

Association of anti-Ro52 antibody with depression and anxiety in patients with connective tissue diseases: an observational, single-centre, cross-sectional study

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Supplementary Tables

Supplementary Table S1 Overall prevalence of depression and anxiety in the CTD patients

score	PHQ-9	GAD-7
0~4	196 (55.7%)	213 (60.5%)
5~9	96 (27.3%)	92 (26.1%)
≥10	60 (17.0%)	47 (13.4%)

Overall prevalence of depression measured by the Patient Health Questionnaire 9 (PHQ-9) and anxiety measured by the Generalized Anxiety Disorders Scale-7 (GAD-7) in the CTD patients recruited in this study. Score 0–4 means minimal depression/anxiety, score 5–9 means mild depression/anxiety, score ≥10 means moderate and severe depression/anxiety. CTD, connective tissue disease.

Supplementary Table S2.1 Multivariate logistic regression analysis of risk factors for depression in SLE patients

	S.E	<i>p</i> value	OR	95%CI	
				Lower limit	Upper limit
Sleep time	0.159	0.127	0.785	0.575	1.071
Gender	0.410	0.841	1.179	0.236	5.875
Comorbid with other CTDs	0.647	0.049	3.579	1.007	12.718
Anti-Ro52	0.561	0.018	3.774	1.258	11.329
Anti-Rib-P	0.529	0.263	1.808	0.641	5.102
Anti-SSA	0.597	0.147	0.421	0.130	1.356
Anti-SSB	0.986	0.566	1.762	0.255	12.179
ILD	0.931	0.777	1.301	0.210	8.067
PAH	0.720	0.590	0.679	0.165	2.785
C3	1.338	0.816	1.366	0.099	18.800

Comorbidity with other CTDs and anti-Ro52 were risk factors for depression in SLE patients. CTD, connective tissue disease; ILD, interstitial lung disease; PAH, pulmonary arterial hypertension.

Supplementary Table S2.2 Multivariate logistic regression analysis of risk factors for depression in

SS patients

	S.E	<i>p</i> value	OR	95%CI	
				Lower limit	Upper limit
Sleep time	0.197	0.002	0.549	0.374	0.807
Gender	0.474	0.424	2.135	0.332	13.709
Comorbid with other CTDs	0.614	0.739	0.815	0.244	2.717
Anti-Ro52	0.649	0.002	7.481	2.096	26.700
Anti-SSA	0.680	0.075	0.298	0.079	1.131
Anti-SSB	0.817	0.146	3.282	0.662	16.273
ILD	0.598	0.955	0.967	0.299	3.122
PAH	0.932	0.160	3.706	0.596	23.033
C3	1.583	0.863	1.315	0.059	29.233

Sleep time was a protective factor while anti-Ro52 was a risk factor for depression in SS patients.

CTD, connective tissue disease; ILD, interstitial lung disease; PAH, pulmonary arterial hypertension.

Supplementary Table S2.3 Multivariate logistic regression analysis of risk factors for depression in

RA patients

	S.E	<i>p</i> value	OR	95%CI	
				Lower limit	Upper limit
Sleep time	0.392	0.009	0.356	0.165	0.768
Gender	0.622	0.338	0.303	0.026	3.479
Comorbid with other CTDs	1.077	0.181	4.226	0.512	34.918
Anti-Ro52	1.000	0.051	7.054	0.994	50.077
Anti-SSA	1.744	0.317	0.175	0.006	5.339
ILD	0.836	0.585	0.634	0.123	3.258
PAH	1.150	0.025	13.199	1.386	125.667
C3	2.134	0.945	0.864	0.013	56.642

Sleep time was a protective factor while anti-Ro52 and PAH were risk factors for depression in RA patients. CTD, connective tissue disease; ILD, interstitial lung disease; PAH, pulmonary arterial hypertension.

Supplementary Table S2.4 Multivariate logistic regression analysis of risk factors for depression in patients with other CTDs (including SSc, IIM and MCTD)

	S.E	<i>p</i> value	OR	95%CI	
				Lower limit	Upper limit
Sleep time	0.187	0.912	1.021	0.707	1.474
Gender	0.315	0.675	0.768	0.223	2.641
Anti-Ro52	0.699	0.004	7.441	1.892	29.275
Anti-SSA	1.254	0.737	1.523	0.130	17.767
ILD	0.677	0.553	1.495	0.396	5.636
PAH	0.937	0.510	1.855	0.296	11.643
C3	1.477	0.662	0.525	0.029	9.490

Anti-Ro52 was a risk factor for depression in patients with other CTDs including SSc, IIM and MCTD. CTD, connective tissue disease; SSc, sclerosis; IIM, inflammatory idiopathic myopathy; MCTD, mixed connective tissue disease; ILD, interstitial lung disease; PAH, pulmonary arterial hypertension.

Supplementary Table S3.1 Multivariate logistic regression analysis of risk factors for anxiety in SLE

patients

	S.E	<i>p</i> value	OR	95%CI	
				Lower limit	Upper limit
Sleep time	0.192	0.005	0.582	0.399	0.848
Comorbid with other CTDs	0.674	0.076	3.304	0.881	12.390
Anti-Ro52	0.648	0.002	7.541	2.117	26.859
Anti-SSA	0.681	0.099	0.325	0.086	1.235
Anti-SSB	1.009	0.873	1.175	0.163	8.496
ILD	0.924	0.593	0.610	0.100	3.731
PAH	0.733	0.731	0.777	0.185	3.268
C3	1.368	0.304	4.084	0.280	59.625
IgG	0.047	0.873	1.008	0.918	1.106

Sleep time was a protective factor while anti-Ro52 was a risk factor for anxiety in SLE patients.

CTD, connective tissue disease; ILD, interstitial lung disease; PAH, pulmonary arterial hypertension.

Supplementary Table S3.2 Multivariate logistic regression analysis of risk factors for anxiety in SS patients

	S.E	<i>p</i> value	OR	95%CI	
				Lower limit	Upper limit
Sleep time	0.231	0.002	0.490	0.312	0.770
Comorbid with other CTDs	0.640	0.164	0.410	0.117	1.438
Anti-Ro52	0.631	0.008	5.375	1.559	18.524
Anti-SSA	0.606	0.832	0.879	0.268	2.886
Anti-SSB	0.812	0.577	0.636	0.129	3.123
ILD	0.595	0.965	1.027	0.320	3.294
PAH	0.855	0.598	1.570	0.294	8.388
C3	1.406	0.858	0.777	0.049	12.226
IgG	0.037	0.208	1.048	0.974	1.128

Sleep time was a protective factor while anti-Ro52 was a risk factor for anxiety in SS patients. CTD, connective tissue disease; ILD, interstitial lung disease; PAH, pulmonary arterial hypertension.

Supplementary Table S3.3 Multivariate logistic regression analysis of risk factors for anxiety in RA patients

	S.E	<i>p</i> value	OR	95%CI	
				Lower limit	Upper limit
Sleep time	0.555	0.045	0.329	0.111	0.976
Comorbid with other CTDs	1.366	0.594	2.069	0.142	30.061
Anti-Ro52	1.419	0.010	38.216	2.367	616.970
ILD	1.161	0.154	0.129	<0.001	102.745
PAH	3.408	0.548	0.001	<0.001	0.773
C3	3.347	0.042	1.006	0.800	1.265
IgG	0.117	0.958	0.329	0.111	0.976

Sleep time was a protective factor while anti-Ro52 and complement C3 were risk factors for anxiety in RA patients. CTD, connective tissue disease; ILD, interstitial lung disease; PAH, pulmonary arterial hypertension.

Supplementary Table 3.4 Multivariate logistic regression analysis of risk factors for anxiety in patients with other CTDs (including SSc, IIM and MCTD)

	S.E	<i>p</i> value	OR	95%CI	
				Lower limit	Upper limit
Sleep time	0.194	0.651	0.916	0.626	1.340
Comorbid with other CTDs	1.062	0.437	2.284	0.285	18.300
Anti-Ro52	0.799	0.007	8.773	1.832	41.998
Anti-SSA	1.517	0.266	0.185	0.009	3.616
ILD	0.745	0.512	0.613	0.142	2.643
PAH	0.994	0.153	4.137	0.589	29.045
C3	1.523	0.322	0.221	0.011	4.374
IgG	0.070	0.453	1.054	0.919	1.209

Anti-Ro52 was a risk factor for anxiety in patients with other CTDs including SSc, IIM and MCTD.

CTD, connective tissue disease; ILD, interstitial lung disease; PAH, pulmonary arterial hypertension.

Supplementary Table S4.1 Univariate analysis of demographic, clinical and laboratory parameters
between SLE patients with or without depression

	Non-depression	Depression	Total	<i>p</i> value
	(n=46)	(n=46)		
Age (year)	43.2 (17.2)	50.2 (13.8)	46.7 (15.9)	0.034
Disease duration (year)	9.1 (9.2)	9.2 (8.5)	9.1 (8.8)	0.944
Education time (year)	10.2 (3.3)	9.4 (4.5)	9.8 (4.0)	0.601
Sleep time (hour)	6.6 (1.6)	5.8 (1.8)	6.2 (1.7)	0.038
Gender				0.726
Male	5 (10.9)	4 (8.7)	9 (9.8)	
Female	41 (89.1)	42 (91.3)	83 (90.2)	
Marital status				0.229
Unmarried	32 (69.6)	37 (80.4)	69 (75)	
Married/Divorced or widowed	14 (30.4)	9 (19.6)	23 (25)	
Comorbid illness				
Other CTDs				0.015
Yes	6 (13)	16 (34.8)	22 (23.9)	
No	40 (87)	30 (65.2)	70 (76.1)	
Thyroid disease				0.099
Yes	5 (10.9)	11 (23.9)	16 (17.4)	
No	41 (89.1)	35 (76.1)	76 (82.6)	

Diabetes				0.139
Yes	2 (4.3)	6 (13)	8 (8.7)	
No	44 (95.7)	40 (87)	84 (91.3)	
Other chronic diseases				0.093
Yes	12 (26.7)	20 (43.5)	32 (35.2)	
No	33 (73.3)	26 (56.5)	59 (64.8)	
Anti-Ro52				0.004
(+)	16 (34.8)	30 (65.2)	46 (50)	
(-)	30 (65.2)	16 (34.8)	46 (50)	
aPLs				0.797
(+)	9 (19.6)	10 (21.7)	19 (20.7)	
(-)	37 (80.4)	36 (78.3)	73 (79.3)	
Anti-Rib-P				0.195
(+)	14 (30.4)	20 (43.5)	34 (37)	
(-)	32 (69.6)	26 (56.5)	58 (63)	
Anti-SSA				0.677
(+)	22 (47.8)	24 (52.2)	46 (50)	
(-)	24 (52.2)	22 (47.8)	46 (50)	
Anti-SSB				0.694
(+)	3 (6.5)	4 (8.7)	7 (7.6)	
(-)	43 (93.5)	42 (91.3)	85 (92.4)	
Anti-RNP/Sm				0.830

(+)	17 (37)	18 (39.1)	35 (38)	
(-)	29 (63)	28 (60.9)	57 (62)	
Anti-CENP-B				0.694
(+)	3 (6.5)	4 (8.7)	7 (7.6)	
(-)	43 (93.5)	42 (91.3)	85 (92.4)	
ILD				0.108
Yes	3 (6.5)	8 (17.4)	11 (12)	
No	43 (93.5)	38 (82.6)	81 (88)	
PAH				0.214
Yes	8 (17.4)	13 (28.3)	21 (22.8)	
No	38 (82.6)	33 (71.7)	71 (77.2)	
ESR (mm/h)	41.88 (41.38)	52.59 (39.69)	47.23 (40.65)	0.124
CRP (mg/L)	6.48 (12.74)	11.68 (18.18)	9.14 (15.88)	0.019
C3 (g/L)	0.62 (0.18)	0.58 (0.20)	0.6 (0.19)	0.349
C4 (g/L)	0.12 (0.06)	0.14 (0.07)	0.13 (0.06)	0.300
IgG (g/L)	14.33 (6.36)	14.68 (5.05)	14.51 (5.70)	0.377

Age, sleep time, presence of comorbid CTDs, presence of anti-Ro52, and CRP level were significantly different between the two groups ($P<0.05$). CTD, connective tissue disease; aPLs, antiphospholipid antibodies; ILD, interstitial lung disease; PAH, pulmonary arterial hypertension; ESR, erythrocyte sedimentation rate; CRP, C-reactive protein.

Supplementary Table S4.2 Multivariate logistic regression analysis of parameters with statistical significance in the univariate analysis for SLE patients with depression

	S.E	<i>p</i> value	OR	95%CI	
				Lower limit	Upper limit
Age	0.017	0.166	1.024	0.990	1.058
Sleep time	0.147	0.184	0.822	0.617	1.097
Comorbid with other CTDs	0.630	0.229	2.133	0.621	7.327
Anti-Ro52	0.496	0.021	3.128	1.184	8.263
CRP	0.018	0.066	1.034	0.998	1.071

Anti-Ro52 was a risk factor for depression in SLE patients. CTD, connective tissue disease; CRP, C-reactive protein.

Supplementary Table S5.1 Univariate analysis of demographic, clinical and laboratory parameters

between SS patients with or without depression

	Non-depression	Depression	Total	<i>p</i>
	(n=45)	(n=62)		value
Age (year)	61.3 (9.4)	59.4 (12.2)	60.2 (11.1)	0.611
Disease duration (year)	6.4 (7.8)	4.8 (5.6)	5.4 (6.6)	0.410
Education time (year)	7.6 (4.4)	8.6 (4.2)	8.2 (4.3)	0.5628
Sleep time (hour)	6.6 (1.4)	5.5 (1.4)	5.9 (1.5)	<.000
Gender				0.965
Male	3 (6.7)	4 (6.5)	7 (6.5)	
Female	42 (93.3)	58 (93.5)	100 (93.5)	
Marital status				0.538
Unmarried	39 (86.7)	51 (82.3)	90 (84.1)	
Married/Divorced or widowed	6 (13.3)	11 (17.7)	17 (15.9)	
Comorbid illness				
Other CTDs				0.976
Yes	11 (24.4)	15 (24.2)	26 (24.3)	
No	34 (75.6)	47 (75.8)	81 (75.7)	
thyroid disease				0.876
Yes	10 (22.2)	13 (21)	23 (21.5)	
No	35 (77.8)	49 (79)	84 (78.5)	

Diabetes				0.212
Yes	9 (20)	7 (11.3)	16 (15)	
No	36 (80)	55 (88.7)	91 (85)	
Other chronic diseases				0.769
Yes	19 (43.2)	25 (40.3)	44 (41.5)	
No	25 (56.8)	37 (59.7)	62 (58.5)	
Anti-Ro52				<.000
(+)	16 (35.6)	47 (75.8)	63 (58.9)	
(-)	29 (64.4)	15 (24.2)	44 (41.1)	
aPLs				0.381
(+)	2 (4.4)	1 (1.6)	3 (2.8)	
(-)	43 (95.6)	61 (98.4)	104 (97.2)	
Anti-Rib-P				0.135
(+)	0 (0)	3 (4.8)	3 (2.8)	
(-)	45 (100)	59 (95.2)	104 (97.2)	
Anti-SSA				0.811
(+)	20 (44.4)	29 (46.8)	49 (45.8)	
(-)	25 (55.6)	33 (53.2)	58 (54.2)	
Anti-SSB				0.059
(+)	5 (11.1)	16 (25.8)	21 (19.6)	
(-)	40 (88.9)	46 (74.2)	86 (80.4)	
Anti-RNP/Sm				0.405

(+)	3 (6.7)	2 (3.2)	5 (4.7)	
(-)	42 (93.3)	60 (96.8)	102 (95.3)	
Anti-CENP-B				0.767
(+)	9 (20)	11 (17.7)	20 (18.7)	
(-)	36 (80)	51 (82.3)	87 (81.3)	
ILD				0.214
Yes	10 (22.7)	21 (33.9)	31 (29.2)	
No	34 (77.3)	41 (66.1)	75 (70.8)	
PAH				0.090
Yes	2 (4.4)	9 (14.5)	11 (10.3)	
No	43 (95.6)	53 (85.5)	96 (89.7)	
ESR (mm/h)	47.21 (39.46)	60.4 (44.65)	54.73 (42.79)	0.143
CRP (mg/L)	10.36 (18.29)	21.19 (36.74)	16.57 (30.62)	0.370
C3 (g/L)	0.82 (0.18)	0.78 (0.18)	0.8 (0.18)	0.073
C4 (g/L)	0.2 (0.06)	0.2 (0.08)	0.2 (0.07)	0.707
IgG (g/L)	16.53 (14.80)	16.96 (8.14)	16.78 (11.30)	0.251

Sleep time and presence of anti-Ro52 were significantly different between the two groups (P<0.05).

CTD, connective tissue disease; aPLs, antiphospholipid antibodies; ILD, interstitial lung disease;

PAH, pulmonary arterial hypertension; ESR, erythrocyte sedimentation rate; CRP, C-reactive protein.

Supplementary Table S5.2 Multivariate logistic regression analysis of parameters with statistical significance in the univariate analysis for SS patients with depression

	S.E	<i>p</i> value	OR	95%CI	
				Lower limit	Upper limit
Sleep time	0.180	0.002	0.576	0.404	0.820
Anti-Ro52	0.463	0.000	5.704	2.303	14.127

Sleep time was a protective factor while anti-Ro52 was a risk factor for depression in SS patients.

Supplementary Table S6.1 Univariate analysis of demographic, clinical and laboratory parameters
between RA patients with or without depression

	Non-depression (n=42)	Depression (n=22)	Total	<i>p</i> value
Age (year)	62.1 (11.8)	65.9 (11.7)	63.4 (11.8)	0.157
Disease duration (year)	12.7 (15.4)	16.7 (16.6)	14.1 (15.8)	0.324
Education time (year)	7.8 (4.0)	9.2 (4.2)	8.3 (4.1)	0.174
Sleep time (hour)	6.5 (0.8)	5.7 (1.2)	6.2 (1.0)	0.005
Gender				0.297
Male	8 (19)	2 (9.1)	10 (15.6)	
Female	34 (81)	20 (90.9)	54 (84.4)	
Marital status				0.493
Unmarried	37 (88.1)	18 (81.8)	55 (85.9)	
Married/Divorced or widowed	5 (11.9)	4 (18.2)	9 (14.1)	
Comorbid illness				
Other CTDs				0.029
Yes	2 (4.8)	5 (22.7)	7 (10.9)	
No	40 (95.2)	17 (77.3)	57 (89.1)	
Thyroid disease				0.933
Yes	8 (19)	4 (18.2)	12 (18.8)	
No	34 (81)	18 (81.8)	52 (81.3)	

Diabetes				0.122
Yes	5 (11.9)	6 (27.3)	11 (17.2)	
No	37 (88.1)	16 (72.7)	53 (82.8)	
Other chronic diseases				0.191
Yes	25 (61)	17 (77.3)	42 (66.7)	
No	16 (39)	5 (22.7)	21 (33.3)	
Anti-Ro52				0.003
(+)	3 (7.1)	8 (36.4)	11 (17.2)	
(-)	39 (92.9)	14 (63.6)	53 (82.8)	
Anti-SSA				0.969
(+)	2 (4.8)	1 (4.5)	3 (4.7)	
(-)	40 (95.2)	21 (95.5)	61 (95.3)	
Anti-RNP/Sm				0.636
(+)	1 (2.4)	1 (4.5)	2 (3.1)	
(-)	41 (97.6)	21 (95.5)	62 (96.9)	
Anti-CENP-B				0.199
(+)	3 (7.1)	0 (0)	3 (4.7)	
(-)	39 (92.9)	22 (100)	61 (95.3)	
ILD				0.787
Yes	12 (28.6)	7 (31.8)	19 (29.7)	
No	30 (71.4)	15 (68.2)	45 (70.3)	
PAH				0.397

Yes	3 (7.1)	3 (13.6)	6 (9.4)	
No	39 (92.9)	19 (86.4)	58 (90.6)	
ESR (mm/h)	68.29 (43.72)	78.09 (45.51)	71.66 (44.23)	0.384
CRP (mg/L)	29.49 (33.84)	25.62 (31.78)	28.14 (32.93)	0.989
C3 (g/L)	0.90 (0.18)	0.89 (0.15)	0.89 (0.17)	0.860
C4 (g/L)	0.22 (0.06)	0.87 (3.02)	0.44 (1.77)	0.671
IgG (g/L)	14.24 (4.85)	12.75 (4.48)	13.73 (4.74)	0.233

Sleep time, presence of comorbid CTDs and presence of anti-Ro52 were significantly different between the two groups ($P<0.05$). CTD, connective tissue disease; aPLs, antiphospholipid antibodies; ILD, interstitial lung disease; PAH, pulmonary arterial hypertension; ESR, erythrocyte sedimentation rate; CRP, C-reactive protein.

Supplementary Table S6.2 Multivariate logistic regression analysis of parameters with statistical significance in the univariate analysis for RA patients with depression

	S.E	<i>p</i> value	OR	95%CI	
				Lower limit	Upper limit
Sleep time	0.329	0.015	0.450	0.236	0.858
Comorbid with other CTDs	0.945	0.084	5.695	1.207	26.867
Anti-Ro52	0.792	0.028	5.111	0.802	32.576

Sleep time was a protective factor while anti-Ro52 was a risk factors for depression in RA patients.

CTD, connective tissue disease.

Supplementary Table S7.1 Univariate analysis of demographic, clinical and laboratory parameters
between Other CTD patients with or without depression

	Non-depression (n=63)	Depression (n=26)	Total	<i>p</i> value
Age (year)	59.0 (18.2)	60.0 (14.1)	59.1 (17.0)	0.876
Disease duration (year)	4.7 (8.7)	4.1 (8.3)	4.5 (8.6)	0.960
Education time (year)	8.4 (5.2)	7.7 (4.6)	8.2 (5.0)	0.614
Sleep time (hour)	6.2 (1.4)	5.8 (1.9)	6.1 (1.5)	0.073
Gender				0.605
Male	23 (36.5)	8 (30.8)	31 (34.8)	
Female	40 (63.5)	18 (69.2)	58 (65.2)	
Marital status				0.095
Unmarried	53 (84.1)	24 (92.3)	77 (86.5)	
Married/Divorced or widowed	10 (15.9)	2 (7.7)	12 (13.5)	
Comorbid illness				
Other CTDs				0.139
Yes	5 (7.9)	0 (0)	5 (5.6)	
No	58 (92.1)	26 (100)	84 (94.4)	
Thyroid disease				0.941
Yes	15 (23.8)	6 (23.1)	21 (23.6)	
No	48 (76.2)	20 (76.9)	68 (76.4)	

Diabetes				0.736
Yes	8 (12.7)	4 (15.4)	12 (13.5)	
No	55 (87.3)	22 (84.6)	77 (86.5)	
Other chronic diseases				0.281
Yes	25 (40.3)	7 (28)	32 (36.8)	
No	37 (59.7)	18 (72)	55 (63.2)	
Anti-Ro52				<.000
(+)	7 (11.1)	15 (57.7)	22 (24.7)	
(-)	56 (88.9)	11 (42.3)	67 (75.3)	
aPLs				0.258
(+)	3 (4.8)	0 (0)	3 (3.4)	
(-)	60 (95.2)	26 (100)	86 (96.6)	
Anti-SSA				0.119
(+)	2 (3.2)	3 (11.5)	5 (5.6)	
(-)	61 (96.8)	23 (88.5)	84 (94.4)	
Anti-RNP/Sm				0.513
(+)	1 (1.6)	1 (3.8)	2 (2.2)	
(-)	62 (98.4)	25 (96.2)	87 (97.8)	
Anti-CENP-B				0.358
(+)	2 (3.2)	0 (0)	2 (2.2)	
(-)	61 (96.8)	26 (100)	87 (97.8)	
ILD				0.014

Yes	11 (17.5)	11 (42.3)	22 (24.7)	
No	52 (82.5)	15 (57.7)	67 (75.3)	
PAH				0.289
Yes	5 (7.9)	4 (15.4)	9 (10.1)	
No	58 (92.1)	22 (84.6)	80 (89.9)	
ESR (mm/h)	57.64 (42.24)	59.65 (33.36)	58.19 (39.82)	0.458
CRP (mg/L)	31.44 (44.48)	30.20 (49.42)	31.08 (45.67)	0.622
C3 (g/L)	0.91 (0.23)	0.88 (0.13)	0.90 (0.20)	1.000
C4 (g/L)	0.81 (4.36)	0.23 (0.07)	0.64 (3.66)	0.958
IgG (g/L)	14.03 (4.10)	14.97 (5.06)	14.31 (4.40)	0.497

Presence of anti-Ro52 and ILD were significantly different between the two groups ($P<0.05$). CTD, connective tissue disease; aPLs, antiphospholipid antibodies; ILD, interstitial lung disease; PAH, pulmonary arterial hypertension; ESR, erythrocyte sedimentation rate; CRP, C-reactive protein.

Supplementary Table S7.2 Multivariate logistic regression analysis of parameters with statistical significance in the univariate analysis for Other CTD patients with depression

	S.E	<i>p</i> value	OR	95%CI	
				Lower limit	Upper limit
Anti-Ro52	0.599	0.000	9.220	2.849	29.837
ILD	0.621	0.445	1.607	0.476	5.431

Anti-Ro52 was a risk factor for depression in patients with Other CTDs including SSc, IIM, and MCTD. CTD, connective tissue disease; ILD, interstitial lung disease; SSc, sclerosis; IIM, inflammatory idiopathic myopathy; MCTD, mixed connective tissue disease.

Supplementary Table S8.1 Univariate analysis of demographic, clinical and laboratory parameters
between SLE patients with or without anxiety

	Non-anxiety (n=50)	Anxiety (n=42)	Total	<i>p</i> value
Age (year)	42.9 (16.8)	51.2 (13.5)	46.7 (15.9)	0.012
Disease duration (year)	7.9 (8.7)	10.5 (8.8)	9.1 (8.8)	0.132
Education time (year)	10.0 (3.7)	9.6 (4.4)	9.8 (4.0)	0.726
Sleep time (hour)	6.8 (1.7)	5.5 (1.5)	6.2 (1.7)	0.001
Gender				0.435
Male	6 (12)	3 (7.1)	9 (9.8)	
Female	44 (88)	39 (92.9)	83 (90.2)	
Marital status				0.227
Unmarried	35 (70)	34 (81)	69 (75)	
Married/Divorced or widowed	15 (30)	8 (19)	23 (25)	
Comorbid illness				
Other CTDs				0.015
Yes	7 (14)	15 (35.7)	22 (23.9)	
No	43 (86)	27 (64.3)	70 (76.1)	
Thyroid disease				0.041
Yes	5 (10)	11 (26.2)	16 (17.4)	
No	45 (90)	31 (73.8)	76 (82.6)	

Diabetes				0.796
Yes	4 (8)	4 (9.5)	8 (8.7)	
No	46 (92)	38 (90.5)	84 (91.3)	
Other chronic diseases				0.114
Yes	14 (28)	18 (43.9)	32 (35.2)	
No	36 (72)	23 (56.1)	59 (64.8)	
Anti-Ro52				0.001
(+)	17 (34)	29 (69)	46 (50)	
(-)	33 (66)	13 (31)	46 (50)	
aPLs				0.387
(+)	12 (24)	7 (16.7)	19 (20.7)	
(-)	38 (76)	35 (83.3)	73 (79.3)	
Anti-Rib-P				0.821
(+)	19 (38)	15 (35.7)	34 (37)	
(-)	31 (62)	27 (64.3)	58 (63)	
Anti-SSA				0.676
(+)	24 (48)	22 (52.4)	46 (50)	
(-)	26 (52)	20 (47.6)	46 (50)	
Anti-SSB				0.877
(+)	4 (8)	3 (7.1)	7 (7.6)	.
(-)	46 (92)	39 (92.9)	85 (92.4)	
Anti-RNP/Sm				0.993

(+)	19 (38)	16 (38.1)	35 (38)	.
(-)	31 (62)	26 (61.9)	57 (62)	
Anti-CENP-B				0.525
(+)	3 (6)	4 (9.5)	7 (7.6)	
(-)	47 (94)	38 (90.5)	85 (92.4)	
ILD				0.202
Yes	4 (8)	7 (16.7)	11 (12)	
No	46 (92)	35 (83.3)	81 (88)	
PAH				0.229
Yes	9 (18)	12 (28.6)	21 (22.8)	
No	41 (82)	30 (71.4)	71 (77.2)	
ESR (mm/h)	48.45 (41.06)	45.82 (40.68)	47.23 (40.65)	0.679
CRP (mg/L)	9.38 (18.16)	8.87 (13.00)	9.14 (15.88)	0.703
C3 (g/L)	0.60 (0.20)	0.60 (0.17)	0.60 (0.19)	0.999
C4 (g/L)	0.12 (0.06)	0.14 (0.06)	0.13 (0.06)	0.192
IgG (g/L)	14.36 (5.92)	14.68 (5.51)	14.51 (5.70)	0.654

Age, sleep time, presence of comorbid CTDs, presence of thyroid disease, and presence of anti-Ro52 were significantly different between the two groups ($P < 0.05$). CTD, connective tissue disease; aPLs, antiphospholipid antibodies; ILD, interstitial lung disease; PAH, pulmonary arterial hypertension; ESR, erythrocyte sedimentation rate; CRP, C-reactive protein.

Supplementary Table S8.2 Multivariate logistic regression analysis of parameters with statistical significance in the univariate analysis for SLE patients with anxiety

	S.E	<i>p</i> value	OR	95%CI	
				Lower limit	Upper limit
Age	0.017	0.156	1.025	0.991	1.060
Sleep time	0.170	0.006	0.627	0.450	0.874
Comorbid with other CTDs	0.630	0.229	2.135	0.621	7.345
Thyroid disease	0.682	0.058	3.645	0.958	13.867
Anti-Ro52	0.519	0.007	4.037	1.459	11.167

Sleep time was a protective factor while anti-Ro52 was a risk factor for anxiety in SLE patients.

CTD, connective tissue disease.

Supplementary Table S9.1 Univariate analysis of demographic, clinical and laboratory parameters

between SS patients with or without anxiety

	Non-anxiety	Anxiety	Total	<i>p</i> value
	(n=49)	(n=58)		
Age (year)	61.3 (10.7)	59.3 (11.4)	60.2 (11.1)	0.425
Disease duration (year)	6.3 (7.8)	4.7 (5.4)	5.4 (6.6)	0.649
Education time (year)	7.9 (4.5)	8.4 (4.2)	8.2 (4.3)	0.734
Sleep time (hour)	6.6 (1.6)	5.4 (1.2)	5.9 (1.5)	<.000
Gender				0.872
Male	3 (6.1)	4 (6.9)	7 (6.5)	
Female	46 (93.9)	54 (93.1)	100 (93.5)	
Marital status				0.343
Unmarried	43 (87.8)	47 (81)	90 (84.1)	
Married/Divorced or widowed	6 (12.2)	11 (19)	17 (15.9)	
Comorbid illness				
Other CTDs				0.344
Yes	14 (28.6)	12 (20.7)	26 (24.3)	
No	35 (71.4)	46 (79.3)	81 (75.7)	
Thyroid disease				0.801
Yes	10 (20.4)	13 (22.4)	23 (21.5)	
No	39 (79.6)	45 (77.6)	84 (78.5)	

Diabetes				0.146
Yes	10 (20.4)	6 (10.3)	16 (15)	
No	39 (79.6)	52 (89.7)	91 (85)	
Other chronic diseases				0.670
Yes	21 (43.8)	23 (39.7)	44 (41.5)	
No	27 (56.3)	35 (60.3)	62 (58.5)	
Anti-Ro52				0.000
(+)	19 (38.8)	44 (75.9)	63 (58.9)	
(-)	30 (61.2)	14 (24.1)	44 (41.1)	
aPLs				0.462
(+)	2 (4.1)	1 (1.7)	3 (2.8)	
(-)	47 (95.9)	57 (98.3)	104 (97.2)	
Anti-Rib-P				0.660
(+)	1 (2)	2 (3.4)	3 (2.8)	
(-)	48 (98)	56 (96.6)	104 (97.2)	
Anti-SSA				0.342
(+)	20 (40.8)	29 (50)	49 (45.8)	
(-)	29 (59.2)	29 (50)	58 (54.2)	
Anti-SSB				0.201
(+)	7 (14.3)	14 (24.1)	21 (19.6)	
(-)	42 (85.7)	44 (75.9)	86 (80.4)	
Anti-RNP/Sm				0.116

(+)	4 (8.2)	1 (1.7)	5 (4.7)	
(-)	45 (91.8)	57 (98.3)	102 (95.3)	
Anti-CENP-B				0.676
(+)	10 (20.4)	10 (17.2)	20 (18.7)	
(-)	39 (79.6)	48 (82.8)	87 (81.3)	
ILD				0.193
Yes	11 (22.9)	20 (34.5)	31 (29.2)	
No	37 (77.1)	38 (65.5)	75 (70.8)	
PAH				0.193
Yes	3 (6.1)	8 (13.8)	11 (10.3)	
No	46 (93.9)	50 (86.2)	96 (89.7)	
ESR (mm/h)	49.55 (42.29)	59.32 (43.11)	54.73 (42.79)	0.167
CRP (mg/L)	11.70 (28.00)	20.81 (32.40)	16.57 (30.62)	0.196
C3 (g/L)	0.81 (0.18)	0.79 (0.18)	0.80 (0.18)	0.459
C4 (g/L)	0.20 (0.06)	0.20 (0.08)	0.20 (0.07)	0.974
IgG (g/L)	14.59 (6.42)	18.58 (13.91)	16.78 (11.30)	0.016

Sleep time, presence of anti-Ro52 and serum level of IgG were significantly different between the two groups ($P<0.05$). CTD, connective tissue disease; aPLs, antiphospholipid antibodies; ILD, interstitial lung disease; PAH, pulmonary arterial hypertension; ESR, erythrocyte sedimentation rate; CRP, C-reactive protein.

Supplementary Table S9.2 Multivariate logistic regression analysis of parameters with statistical significance in the univariate analysis for SS patients with anxiety

	S.E	<i>p</i> value	OR	95%CI	
				Lower limit	Upper limit
Sleep time	0.222	0.001	0.487	0.315	0.753
Anti-Ro52	0.509	0.005	4.164	1.537	11.285
IgG	0.034	0.152	1.050	0.982	1.123

Sleep time was a protective factor while anti-Ro52 was a risk factor for anxiety in SS patients.

Supplementary Table S10.1 Univariate analysis of demographic, clinical and laboratory parameters

between RA patients with or without anxiety

	Non-anxiety	Anxiety	Total	<i>p</i> value
	(n=51)	(n=13)		
Age (year)	62.5 (12.1)	67.2 (10.1)	63.4 (11.8)	0.176
Disease duration (year)	13.5 (15.9)	16.4 (15.7)	14.1 (15.8)	0.505
Education time (year)	8.3 (4.0)	8.3 (4.6)	8.3 (4.1)	0.864
Sleep time (hour)	6.4 (0.9)	5.5 (1.1)	6.2 (1.0)	0.008
Gender				0.407
Male	7 (13.7)	3 (23.1)	10 (15.6)	
Female	44 (86.3)	10 (76.9)	54 (84.4)	
Marital status				0.295
Unmarried	45 (88.2)	10 (76.9)	55 (85.9)	
Married/Divorced or widowed	6 (11.8)	3 (23.1)	9 (14.1)	
Comorbid illness				
Other CTDs				0.116
Yes	4 (7.8)	3 (23.1)	7 (10.9)	
No	47 (92.2)	10 (76.9)	57 (89.1)	
Thyroid disease				0.214
Yes	8 (15.7)	4 (30.8)	12 (18.8)	
No	43 (84.3)	9 (69.2)	52 (81.3)	

Diabetes				0.528
Yes	8 (15.7)	3 (23.1)	11 (17.2)	
No	43 (84.3)	10 (76.9)	53 (82.8)	
Other chronic diseases				0.379
Yes	32 (64)	10 (76.9)	42 (66.7)	
No	18 (36)	3 (23.1)	21 (33.3)	
Anti-Ro52				<.000
(+)	4 (7.8)	7 (53.8)	11 (17.2)	
(-)	47 (92.2)	6 (46.2)	53 (82.8)	
aPLs				0.046
(+)	0 (0)	1 (7.7)	1 (1.6)	
(-)	51 (100)	12 (92.3)	63 (98.4)	
Anti-Rib-P				0.046
(+)	0 (0)	1 (7.7)	1 (1.6)	
(-)	51 (100)	12 (92.3)	63 (98.4)	
Anti-SSA				0.041
(+)	1 (2)	2 (15.4)	3 (4.7)	
(-)	50 (98)	11 (84.6)	61 (95.3)	
Anti-RNP/Sm				0.289
(+)	1 (2)	1 (7.7)	2 (3.1)	
(-)	50 (98)	12 (92.3)	62 (96.9)	
Anti-CENP-B				0.370

(+)	3 (5.9)	0 (0)	3 (4.7)	
(-)	48 (94.1)	13 (100)	61 (95.3)	
ILD				0.146
Yes	13 (25.5)	6 (46.2)	19 (29.7)	
No	38 (74.5)	7 (53.8)	45 (70.3)	
PAH				0.816
Yes	5 (9.8)	1 (7.7)	6 (9.4)	
No	46 (90.2)	12 (92.3)	58 (90.6)	
ESR (mm/h)	70.9 (44.64)	74.62 (44.22)	71.66 (44.23)	0.732
CRP (mg/L)	31.18 (35.89)	16.43 (12.48)	28.14 (32.93)	0.497
C3 (g/L)	0.91 (0.17)	0.83 (0.13)	0.89 (0.17)	0.127
C4 (g/L)	0.22 (0.06)	1.31 (3.94)	0.44 (1.77)	0.947
IgG (g/L)	13.53 (4.88)	14.52 (4.21)	13.73 (4.74)	0.504

Sleep time, presence of anti-Ro52, aPLs, anti-Rib-P and SSA were significantly different between the two groups ($P<0.05$). CTD, connective tissue disease; aPLs, antiphospholipid antibodies; ILD, interstitial lung disease; PAH, pulmonary arterial hypertension; ESR, erythrocyte sedimentation rate; CRP, C-reactive protein.

Supplementary Table S10.2 Multivariate logistic regression analysis of parameters with statistical significance in the univariate analysis for RA patients with anxiety

	S.E	<i>p</i> value	OR	95%CI	
				Lower limit	Upper limit
Sleep time	0.425	0.017	0.364	0.158	0.837
Anti-Ro52	0.901	0.005	12.302	2.105	71.878
Anti-SSA	1.524	0.055	18.535	0.935	367.366

Sleep time was a protective factor while anti-Ro52 was a risk factor for anxiety in RA patients. Due to the limited number of patients positive with aPLs and anti-Rib-P in this subgroup (only 1 case for each parameter as shown in table S10.1), no results were obtained by multivariate analysis.

Supplementary Table S11.1 Univariate analysis of demographic, clinical and laboratory parameters
between Other CTD patients with or without anxiety

	Non-anxiety (n=63)	Anxiety (n=26)	Total	<i>p</i> value
Age (year)	58.7 (18.0)	60.2 (14.8)	59.1 (17.0)	0.719
Disease duration (year)	5.4 (9.3)	2.4 (6.0)	4.5 (8.6)	0.375
Education time (year)	8.2 (5.3)	8.3 (4.1)	8.2 (5.0)	0.993
Sleep time (hour)	6.2 (1.5)	5.8 (1.7)	6.1 (1.5)	0.058
Gender				0.644
Male	21 (33.3)	10 (38.5)	31 (34.8)	
Female	42 (66.7)	16 (61.5)	58 (65.2)	
Marital status				0.095
Unmarried	53 (84.1)	24 (92.3)	77 (86.5)	
Married/Divorced or widowed	10 (15.9)	1 (7.7)	11 (13.5)	
Comorbid illness				
Other CTDs				0.585
Yes	3 (4.8)	2 (7.7)	5 (5.6)	
No	60 (95.2)	24 (92.3)	84 (94.4)	
Thyroid disease				0.941
Yes	15 (23.8)	6 (23.1)	21 (23.6)	
No	48 (76.2)	20 (76.9)	68 (76.4)	

Diabetes				0.304
Yes	10 (15.9)	2 (7.7)	12 (13.5)	
No	53 (84.1)	24 (92.3)	77 (86.5)	
Other chronic diseases				0.281
Yes	25 (40.3)	7 (28)	32 (36.8)	
No	37 (59.7)	18 (72)	55 (63.2)	
Anti-Ro52				<.000
(+)	8 (12.7)	14 (53.8)	22 (24.7)	
(-)	55 (87.3)	12 (46.2)	67 (75.3)	
aPLs				0.873
(+)	2 (3.2)	1 (3.8)	3 (3.4)	
(-)	61 (96.8)	25 (96.2)	86 (96.6)	
Anti-Rib-P				0.873
(+)	0 (0)	0 (0)	0 (0)	
(-)	63 (100)	26 (100)	89 (100)	
Anti-SSA				0.585
(+)	3 (4.8)	2 (7.7)	5 (5.6)	
(-)	60 (95.2)	24 (92.3)	84 (94.4)	
Anti-RNP/Sm				0.513
(+)	1 (1.6)	1 (3.8)	2 (2.2)	
(-)	62 (98.4)	25 (96.2)	87 (97.8)	
Anti-CENP-B				0.358

(+)	2 (3.2)	0 (0)	2 (2.2)	
(-)	61 (96.8)	26 (100)	87 (97.8)	
ILD				0.164
Yes	13 (20.6)	9 (34.6)	22 (24.7)	
No	50 (79.4)	17 (65.4)	67 (75.3)	
PAH				0.067
Yes	4 (6.3)	5 (19.2)	9 (10.1)	
No	59 (93.7)	21 (80.8)	80 (89.9)	
ESR (mm/h)	57.51 (41.14)	60.00 (36.88)	58.19 (39.82)	0.571
CRP (mg/L)	32.48 (47.51)	27.63 (41.44)	31.08 (45.67)	0.800
C3 (g/L)	0.92 (0.22)	0.87 (0.12)	0.9 (0.20)	0.487
C4 (g/L)	0.81 (4.36)	0.23 (0.07)	0.64 (3.66)	0.873
IgG (g/L)	13.92 (3.89)	15.28 (5.45)	14.31 (4.40)	0.458

Presence of anti-Ro52 was significantly different between the two groups ($P<0.05$). CTD, connective tissue disease; aPLs, antiphospholipid antibodies; ILD, interstitial lung disease; PAH, pulmonary arterial hypertension; ESR, erythrocyte sedimentation rate; CRP, C-reactive protein.

Supplementary Table S11.2 Multivariate logistic regression analysis of parameters with statistical significance in the univariate analysis for Other CTD patients with anxiety

	S.E	<i>p</i> value	OR	95%CI	
				Lower limit	Upper limit
Anti-Ro52	0.5458	0.000	8.021	2.752	23.380

Anti-Ro52 was a risk factor for anxiety in patients with Other CTDs including SSc, IIM, and MCTD. CTD, connective tissue disease; ILD, interstitial lung disease; SSc, sclerosis; IIM, inflammatory idiopathic myopathy; MCTD, mixed connective tissue disease.