

# Psychological Effects of Lockdown Measures for the COVID-19 Outbreak in Patients with Systemic Lupus Erythematosus

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**Objective:** To compare the psychological impact of the lockdown measures contrasting the COVID-19 outbreak between systemic lupus erythematosus (SLE) and general population.

**Patients and Methods:** From July 15th to August 15th 2020, a retrospective survey referring to the period March 9th to May 18th 2020 was administered to SLE patients and the results of the survey, called LEPRE (Lupus Erythematosus PREsto) study, were compared with those from the PRESTO (imPact of quaRantine mEasures againST cOvid19) project, the same survey provided to the general population. Consecutive patients >18 years old affected by SLE and regularly followed in a single rheumatologic centre were involved. Primary outcome was to compare the scores of the Impact of Events Scale-Revised (IES-R), the General Health Questionnaire 12 (GHQ-12) and the Center for Epidemiological Depression Scale (CES-D) between patients and general population.

**Results:** A total of 64 patients completed the survey. After a propensity score matching, they were compared to 128 people from PRESTO project. The median age among patients was 43 years (I–III interquartile range 35–54.5), 88% were female and 100% Caucasian. IES-R [(score>23: 57% (34) vs 49% (58)], GHQ-12 [(score>13: 85% (52) vs 88% (106)], and CES-D [(score>15: 45% (28) vs 40% (46)] scores were not statistically different between patients and controls ( $p>0.05$ ).

**Conclusion:** Restrictive measures for COVID-19 pandemic had no greater impact on patients with SLE than in the general population. Strategy for coping to the SLE might be useful during lockdown measures and may be helpful for other chronic conditions.

**Keywords:** systemic lupus erythematosus, COVID-19, psychological distress

## Introduction

COVID-19 is a systemic viral disease currently spreading as a pandemic.<sup>1</sup> A more severe course and prognosis of COVID-19 in some autoimmune diseases, such as systemic lupus erythematosus (SLE) and vasculitis, and for some immunosuppressive agents or higher doses of glucocorticoids has been reported.<sup>2</sup>

SLE is the model of systemic autoimmune disease, that is characterizes by the occurrence in young people, chronic course, increased susceptibility to infections, damage accrual due to the disease itself and long-term glucocorticoid therapy and immunosuppressive treatments, and comorbidities. Furthermore, SLE is a chronic disease that deeply affects multiple dimensions of young patients' lives, with fatigue and chronic pain being the most frequent symptoms, with a profound effect on quality of life, despite treatments.<sup>3,4</sup> On the other hand, chronic diseases

affecting the humoral immune system show a great impact on mental health. In fact, a stronger association with psychiatric disorders and suicidal behavior has been recently highlighted for joint exposure to primary humoral immunodeficiencies and autoimmune disease.<sup>5</sup> Thus, a pandemic is a trigger that can influence the mental health of patients living with SLE.

The PRESTO (imPact of quaRantine mEasures against cOvid19) project is a survey that investigated the impact of the Italian government measures adopted between March 9th and May 18th 2020. This project was sponsored by SANV Unite (Feeding, Nutrition and Health) of the Italian Istituto Superiore di Sanità, the Unit of biostatistics, epidemiology and public health of Department of cardio-thoracic-vascular Science and public health (DCTV) of Padua University and by Psychotherapy and Psychology Unit of Prochild Onlus, with technical support by Zeta Research S.r.l. The project was based on a broad review of studies which reported negative psychological effects of quarantine, including post-traumatic stress symptoms, confusion, and anger. Stressors included longer quarantine duration, infection fears, frustration, boredom, inadequate supplies, inadequate information, financial loss, and stigma.<sup>6</sup>

Our investigation, namely the Lupus Erythematosus PRESTO (LEPRE) study, aimed to evaluate the psychological impact of lockdown measures against COVID-19 on patients with SLE as compared to the general population participating in the PRESTO project.

## Patients and Methods

From July 15th to August 15th 2020, consecutive patients  $\geq 18$  years old affected by SLE classified according to the 2019 ACR criteria<sup>7</sup> and regularly followed at our Rheumatology Clinic, Academic Hospital of Udine, were asked to anonymously complete the online questionnaire referring to the quarantine period March 9th to May 18th 2020. All patients who were involved had been taking stable treatment for at least 6 months and they were in remission or in low disease activity state.<sup>8</sup> Patients with pre-existing neuropsychiatric disorders were excluded. During the lockdown measures, the patients had full access to the hospital for urgent visits, and could communicate with medical staff via telephone or email. The survey collected socio-demographic data and focused on COVID-19 concerns, emotional impact, self-perception, and change in habits during quarantine for the COVID-19 outbreak. The psychological impact was measured

using the Impact of Events Scale-Revised (IES-R),<sup>9</sup> the General Health Questionnaire 12 (GHQ-12),<sup>10</sup> and the Center for Epidemiological Studies Depression Scale (CES-D).<sup>11</sup>

In detail, the IES-R was designed as a measure of post-traumatic stress disorder (PTSD) symptoms, and is a short, easily administered self-report questionnaire. It is best used for recent and specific traumatic events. It has 22 questions, 5 of which were added to the original Horowitz (IES) to better capture the DSM-IV criteria for PTSD. The IES-R score was categorized into 4 classes according to a recent publication in the field: 0–23 (normal), 24–32 (mild psychological impact), 33–36 (moderate psychological impact), and  $\geq 37$  (severe impact).<sup>12</sup> To assess psychological distress, the GHQ-12 was employed, using a cut-off at 14 points to identify psychological distress.<sup>13</sup> Finally, depression was screened using the CES-D. Three classes of symptoms severity were considered: 0–15 (no/mild depressive symptoms), 16–23 (moderate depressive symptoms), and 24–60 (severe depressive symptoms).<sup>11</sup>

Results from the LEPRE project were compared with those reported by the general population (PRESTO project), with further sub analyses by including or not people declaring chronic diseases. The PRESTO project is a survey started on the 20th of March 2020 with the aim of describing lifestyle habits and the prevalence of psychological discomfort among the Italian population during the COVID-19 lockdown. It was web-based, using Lime Survey, and it was disseminated via messaging apps (eg, WhatsApp) and social networks (eg, Facebook).

Stakeholders other than physicians were involved in the study: health professionals (AP), psychologists (EM), nutritionists (MS), epidemiologists and biostatisticians (DG, DA, CL, GL), and patients (MM) were involved in planning the study and interpretation of the results.

Data were summarized according to LEPRE versus PRESTO groups (for the best comparison only people coming from Friuli Venezia Giulia region of Italy were selected) and reported as a percentage and absolute number. The Pearson Chi-Square test was performed to compare the groups together with the Fisher exact test wherever appropriate.

A propensity score was estimated to match the LEPRE cases to the PRESTO responders with a ratio of 2 versus 1.<sup>14</sup>

To perform clustering analysis on categorical data, the Multiple Correspondence Analysis (MCA) results can be used to transform categorical variables into a set of few

continuous variables (the latent dimension). The cluster analysis can then be applied to the results. In this case, the MCA can be considered as pre-processing steps that allow computing clustering on categorical data.

A Factorial Agglomerative hierarchical clustering analysis has been then carried out on the MCA results. The distance between MCA loadings has been computed via Manhattan measure using the Ward method to identify the hierarchical partition. The data partition has been represented in a cluster dendrogram. The cluster membership together with the individual loading has been represented in a factor map with the 95% confidence ellipses around centroids.

The features discriminating the clusters according to the Chi-square significance ( $\alpha < 0.05$ ) have been selected and summarized ([Figures S1](#) and [S2](#)).

A significance level of 0.05 has been considered for the analyses. Computations have been performed with the R 3.6.2 system and the Factominer, Matchit, and Factoextra packages.

## Results

Among 110 patients who were asked to participate in the study, 64 patients anonymously completed the survey and were included in the LEPRE study. They were compared to 1114 unselected people living in the same geographical area of Italy, namely the Friuli Venezia Giulia region. The survey responders' characteristics were different between the LEPRE and PRESTO; the LEPRE group showed a higher percentage of females [88% (56) vs 61% (673),  $p < 0.001$ ] and subjects with lower educational level (prevalently high school) [University: 28% (18) vs 49% (548),  $p = 0.001$ ]. The SLE subjects live mainly in detached houses [59% (38) vs 31% (348),  $p < 0.001$ ], having access to a private garden [81% (52) vs 56% (625),  $p < 0.001$ ] and also owning a pet [67% (43) vs 46% (508),  $p = 0.001$ ], in comparison with the PRESTO sample living mainly in flats [39% (25) vs 66% (740),  $p < 0.001$ ] ([Table 1](#)).

Moreover, a greater percentage of the LEPRE study group had a swab test during the pandemic [19% (12) vs 4% (22),  $p < 0.001$ ]. The LEPRE sample practiced less frequent physical activity during the quarantine in comparison with the PRESTO group [27% (16) vs 43% (392),  $p = 0.016$ ] ([Table 1](#)).

However, after matching the sample using the propensity score all the standardized mean differences lie in the  $\pm 0.1$  threshold indicating a suitable balance across groups ([Figure S1](#)).

One hundred and twenty-eight matched people from the PRESTO study were compared to the 64 SLE patients. The median age among patients was 43 years (I–III interquartile range 35–54.5), 88% were female and 100% Caucasian.

No significant differences were identified in the groups' characteristics after the matching procedure ([Table 2](#)).

The psychological impact measured by IES-R [(score > 23: 57% (34) vs 49% (58)], GHQ-12 [(score > 13: 85% (52) vs 88% (106)], and CES-D [(score > 15: 45% (28) vs 40% (46)] scores were not statistically different between patients and the general population ( $p > 0.05$ ) ([Table 2](#)).

As regards missing activities, patients with SLE missed playing sports/exercise less than general population [19% (12) vs 36% (46),  $p = 0.017$ ], while they felt more the lack of the company of family and relatives [71% (45) vs 33% (42),  $p < 0.001$ ] ([Table 3](#)).

Concerning the responders' feelings during the quarantine, COVID-19 concerns, anxiety, and depression rates as well as feelings were not different between patients and general population ([Table 4](#)). However, patients perceived more difficulty to find some more free time and enjoy it [21% (13) vs 39% (47),  $p = 0.01$ ] and to be able to solve own problems more than usual [(0 vs 11% (13),  $p = 0.02$ )] ([Table 4](#)). On the contrary, patients felt less sad or depressed than usual [28% (17) vs 11% (13),  $p = 0.003$ ] in comparison with the PRESTO group ([Table 4](#)). Moreover, the PRESTO group less frequently avoided discussions that could remind them of the pandemic [(37% (22) vs 56% (66),  $p = 0.02$ )] ([Table 4](#)).

Regarding emotional status, the patients also very rarely or never had the impression that people did not like them [(93% (56) vs 75% (87),  $p = 0.003$ )] ([Table 5](#)).

Finally, no differences were evidenced for dietary habits during the quarantine among groups, except for a greater consumption of eggs per week for the PRESTO group [(median (I–III quartile range): 1 (1–2) vs 2 (1–2),  $p = 0.005$ )] ([Table S1](#)).

Notably, two sub analyses performed by comparing LEPRE subjects only with people with chronic diseases ([Tables S2–S4](#)), or only with healthy volunteers retrieved the same results ([Tables S5–S7](#)).

The clusters' characteristics are reported in [Table S8](#): cluster 1 is composed in prevalence of males reporting a

**Table 1** Descriptive Statistics of the Survey Responders

Answer	N. of Responders	Response	LEPRE (N=64)	PRESTO (N=1114)	Combined (N=1178)	P value
How old are you?	1178	Age, median (I–III interquartile range)	43.0 (35–54.5)	47.0 (34–57)	47.0 (35–56.8)	0.6
	1178	≤29 years 29–65 years >65 years	16% (10) 81% (52) 3% (2)	19% (207) 71% (791) 10% (116)	18% (217) 72% (843) 10% (118)	0.112
What is your gender	1176	Female Male	88% (56) 12% (8)	61% (673) 39% (439)	62% (729) 38% (447)	<b>&lt;0.001</b>
Please specify your nationality	1178	Other Italian	3% (2) 97% (62)	2% (20) 98% (1094)	2% (22) 98% (1156)	0.445
What is your level of education?	1178	High School University Secondary school	70% (45) 28% (18) 2% (1)	51% (563) 49% (548) 0% (3)	52% (608) 48% (566) 0% (4)	<b>0.001</b>
What is your employment status?	1178	Employed Student	97% (62) 3% (2)	92% (1029) 8% (85)	93% (1091) 7% (87)	0.18
What is your house like?	1178	Flat Studio flat Detached house	39% (25) 2% (1) 59% (38)	66% (740) 2% (26) 31% (348)	65% (765) 2% (27) 33% (386)	<b>&lt;0.001</b>
Can you access a private garden?	1176	No Yes	19% (12) 81% (52)	44% (487) 56% (625)	42% (499) 58% (677)	<b>&lt;0.001</b>
Did you take the swab test?	633	No Yes	81% (51) 19% (12)	96% (548) 4% (22)	95% (599) 5% (34)	<b>&lt;0.001</b>
Have you lost anyone during this period?	629	No Yes	89% (56) 11% (7)	90% (509) 10% (57)	90% (565) 10% (64)	0.796
Besides yourself, how many people live in your home?	1153	I do not live alone I live alone	94% (59) 6% (4)	85% (924) 15% (166)	85% (983) 15% (170)	0.053
AFTER the measures taken by the government to contain the spread of the coronavirus since you have been in quarantine do you habitually practice some physical activity	967	No Yes	73% (43) 27% (16)	57% (516) 43% (392)	58% (559) 42% (408)	<b>0.016</b>
Own a pet	1178	No Yes	33% (21) 67% (43)	54% (606) 46% (508)	53% (627) 47% (551)	<b>0.001</b>

**Note:** Significant P values between LEPRE and PRESTO groups are expressed in bold characters.

better situation from the point of view of psychological distress on both the GHQ and IES -R scales along with the depression scale CES-D, while cluster 2 is mainly composed of females reporting worse psychological distress on the GHQ-12 together with the IES-R scale and CES-D score. The two clusters are characterized by similar frequencies of people coming from the LEPRE and PRESTO cohorts indicating an overall homogeneity across the survey groups of responders (Table S8). Interestingly,

independently from belonging to the LEPRE or PRESTO cohort, women showed the worst IES-R, GHQ-12, and CES-D scores (Table S8).

### Discussion

Concerns, healthcare-related behaviors and psychological impact of COVID-19 pandemic among patients with rheumatic diseases and in particular with SLE have been investigated by several works, reporting a trend towards

**Table 2** Descriptive Statistics of the Survey Responders Post Propensity Score Matching

Answer	N. of Responders	Variable	LEPRE (N=64)	PRESTO (N=128)	Combined (N=192)	P value
How old are you?	192	<b>Age, median (I-III interquartile range)</b>	43 (35–54.5)	46 (39.5–55)	45.5 (37.8–55)	0.467
Age class	192	<29 29–65 65+	16% (10) 81% (52) 3% (2)	9% (12) 88% (112) 3% (4)	11% (22) 85% (164) 3% (6)	0.438
What is your gender	192	Female Male	88% (56) 12% (8)	85% (109) 15% (19)	86% (165) 14% (27)	0.66
Please specify your nationality	192	Other Italian	3% (2) 97% (62)	2% (2) 98% (126)	2% (4) 98% (188)	0.475
What is your level of education?	192	High School University Secondary school	70% (45) 28% (18) 2% (1)	64% (82) 34% (44) 2% (2)	66% (127) 32% (62) 2% (3)	0.681
What is your employment status?	192	Employed Student	97% (62) 3% (2)	97% (124) 3% (4)	97% (186) 3% (6)	1
What is your house like?	192	Flat Studio flat Detached house	39% (25) 2% (1) 59% (38)	38% (49) 1% (1) 61% (78)	39% (74) 1% (2) 60% (116)	0.872
Can you access a private garden?	192	No Yes	19% (12) 81% (52)	19% (24) 81% (104)	19% (36) 81% (156)	1
Did you take the swab test?	126	No Yes	81% (51) 19% (12)	86% (54) 14% (9)	83% (105) 17% (21)	0.473
Have you lost anyone during this period?	125	No Yes	89% (56) 11% (7)	94% (58) 6% (4)	91% (114) 9% (11)	0.358
Besides yourself, how many people live in your home?	188	I do not live alone I live alone	94% (59) 6% (4)	94% (118) 6% (7)	94% (177) 6% (11)	0.836
AFTER the measures taken by the government to contain the spread of the coronavirus since you have been in quarantine do you habitually practice some physical activity	163	No Yes	73% (43) 27% (16)	73% (76) 27% (28)	73% (119) 27% (44)	0.978
Own a pet	192	No Yes	33% (21) 67% (43)	33% (42) 67% (86)	33% (63) 67% (129)	1
Mental health scores GHQ-12 Total score	181	0–13 14–36	15% (9) 85% (52)	12% (14) 88% (106)	13% (23) 87% (158)	0.556
IES-R Total score	178	0–23 24–32 33–36 37–88	43% (26) 27% (16) 7% (4) 23% (14)	51% (60) 23% (27) 6% (7) 20% (24)	48% (86) 24% (43) 6% (11) 21% (38)	0.825
CES-D Total score	176	0–15 16–23 24–60	55% (33) 27% (16) 18% (11)	60% (70) 22% (25) 18% (21)	59% (103) 23% (41) 18% (32)	0.727

**Table 3** Descriptive Statistics of the Missing Activities (“Which of the Following Activities are You Missing the Most During This Quarantine Period?”) During the COVID-19 Quarantine (Post-Propensity Match Sample)

Answer	N. of Responders	Response	LEPRE (N=64)	PRESTO (N=128)	Combined (N=192)	P value
Going to the cinema, theatre.	191	Not selected Yes	75% (47) 25% (16)	73% (94) 27% (34)	74% (141) 26% (50)	0.863
Playing sports/exercise.	191	Not selected Yes	81% (51) 19% (12)	64% (82) 36% (46)	70% (133) 30% (58)	<b>0.017</b>
Going to exhibitions and museums.	191	Not selected Yes	89% (56) 11% (7)	88% (112) 12% (16)	88% (168) 12% (23)	0.782
Going to nightclubs.	191	Not selected Yes	98% (62) 2% (1)	98% (125) 2% (3)	98% (187) 2% (4)	0.731
Attending sporting events.	191	Not selected Yes	95% (60) 5% (3)	91% (117) 9% (11)	93% (177) 7% (14)	0.339
Going out to eat.	191	Not selected Yes	56% (35) 44% (28)	52% (66) 48% (62)	53% (101) 47% (90)	0.603
Going to coffee shops.	191	Not selected Yes	84% (53) 16% (10)	84% (107) 16% (21)	84% (160) 16% (31)	0.925
Gardening.	191	Not selected Yes	95% (60) 5% (3)	97% (124) 3% (4)	96% (184) 4% (7)	0.571
Going out for a walk.	191	Not selected Yes	40% (25) 60% (38)	38% (49) 62% (79)	39% (74) 61% (117)	0.852
Going out with friends.	191	Not selected Yes	40% (25) 60% (38)	41% (53) 59% (75)	41% (78) 59% (113)	0.82
Seeing the family.	191	Not selected Yes	29% (18) 71% (45)	67% (86) 33% (42)	54% (104) 46% (87)	<b>&lt;0.001</b>
Going shopping.	191	Not selected Yes	78% (49) 22% (14)	75% (96) 25% (32)	76% (145) 24% (46)	0.673
Going to work.	191	Not selected Yes	75% (47) 25% (16)	70% (89) 30% (39)	71% (136) 29% (55)	0.467

**Note:** Significant P values between LEPRE and PRESTO groups are expressed in bold characters.

remarkable psychological distress, however with contrasting results; more specifically, the effect of restrictive measures among the same populations has been less analysed.<sup>15–19</sup>

Our hypothesis, was that not only the fear of the infection but also the restriction-based strategy might upset the life of patients with SLE. To minimize attribution bias due to disease activity, we selected only SLE patients who were in remission or with low disease activity at the last follow-up visit, and we compared them to the general population, utilizing the same survey form pertaining to the same lockdown period. Globally, lockdown measures showed a great psychological impact on

both patients and general population, half or more than half of both groups disclosing high scores of IES-R, GHQ-12 and CES-D questionnaires. However, our study showed no differences between SLE patients and the general population in IES-R, GHQ-12 and CES-D scores, while feeling sad or depressed was more common in the general population than in the patients, thus supporting the concept of resilience of SLE due to a previously adaptation to a difficult context (ie, chronic inflammatory disease). Patients did not show significant differences in their behavior if compared to the general population, except for two aspects: “missing playing sports or exercise” (less impact) and “missing to see the family” (more

**Table 4** Descriptive Statistics of the Responder's Feeling ("Since the Government Started the Restrictive Measures Since You are in Quarantine, What Do You Feel When You Think About the Pandemic and the Coronavirus?") During the COVID-19 Quarantine (Post-Propensity Match Sample)

Answer	N. of Responders	Response	LEPRE (N=64)	PRESTO (N=128)	Combined (N=192)	P value
Do you have difficulty concentrating on what you do? Can you follow the train of thought? Concentrate when reading, at work, etc.?	181	As usual Less than usual Much less than usual More than usual	69% (42) 8% (5) 2% (1) 21% (13)	57% (68) 18% (22) 7% (8) 18% (22)	61% (110) 15% (27) 5% (9) 19% (35)	0.111
Do you think you have lost a lot of sleep, enough to make you worry?	181	As usual Less than usual Much less than usual More than usual	57% (35) 23% (14) 7% (4) 13% (8)	52% (63) 13% (16) 16% (19) 18% (22)	54% (98) 17% (30) 13% (23) 17% (30)	0.12
Do you think you are productive, are you able to do many things during the day?	181	As usual Less than usual Much less than usual More than usual	48% (29) 21% (13) 8% (5) 23% (14)	38% (45) 29% (35) 11% (13) 22% (27)	41% (74) 27% (48) 10% (18) 23% (41)	0.527
Do you think you are able to make decisions most of the time?	181	As usual Less than usual Much less than usual More than usual	77% (47) 16% (10) 0% (0) 7% (4)	81% (97) 13% (16) 1% (1) 5% (6)	80% (144) 14% (26) 1% (1) 6% (10)	0.796
Do you feel constantly under pressure?	181	As usual Less than usual Much less than usual More than usual	33% (20) 10% (6) 10% (6) 48% (29)	34% (41) 18% (21) 8% (10) 40% (48)	34% (61) 15% (27) 9% (16) 43% (77)	0.52
Do you think you are able to overcome difficulties right now?	181	As usual Less than usual Much less than usual More than usual	52% (32) 15% (9) 2% (1) 31% (19)	56% (67) 15% (18) 2% (2) 28% (33)	55% (99) 15% (27) 2% (3) 29% (52)	0.965
During this period, are you able to find some free time and enjoy it?	181	As usual Less than usual Much less than usual More than usual	46% (28) 20% (12) 13% (8) 21% (13)	25% (30) 27% (32) 9% (11) 39% (47)	32% (58) 24% (44) 10% (19) 33% (60)	<b>0.013</b>
In this situation, do you feel able to solve your problems?	181	As usual Less than usual Much less than usual More than usual	77% (47) 18% (11) 5% (3) 0% (0)	59% (71) 24% (29) 6% (7) 11% (13)	65% (118) 22% (40) 6% (10) 7% (13)	<b>0.025</b>
Sad or depressed.	181	As usual Less than usual Much less than usual More than usual	38% (23) 18% (11) 10% (6) 34% (21)	46% (55) 5% (6) 6% (7) 43% (52)	43% (78) 9% (17) 7% (13) 40% (73)	<b>0.022</b>
As if I have lost confidence in myself.	181	As usual Less than usual Much less than usual More than usual	54% (33) 15% (9) 18% (11) 13% (8)	68% (82) 9% (11) 9% (11) 13% (16)	64% (115) 11% (20) 12% (22) 13% (24)	0.168
As if I had less self-esteem.	181	As usual Less than usual Much less than usual More than usual	57% (35) 16% (10) 16% (10) 10% (6)	74% (89) 8% (10) 8% (10) 9% (11)	69% (124) 11% (20) 11% (20) 9% (17)	0.092

(Continued)

**Table 4** (Continued).

Answer	N. of Responders	Response	LEPRE (N=64)	PRESTO (N=128)	Combined (N=192)	P value
With an overall happy emotional state.	181	As usual Less than usual Much less than usual More than usual	51% (31) 28% (17) 7% (4) 15% (9)	45% (54) 34% (41) 12% (14) 9% (11)	47% (85) 32% (58) 10% (18) 11% (20)	0.392
Everything that reminds me of the pandemic makes me feel emotions.	178	Quite a bit Extremely Moderately Not at all A little bit	32% (19) 17% (10) 18% (11) 7% (4) 27% (16)	35% (41) 8% (10) 21% (25) 8% (10) 27% (32)	34% (60) 11% (20) 20% (36) 8% (14) 27% (48)	0.589
I had difficulty staying asleep.	178	Quite a bit Extremely Moderately Not at all A little bit	15% (9) 5% (3) 12% (7) 43% (26) 25% (15)	15% (18) 2% (2) 13% (15) 44% (52) 26% (31)	15% (27) 3% (5) 12% (22) 44% (78) 26% (46)	0.806
Things that do not concern the pandemic make me think about it anyway.	178	Quite a bit Extremely Moderately Not at all A little bit	18% (11) 3% (2) 20% (12) 27% (16) 32% (19)	16% (19) 2% (2) 20% (24) 25% (29) 37% (44)	17% (30) 2% (4) 20% (36) 25% (45) 35% (63)	0.907
I feel irritable and angry.	178	Quite a bit Extremely Moderately Not at all A little bit	15% (9) 10% (6) 22% (13) 23% (14) 30% (18)	19% (22) 3% (3) 20% (24) 31% (37) 27% (32)	17% (31) 5% (9) 21% (37) 29% (51) 28% (50)	0.221
I avoid getting upset when I think about it or it is reminded me by others.	178	Quite a bit Extremely Moderately Not at all A little bit	17% (10) 7% (4) 27% (16) 20% (12) 30% (18)	21% (25) 5% (6) 28% (33) 14% (17) 31% (37)	20% (35) 6% (10) 28% (49) 16% (29) 31% (55)	0.844
I think about it without intending to.	178	Quite a bit Extremely Moderately Not at all A little bit	20% (12) 3% (2) 28% (17) 20% (12) 28% (17)	10% (12) 4% (5) 21% (25) 19% (23) 45% (53)	13% (24) 4% (7) 24% (42) 20% (35) 39% (70)	0.16
I have a feeling it did not happen or it is not real.	178	Quite a bit Extremely Moderately Not at all A little bit	13% (8) 0% (0) 12% (7) 60% (36) 15% (9)	10% (12) 2% (2) 17% (20) 45% (53) 26% (31)	11% (20) 1% (2) 15% (27) 50% (89) 22% (40)	0.187
I avoided things that could remind it to me.	178	Quite a bit Extremely Moderately Not at all A little bit	3% (2) 3% (2) 17% (10) 37% (22) 40% (24)	8% (10) 1% (1) 12% (14) 56% (66) 23% (27)	7% (12) 2% (3) 13% (24) 49% (88) 29% (51)	<b>0.029</b>

(Continued)



Table 4 (Continued).

Answer	N. of Responders	Response	LEPRE (N=64)	PRESTO (N=128)	Combined (N=192)	P value
Some images about the pandemic, coronavirus, come to mind suddenly.	178	Quite a bit Extremely Moderately Not at all A little bit	5% (3) 3% (2) 23% (14) 35% (21) 33% (20)	6% (7) 3% (4) 14% (16) 49% (58) 28% (33)	6% (10) 3% (6) 17% (30) 44% (79) 30% (53)	0.343
I am nervous and easily scared.	178	Quite a bit Extremely Moderately Not at all A little bit	13% (8) 3% (2) 15% (9) 37% (22) 32% (19)	9% (11) 4% (5) 11% (13) 44% (52) 31% (37)	11% (19) 4% (7) 12% (22) 42% (74) 31% (56)	0.787
I try not to think about it.	178	Quite a bit Extremely Moderately Not at all A little bit	20% (12) 10% (6) 22% (13) 17% (10) 32% (19)	21% (25) 3% (4) 19% (23) 20% (24) 36% (42)	21% (37) 6% (10) 20% (36) 19% (34) 34% (61)	0.452
I am aware that I still can not manage all my emotions regarding the pandemic, coronavirus.	178	Quite a bit Extremely Moderately Not at all A little bit	18% (11) 3% (2) 22% (13) 28% (17) 28% (17)	12% (14) 4% (5) 23% (27) 31% (36) 31% (36)	14% (25) 4% (7) 22% (40) 30% (53) 30% (53)	0.841
My feelings about it are kind of numb.	178	Quite a bit Extremely Moderately Not at all A little bit	7% (4) 0% (0) 10% (6) 58% (35) 25% (15)	8% (9) 3% (3) 16% (19) 52% (61) 22% (26)	7% (13) 2% (3) 14% (25) 54% (96) 23% (41)	0.54
I found myself acting or feeling as though I was back at the time when the quarantine was announced.	178	Quite a bit Extremely Moderately Not at all A little bit	7% (4) 0% (0) 20% (12) 48% (29) 25% (15)	4% (5) 0% (0) 16% (19) 60% (71) 19% (23)	5% (9) 0% (0) 17% (31) 56% (100) 21% (38)	0.5
I have trouble falling asleep.	178	Quite a bit Extremely Moderately Not at all A little bit	7% (4) 8% (5) 12% (7) 43% (26) 30% (18)	9% (11) 4% (5) 9% (11) 58% (69) 19% (22)	8% (15) 6% (10) 10% (18) 53% (95) 22% (40)	0.22
I have waves of strong feelings when I think about it.	178	Quite a bit Extremely Moderately Not at all A little bit	18% (11) 3% (2) 27% (16) 18% (11) 33% (20)	15% (18) 6% (7) 19% (23) 28% (33) 31% (37)	16% (29) 5% (9) 22% (39) 25% (44) 32% (57)	0.519
I tried to remove it from my memory.	178	Quite a bit Extremely Moderately Not at all A little bit	13% (8) 2% (1) 20% (12) 43% (26) 22% (13)	11% (13) 7% (8) 19% (22) 42% (50) 21% (25)	12% (21) 5% (9) 19% (34) 43% (76) 21% (38)	0.683

(Continued)

**Table 4** (Continued).

Answer	N. of Responders	Response	LEPRE (N=64)	PRESTO (N=128)	Combined (N=192)	P value
I have trouble concentrating.	178	Quite a bit Extremely Moderately Not at all A little bit	12% (7) 3% (2) 10% (6) 45% (27) 30% (18)	8% (10) 4% (5) 8% (10) 52% (61) 27% (32)	10% (17) 4% (7) 9% (16) 49% (88) 28% (50)	<b>0.896</b>
Reminders of it cause me to have physical reactions, such as sweating, trouble breathing, nausea, or a pounding heart.	178	Quite a bit Extremely Moderately Not at all A little bit	7% (4) 3% (2) 5% (3) 67% (40) 18% (11)	3% (3) 2% (2) 4% (5) 75% (89) 16% (19)	4% (7) 2% (4) 4% (8) 72% (129) 17% (30)	<b>0.594</b>
I have dreams about the pandemic/coronavirus.	178	Quite a bit Extremely Moderately Not at all A little bit	5% (3) 3% (2) 2% (1) 75% (45) 15% (9)	2% (2) 2% (2) 4% (5) 78% (92) 14% (17)	3% (5) 2% (4) 3% (6) 77% (137) 15% (26)	<b>0.582</b>
I have become watchful and on-guard with people and the environment.	178	Quite a bit Extremely Moderately Not at all A little bit	27% (16) 15% (9) 25% (15) 15% (9) 18% (11)	18% (21) 7% (8) 24% (28) 21% (25) 31% (36)	21% (37) 10% (17) 24% (43) 19% (34) 26% (47)	<b>0.117</b>
I try not to talk about the pandemic/coronavirus.	178	Quite a bit Extremely Moderately Not at all A little bit	7% (4) 2% (1) 17% (10) 50% (30) 25% (15)	5% (6) 2% (2) 26% (31) 37% (44) 30% (35)	6% (10) 2% (3) 23% (41) 42% (74) 28% (50)	<b>0.459</b>

**Note:** Significant P values between LEPRE and PRESTO groups are expressed in bold characters.

impact). No difference to the general population was observed about anxiety or depression rate, self-esteem, confidence in the future, sleep disorders, appetite, or even food consumption. On the other hand, the patients could be more able to cope with the problem of the outbreak, also by “avoiding things that could remind it”, that refers to a previously adopted coping strategy. Interestingly, the patients’ lifestyle (eg, living in detached houses, having access to a private garden and also owning a pet) could contribute to cope with restrictions. Notably, this coping strategy might be of value also for healthy people, in order to limit the psychological distress of restrictive measures and to mitigate the risk of mental disorders. Indeed, the possibility of communicating with medical staff can affect patients’ ability to adapt to the stressful situation caused by the pandemic.<sup>20</sup> Finally, patients consumed fewer eggs than general population, adhering more tightly to the Mediterranean diet. Thus, resilience

of patients with SLE probably rests on three pillars: family and relatives, lifestyle and access to care (Figure 1).

Limits of our study were the lack of knowledge of the pre-pandemic lifestyle of the enrolled patients and the anonymous nature of the questionnaire, that did not allow us to perform clinical associations. Also, the correct inclusion of PRESTO responders in the two categories (with or without chronic disease) could not be verified by a doctor due to the self-administered nature of the questionnaire. On the other hand, the high number of participants in the PRESTO study and the reproducibility of the results in all the three sub analyses, after the propensity score matching procedures, resulted in a robust comparison between patients and general population minimizing potential selection bias. Also, generalizability of the conclusion is limited, since the inclusion criteria comprised remission or low disease activity state, while

**Table 5** Descriptive Statistics of the Responder's Emotional Status During the COVID-19 Quarantine (Post-Propensity Match Sample) ("the Following Questions Refer to the Quarantine Period")

Answer	N. of Responders	Response	LEPRE (N=64)	PRESTO (N=128)	Combined (N=192)	P value
I have been hindered by things that do not usually bother me.	176	Frequently, all the time (5 to 7 days) Never/Very rarely (less than a day) Very often (3 to 4 days) Occasionally (1 to 2 days)	0% (0) 47% (28) 13% (8) 40% (24)	3% (4) 60% (70) 8% (9) 28% (33)	2% (4) 56% (98) 10% (17) 32% (57)	0.098
I had no desire to eat nor appetite.	176	Frequently, all the time (5 to 7 days) Never/Very rarely (less than a day) Very often (3 to 4 days) Occasionally (1 to 2 days)	2% (1) 83% (50) 2% (1) 13% (8)	3% (3) 83% (96) 5% (6) 9% (11)	2% (4) 83% (146) 4% (7) 11% (19)	0.59
I got the impression that I could not get out of depression.	176	Frequently, all the time (5 to 7 days) Never/Very rarely (less than a day) Very often (3 to 4 days) Occasionally (1 to 2 days)	0% (0) 85% (51) 3% (2) 12% (7)	1% (1) 82% (95) 4% (5) 13% (15)	1% (1) 83% (146) 4% (7) 12% (22)	0.871
I had the feeling of being different from others.	176	Frequently, all the time (5 to 7 days) Never/Very rarely (less than a day) Very often (3 to 4 days) Occasionally (1 to 2 days)	5% (3) 50% (30) 23% (14) 22% (13)	3% (4) 67% (78) 10% (12) 19% (22)	4% (7) 61% (108) 15% (26) 20% (35)	0.078
I had trouble concentrating on what I was doing.	176	Frequently, all the time (5 to 7 days) Never/Very rarely (less than a day) Very often (3 to 4 days) Occasionally (1 to 2 days)	0% (0) 55% (33) 12% (7) 33% (20)	9% (10) 54% (63) 9% (10) 28% (33)	6% (10) 55% (96) 10% (17) 30% (53)	0.118
I felt depressed.	176	Frequently, all the time (5 to 7 days) Never/Very rarely (less than a day) Very often (3 to 4 days) Occasionally (1 to 2 days)	2% (1) 62% (37) 8% (5) 28% (17)	4% (5) 59% (69) 13% (15) 23% (27)	3% (6) 60% (106) 11% (20) 25% (44)	0.576
I got the impression that any action required a lot of effort.	176	Frequently, all the time (5 to 7 days) Never/Very rarely (less than a day) Very often (3 to 4 days) Occasionally (1 to 2 days)	2% (1) 53% (32) 17% (10) 28% (17)	6% (7) 60% (70) 15% (17) 19% (22)	5% (8) 58% (102) 15% (27) 22% (39)	0.3
I have faith in the future.	176	Frequently, all the time (5 to 7 days) Never/Very rarely (less than a day) Very often (3 to 4 days) Occasionally (1 to 2 days)	13% (8) 13% (8) 42% (25) 32% (19)	28% (32) 9% (11) 35% (41) 28% (32)	23% (40) 11% (19) 38% (66) 29% (51)	0.193
I thought my life was a failure.	176	Frequently, all the time (5 to 7 days) Never/Very rarely (less than a day) Very often (3 to 4 days) Occasionally (1 to 2 days)	0% (0) 78% (47) 8% (5) 13% (8)	3% (3) 74% (86) 9% (10) 15% (17)	2% (3) 76% (133) 9% (15) 14% (25)	0.638
I felt scared.	176	Frequently, all the time (5 to 7 days) Never/Very rarely (less than a day) Very often (3 to 4 days) Occasionally (1 to 2 days)	10% (6) 32% (19) 28% (17) 30% (18)	3% (3) 33% (38) 22% (25) 43% (50)	5% (9) 32% (57) 24% (42) 39% (68)	0.079
I can not sleep well.	176	Frequently, all the time (5 to 7 days) Never/Very rarely (less than a day) Very often (3 to 4 days) Occasionally (1 to 2 days)	8% (5) 47% (28) 8% (5) 37% (22)	5% (6) 58% (67) 9% (10) 28% (33)	6% (11) 54% (95) 9% (15) 31% (55)	0.495

(Continued)

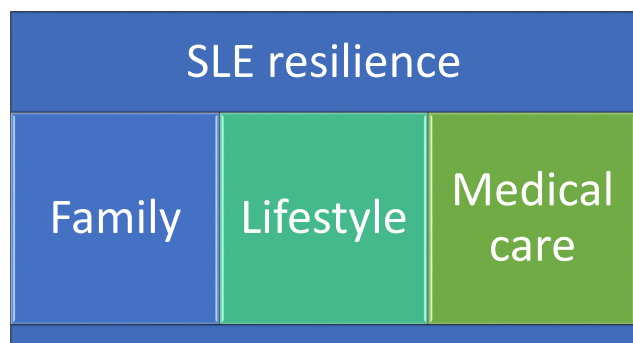
Table 5 (Continued).

Answer	N. of Responders	Response	LEPRE (N=64)	PRESTO (N=128)	Combined (N=192)	P value
I have been happy.	176	Frequently, all the time (5 to 7 days) Never/Very rarely (less than a day) Very often (3 to 4 days) Occasionally (1 to 2 days)	7% (4) 7% (4) 50% (30) 37% (22)	11% (13) 17% (20) 35% (41) 36% (42)	10% (17) 14% (24) 40% (71) 36% (64)	0.103
I talked less than usual.	176	Frequently, all the time (5 to 7 days) Never/Very rarely (less than a day) Very often (3 to 4 days) Occasionally (1 to 2 days)	3% (2) 57% (34) 7% (4) 33% (20)	4% (5) 58% (67) 9% (11) 28% (33)	4% (7) 57% (101) 9% (15) 30% (53)	0.853
I felt alone.	176	Frequently, all the time (5 to 7 days) Never/Very rarely (less than a day) Very often (3 to 4 days) Occasionally (1 to 2 days)	5% (3) 48% (29) 17% (10) 30% (18)	4% (5) 52% (60) 14% (16) 30% (35)	5% (8) 51% (89) 15% (26) 30% (53)	0.95
Other people have been hostile towards me.	176	Frequently, all the time (5 to 7 days) Never/Very rarely (less than a day) Very often (3 to 4 days) Occasionally (1 to 2 days)	2% (1) 85% (51) 3% (2) 10% (6)	1% (1) 78% (90) 5% (6) 16% (19)	1% (2) 80% (141) 5% (8) 14% (25)	0.588
I enjoyed life.	176	Frequently, all the time (5 to 7 days) Never/Very rarely (less than a day) Very often (3 to 4 days) Occasionally (1 to 2 days)	12% (7) 22% (13) 28% (17) 38% (23)	15% (17) 26% (30) 26% (30) 34% (39)	14% (24) 24% (43) 27% (47) 35% (62)	0.829
I had crying fits.	176	Frequently, all the time (5 to 7 days) Never/Very rarely (less than a day) Very often (3 to 4 days) Occasionally (1 to 2 days)	5% (3) 62% (37) 10% (6) 23% (14)	2% (2) 71% (82) 9% (11) 18% (21)	3% (5) 68% (119) 10% (17) 20% (35)	0.471
I felt sad.	176	Frequently, all the time (5 to 7 days) Never/Very rarely (less than a day) Very often (3 to 4 days) Occasionally (1 to 2 days)	5% (3) 28% (17) 13% (8) 53% (32)	7% (8) 28% (32) 16% (18) 50% (58)	6% (11) 28% (49) 15% (26) 51% (90)	0.93
I have the impression that people do not like me.	176	Frequently, all the time (5 to 7 days) Never/Very rarely (less than a day) Very often (3 to 4 days) Occasionally (1 to 2 days)	0% (0) 93% (56) 2% (1) 5% (3)	3% (4) 75% (87) 4% (5) 17% (20)	2% (4) 81% (143) 3% (6) 13% (23)	<b>0.029</b>
I lack motivation.	176	Frequently, all the time (5 to 7 days) Never/Very rarely (less than a day) Very often (3 to 4 days) Occasionally (1 to 2 days)	2% (1) 57% (34) 22% (13) 20% (12)	5% (6) 54% (63) 10% (12) 30% (35)	4% (7) 55% (97) 14% (25) 27% (47)	0.095

Note: Significant P values between LEPRE and PRESTO groups are expressed in bold characters.

patients with neuropsychiatric features were excluded. However, by excluding confounding factors such as different levels of disease activity as well as the presence of psychiatric features, the study selected a group of SLE patients as homogeneous as possible.

To conclude, restrictive measures for contrasting the COVID-19 pandemic did not unveil a greater psychological fragility of people living with SLE than the other people. By contrast, a coping strategy for managing a chronic autoimmune disease, including the role of the family and the



**Figure 1** The three pillars of lupus patients' resilience.

lifestyle, contributes to resilience of SLE in difficult scenarios such as those presented by the pandemic.

## Data Sharing Statement

All data relevant to the study are included in the article or uploaded as [Supplemental Materials](#). The online questionnaire is available at <https://www.prestoinsieme.com>. We used deidentified participant data.

## Ethical Approval Information

The Italian "Istituto Superiore di Sanità" (ISS) Ethics Committee has taken notice of the study, since it was only a survey collecting anonymized data. It followed the European and the Italian privacy policy. People participating to the survey digitally gave consent before starting the questionnaire.

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Local patients' associations for rheumatic diseases and stakeholders other than physicians (psychologist, health professional, nutritionist, public health scientist) were involved in identifying this topic as an urgent need for the best management of patients suffering from systemic lupus erythematosus as a model of the autoimmune diseases, and to deeper understand the multidimensional features of the disease, in difficult context such as the outbreak and the restrictive measures. This information has been thought of relevance also for improving the quality of care of patients in general, and not only in the present outbreak.

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