, changes in daily routines and caregiving, the illness or death of family members or friends, loss of work, and financial concerns (Barzilay *et al.*, 2020; Restubog *et al.*, 2020; Park *et al.*, 2020). Furthermore, for people with chronic conditions, somatic symptoms may also be enhanced by delayed medical evaluations (Choini'ere *et al.*, 2010) and reduced access to health services (Eccleston

et al., 2020; Shanthanna *et al.*, 2020). Moreover, in those patients, a sensitized brain might augment somatic symptoms in response to stress in people with chronic painful conditions (Meeus and Nijs, 2007; Moloney *et al.*, 2016). This finding emphasized the essential need for psychological interventions to cope with the stress induced by crises to minimize the perceived somatic symptoms among those populations.

This study would be claimed for a few limitations. The cross-sectional design would be criticized, as the inference of the causal relationship between various variables cannot be emphasized. Yet, the authors would advocate that the current study would be one of few studies, if any, which evaluated the QoL and other related psychosocial variables among individuals with SLE during the pandemic in Egypt.

Consequently, future large-sized longitudinal studies are warranted that would permit further analyses to consider the causality relationship between COVID-19-related psychological factors and QoL as well as SLE disease activity among those populations. Another concern was that the patients were selected from a single health facility, which would limit the generalizability of the results. However, it could be argued that the Zagazig University hospitals are one of the largest general health facilities located in the eastern delta of Egypt and serving around eight million people.

CONCLUSION

Individuals with SLE had higher levels of FCV and experienced reduced QoL during the pandemic. Moreover, there was a robust association between the perceived FCV and reduced QoL (physical, environmental, and total) in those individuals.

These results would draw attention to the potential adverse influence of the pandemic on patients with autoimmune inflammatory diseases, particularly SLE, and shed light on the need for comprehensive patient-centered care that should be tailored to their holistic needs. Developing routine interviews for screening both physical and psychological health-related issues during and after the pandemic would be warranted. These measures should include early monitoring, assessment, and management for the potentially emerging psychological symptoms. In addition, therapeutic and behavioral interventions during the current and future crises should be implemented to target the maladaptive coping strategies (e.g. somatizations) that would eventually result in improved disease outcomes and QoL among those populations.

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Authors' contributions: M.A. and M.S.H have been responsible for research conceptualization and proposal design. E.I.A., S.A.S., and D.I.M. have collected data, conducted formal analysis, and interpreted the results. M.S.H. and D.A.S. have written and edited the original manuscript. M.A. has conducted the final editing and revision. Lastly, all authors have collectively approved the final manuscript and believed that their manuscript was original work.

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There are no conflicts of interest.

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