

# Functional and mental health affection (depression, anxiety, stress) among Egyptian rheumatic diseases patients during COVID-19 pandemic

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**Abstract.** – **OBJECTIVE:** Psychological distress caused by the SARS-CoV-2 outbreak has had deleterious effects on patients with chronic rheumatic disease, as those patients were highly susceptible for COVID-19 infection due to their chronicity, in addition to use of immunosuppressive drugs. Therefore, they underwent to more isolation than other people and develop more stress and depression. This study aimed at evaluating level of depression, anxiety, stress symptoms and physical health status in Egyptian patients with various rheumatic diseases during COVID-19 pandemic.

**PATIENTS AND METHODS:** This is a cross-sectional study conducted in Gharbia Governorate, Egypt. It included 440 diagnosed cases of rheumatic diseases from 1st to the end of March 2021. Depression, Anxiety and Stress Scale-21 (DASS21) and RAPID3/MDHAQ test were used to assess the pandemic's psychological and functional effect on participants.

**RESULTS:** RAPID3 test results showed that during the COVID-19 outbreak the 40% of patients had a moderate severity functional affection and 20% had high severity. DASS21 depression scoring showed mild to moderate depression (33% and 35%, respectively), while severe depression was detected in only 3.2% of cases. Moderate anxiety was reported in 49% of cases, 29% had severe anxiety while 1% showed extremely severe anxiety. Mild to moderate stress was reported in 17% and 16%, respectively. Female and cases aged more than 45 years had significantly more severe functional affection recorded by RAPID3 test, moderate stress and

severe anxiety. On the other hand, severe depression was significantly higher in male and young patients younger than 45 years old.

**CONCLUSIONS:** Rheumatic disease patients have been highly susceptible to functional affection and psychological distress related to COVID-19 pandemic. Planning and implementation of programs to enforce coping strategies for these patients are required.

#### Key Words:

Rheumatoid arthritis (RA), COVID-19, Routine assessment of patient index data 3 (RAPID3), Depression, Anxiety, Stress scale (DASS21).

## Introduction

Coronavirus pandemic (COVID-19) is an extreme health, economic and social emergency, with at least 3,023,788 of confirmed cases worldwide<sup>1</sup>. The pandemic caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), started in Wuhan, China, at the beginning of December 2019, and the World Health Organization defined it as pandemic on 11 March 2020<sup>2,3</sup>.

The COVID-19 pandemic led to people distancing, isolation, health and economic problems and harmful spread of false information. People, in particular patients and health professionals, have been under a great mental pressure

that might have led to short- and long-term psychological diseases like stress, anxiety, apprehension, depression and post-traumatic stress disorders<sup>4,5</sup>.

Rheumatic diseases patients are those suffering from rheumatoid arthritis, lupus, scleroderma, Sjogren's disease, gout, psoriatic arthritis, spondyloarthropthies, inflammatory myositis, fibromyalgia, or others. The chronic nature of this disease, the use of glucocorticoids at high doses, the high susceptibility to infections, the long hospitalization, and the brain affection by inflammation, put these patients at higher risk of developing associated psychiatric diseases. Some studies<sup>6</sup> reported a prevalence of anxiety and depression up to 40% among these patients.

Rheumatic diseases patients are highly susceptible for developing COVID-19 infection due to their chronicity in addition to the use of immunosuppressive drugs, but they have also been facing many problems, like decreased drug availability, issues in reaching health services, and risks of physical inactivity resulting from staying at home. All these quarantine related problems may produce depression, anxiety, and general psychological distress among those patients<sup>7</sup>.

This cross-sectional study aimed at detecting the level of depression, anxiety and stress symptoms along with physical function impairment among patients with various rheumatic diseases during COVID-19 pandemic.

## Patients and Methods

### Study Design and Sample

This represents a cross-sectional study conducted in Gharbia Governorate, Egypt. It included all accessible rheumatic disease patients treated in Rheumatology, Rehabilitation & Physical Medicine Department, at Tanta University. The sample size was 384, it was calculated using Epi-Info program of statistics version 7.1.5.2 at confidence level 95% and confidence limits 5%. Cases were recruited from the 1<sup>st</sup> to the end of March 2021; for a better accuracy and validity, 440 cases were included in the study.

Inclusion criteria: rheumatic disease patients, diagnosed according to the European League Against Rheumatism (EULAR) classification criteria of each disease.

Exclusion criteria: non-rheumatic disease patients.

### Data Collection and Instruments

A semi-structured pre-tested questionnaire was used for data collection and developed based on the associated reviews of literature and statistical experts in the medical college who assessed its validity and reliability. The questionnaire was translated into Arabic language and checked for completeness and consistency. Also, it was field-tested on a pilot sample of 38 cases (10% of the target sample) to clarify any ambiguities and to ensure a proper understanding of the questionnaire. Some modifications were added after pilot testing, to achieve higher internal consistency and reliability (Cronbach's  $\alpha = 0.82$ ). The pilot sample was not included in the final results of the study. The questionnaire was built on Google form; social networks were used to distribute it among rheumatic disease patients. It consisted of three sections: sociodemographic data, DASS-21 and RAPID3 test.

#### Section One

This section focused on participants' sociodemographic characteristics including gender, age, education, marital status, residence and income.

#### Section Two: DASS-21<sup>8</sup>

COVID-19 distress index was calculated using Depression, Anxiety and Stress Scale-21 items (DASS-21). DASS-21 is a set of three self-report scales measures the emotional states of depression, anxiety and stress. Each of the three DASS-21 scales contains seven questions, divided into subscales with similar content.

Scoring: each item has four answers (never = 0, rarely = 1, sometimes = 2, most of the time = 3), and the whole scoring rang is 0-63.

The depression scale measures discomfort (lack of satisfaction), despair, life devaluation, self-deprecation and ignorance/lack of involvement and disable. The anxiety scale measures autonomic arousal, effects appeared on skeletal muscles, situational confusion and self-experiencing the effect of anxiety. The stress scale measures levels of chronic nonspecific arousal (wakefulness), difficulties in relaxation, nervous stimulation, being easily upset/confused, irritable/over-reactive and impatient.

Scores were calculated by summation for the relevant items. The DASS-21 was based on a dimensional rather than a categorical conception of psychological disorder.

Recommended cut-off scores for depression are: normal = 0-9, mild = 10-13, moderate =

14-29, severe = 21-27 and extremely severe = 28+; anxiety scores are: normal = 0-7, mild: 8-9, moderate = 10-14, severe = 15-19, and extremely severe = 20+; stress scores are: normal = 0-14, mild = 15-18, moderate = 19-25, severe = 26-33 and extremely severe = 34+.

### Section Three: RAPID3 Test<sup>9</sup>

It is a Multi-Dimensional Health Assessment Questionnaire (MDHAQ) which includes 0-10 scores for physical function (in 10 activities), a pain, and a PGA (on 0-10 visual analogue scales VAS), for a total score range between 0 and 30, where Near Remission (NR): 1-3, Low Severity (LS): 4-6, Moderate Severity (MS): 7-12, High Severity (HS): 13-30.

RAPID3 is a clinical index that demonstrates how is the patient affected in his/her multiple contexts of life. It guides the physicians to determine the right time to change medications, for providing better management of the disease. Compared to other indexes, it results to have an advantage in clinical practice, since it considers pain and focuses on the patient's capacity to perform daily activities<sup>10</sup>.

### Statistical Analysis

The collected data were organized, tabulated and analysed using SPSS version 21 (Statistical Package for Social Sciences; IBM Corp., Armonk, NY, USA). Qualitative data were summarized as number and percentage and compared using Chi-square to test hypotheses. Quantitative data were presented as mean and standard deviation. The level of significance of *p*-value was 5%.

## Results

The study included 440 participants with various rheumatic diseases. 82% of them were aged more than 45 years with a mean age of  $40.75 \pm 14.12$ . Most participants were female 76.6%, of which married 58.9%, and 72.7% with a high education level. More than half of participants had enough and saving income (54.8%), of which the majority (77.3%) were urban resident. Regarding rheumatic disease type, 25.5% had osteoarthritis, 20.5% Rheumatoid arthritis, 1.8% Lupus, while other diseases represented 53.3% of the patients. Most of the cases (79.5%) were taking non-steroidal anti-inflammatory drugs

(NSAID), while 34.1%, 11.4%, 11.4% were on conventional DMARDs, biological DMARDs and steroids, respectively.

Among the studied cases, RAPID3 test result mean was  $12.59 \pm 6.05$ , less than half of cases (40%) had moderate severity affection and 20% had high severity, as shown in Figure 1. Significantly high severity RAPID3 scores were detected in female (21.7%), aged more than 45 years (34.4%), with lower education (42.5% with a level lower than secondary school), widow (44.4%), and low-income patients (32.5%) (Table I).

The result of DASS21 scoring in the study population had mean  $35.85 \pm 13.45$  (range 2-63, median was 34.0). Regarding depression, most of the studied patients showed mild to moderate depression (33.0% and 35%, respectively), while severe depression was detected in only 3.2% of the cases (Figure 2). Severe depression was significantly higher in male (5.8%), patients younger than 45 years, rural resident, divorced, widow and low-income patients (3.6%, 4%, 13.8%, 11.1% and 10.4%, respectively) (Table II).

Concerning anxiety, severe anxiety was reported in 29% of cases and 1% showed extremely severe anxiety, while the majority showed moderate anxiety (49%) (Figure 3). Severe anxiety was more significantly detected to be in female (30.3%), older than 45 years (33.1%), with a high school education level (higher than secondary school - 32.5%), urban resident (34.4%) and divorced (44.8%), while 11.1% of widow showed extremely severe anxiety (Table III).

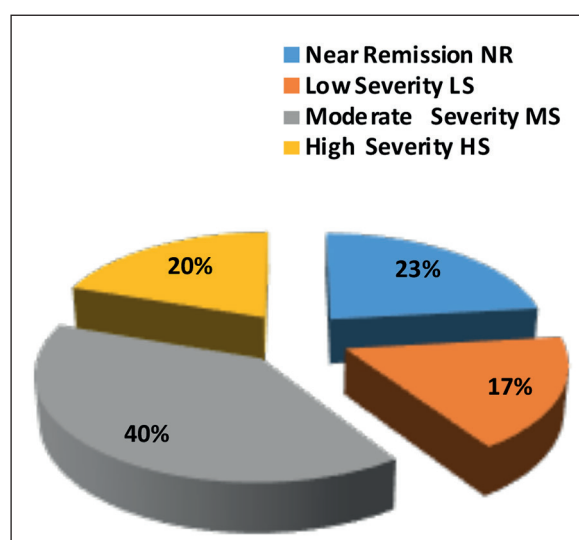


Figure 1. RAPID3 test scoring in the study population.

**Table I.** RAPID3 test scoring, according to the socio-demographic characteristics of the study population.

	RAPID score				Total	X <sup>2</sup> /p
	Near remission (NR) 102 (23.2)	Low severity (LS) 77 (17.5)	Moderate severity (MS) 174 (39.5)	High Severity (HS) 87 (19.8)		
Gender						<b>0.039*</b>
Male	28 (27.2)	12 (11.7)	49 (47.6)	14 (13.6)	103 (100.0)	
Female	74 (22.0)	65 (19.3)	125 (37.1)	73 (21.7)	337 (100.0)	
Age group						<b>0.000*</b>
≤ 45 years	86 (30.7)	53 (18.9)	109 (38.9)	32 (11.4)	280 (100.0)	
> 45 years	16 (10.0)	24 (15.0)	65 (40.6)	55 (34.4)	160 (100.0)	
Education						<b>0.000*</b>
≤ 2ry school	25 (20.8)	13 (10.8)	31 (25.8)	51 (42.5)	120 (100.0)	
> 2ry school	77 (24.1)	64 (20.0)	143 (44.7)	36 (11.3)	320 (100.0)	
Residence						<b>0.425</b>
Urban	74 (21.8)	61 (17.9)	140 (41.2)	65 (19.1)	340 (100.0)	
Rural	28 (28.0)	16 (16.0)	34 (34.0)	22 (22.0)	100 (100.0)	
Marital status						<b>0.000*</b>
Single	46 (39.7)	12 (10.3)	46 (39.7)	12 (10.3)	116 (100.0)	
Married	52 (20.1)	65 (25.1)	87 (33.6)	55 (21.2)	259 (100.0)	
Divorced	4 (13.8)	0 (0.0)	21 (72.4)	4 (13.8)	29 (100.0)	
Widow	0 (0.0)	0 (0.0)	20 (55.6)	16 (44.4)	36 (100.0)	
Income						<b>0.000*</b>
Not enough	4 (5.2)	9 (11.7)	39 (50.6)	25 (32.5)	77 (100.0)	
Just Enough	44 (18.3)	36 (14.9)	103 (42.7)	58 (24.1)	241 (100.0)	
Enough and saving	54 (44.3)	32 (26.2)	32 (26.2)	4 (3.3)	122 (100.0)	

x<sup>2</sup> Chi square test; \*significant at p=0.05.

Stress scale results showed normal scoring in about two third of the cases (67%). Nearly equal percentage showed mild to moderate stress (17% and 16%, respectively) (Figure 4). Moderate stress was significantly higher in females (18.1%),

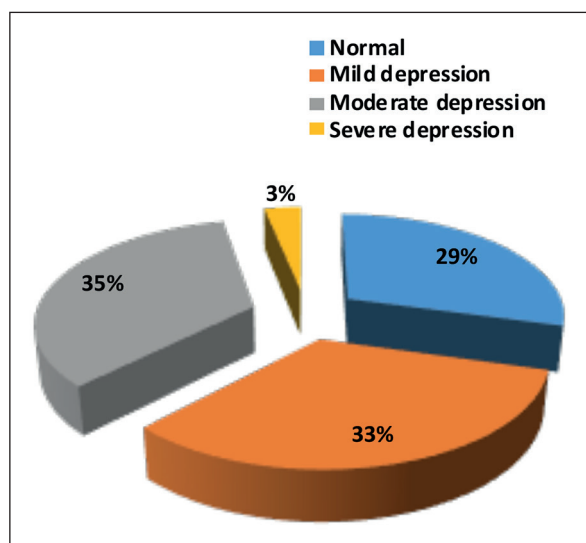
older than 45 years (25.6%), with a lower level of education (20.8% under secondary school), urban resident (17.1%), widows (44.4%) and low-income cases (39.0%) (Table IV).

### Discussion

During COVID-19 pandemic, in addition to the infection itself, many factors affected the general population, such as social isolation, quarantine, loneliness and fear of infection or death. The apprehension that occurred is a usual response to any major life-threatening event, and when a chronic illness is present, this change might become harmful and may lead to psychiatric illness<sup>11,12</sup>.

Psychiatric disorders such as anxiety, depression, and stress can often be detected in patients with rheumatic diseases<sup>13,14</sup> and can negatively affecting their quality of life. However, psychiatric symptoms may differ in patients suffering from these diseases, and the prevalence of psychiatric symptoms can vary<sup>15</sup>.

It has been shown<sup>16,17</sup> that patients suffering from chronic rheumatic diseases have been among the most vulnerable to the traumatic stress



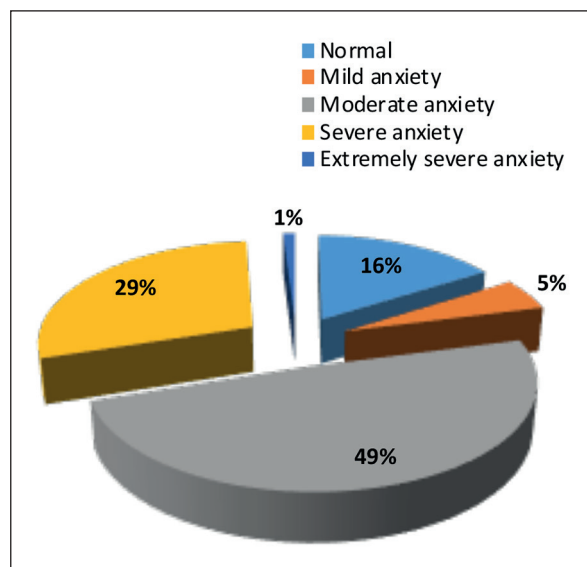
**Figure 2.** DASS21 depression scoring in the study population.

**Table II.** DASS21 depression scoring, according to the socio-demographic characteristics of the study population.

	DASS21 depression scoring				Total 440 (100.0)	X <sup>2</sup> /p
	Normal 129 (29.3)	Mild depression 145 (33.0)	Moderate depression 152 (34.5)	Severe depression 14 (3.2)		
Gender						0.000*
Male	44 (42.7)	40 (38.8)	13 (12.6)	6 (5.8)	103 (100.0)	
Female	85 (25.2)	105 (31.2)	139 (41.2)	8 (2.4)	337 (100.0)	
Age group						0.000*
≤ 45 years	79 (28.2)	117 (41.8)	74 (26.4)	10 (3.6)	280 (100.0)	
> 45 years	50 (31.3)	28 (17.5)	78 (48.8)	4 (2.5)	160 (100.0)	
Education						0.000*
≤ 2ry school	53 (44.2)	25 (20.8)	38 (31.7)	4 (3.3)	120 (100.0)	
> 2ry school	76 (23.8)	120 (37.5)	114 (35.6)	10 (3.1)	320 (100.0)	
Residence						0.000*
Urban	73 (21.5)	121 (35.6)	136 (40.0)	10 (2.9)	340 (100.0)	
Rural	56 (56.0)	24 (24.0)	16 (16.0)	4 (4.0)	100 (100.0)	
Marital status						0.000*
Single	34 (29.3)	42 (36.2)	34 (29.3)	6 (5.2)	116 (100.0)	
Married	79 (30.5)	91 (35.1)	89 (34.4)	0 (0.0)	259 (100.0)	
Divorced	8 (27.6)	8 (27.6)	9 (31.0)	4 (13.8)	29 (100.0)	
Widow	8 (22.2)	4 (11.1)	20 (55.6)	4 (11.1)	36 (100.0)	
Income						0.000*
Not enough	31 (40.3)	16 (20.8)	22 (28.6)	8 (10.4)	77 (100.0)	
Just Enough	58 (24.1)	75 (31.1)	102 (42.3)	6 (2.5)	241 (100.0)	
Enough and saving	40 (32.8)	54 (44.3)	28 (23.0)	0 (0.0)	122 (100.0)	

x<sup>2</sup> Chi square test; \*significant at p =0.05.

due to the COVID-19 pandemic lockdown. They are also immune deficient, feel intense fear of being more susceptible to the SARS-CoV-2 infection; this new type of apprehension may further initiate psychological diseases<sup>18</sup>.



**Figure 3.** DASS21 anxiety scoring in the study population..

In the present study, RAPID3 test mean was  $12.59 \pm 6.05$ , less than half of cases (40%) had a moderate severity affection, while 20% showed high severity. This was in lower percentage compared with Boone et al<sup>19</sup>, who evaluated the routine practice of rheumatoid arthritis patients treated with anti-rheumatic drugs (b-DMARDs). They reported near average figures ( $11.7 \pm 6.2$ ), but 96% of the patients had a moderate-to-high RAPID3 score. The higher percentage in his study may be attributed to the sample criteria which included only rheumatoid arthritis patients all of them on biological (DMARDs), second line of treatment which also indicated a more severe disease.

The result of DASS21 anxiety score showed severe anxiety in 29% of cases and 1% had extremely severe anxiety while the majority had moderate anxiety (49%). This finding is higher in degree if compared with another study<sup>20</sup> investigating the psychological health and associated factors among rheumatoid arthritis Filipinos during COVID-19 pandemic, which reported that about one third of patients had moderate to severe anxiety (38.7%). This higher severity score in the present study may be due to our sample criteria, as our sample included different rheumatic

**Table III.** DASS21 anxiety scoring according to the socio-demographic character of the study population.

	DASS21 anxiety scoring					Total 440 (100.0)	p
	Normal 72 (16.4)	Mild anxiety 20 (4.5)	Moderate anxiety 215 (48.9)	Severe anxiety 129 (29.3)	Extremely severe anxiety 4 (0.9)		
Gender							0.207
Male	24 (23.3)	4 (3.9)	48 (46.6)	27 (26.2)	0 (0.0)	103 (100.0)	
Female	48 (14.2)	16 (4.7)	167 (49.6)	102 (30.3)	4 (1.2)	337 (100.0)	
Age group							0.002*
≤ 45 years	56 (20.0)	16 (5.7)	132 (47.1)	76 (27.1)	0 (0.0)	280 (100.0)	
> 45 years	16 (10.0)	4 (2.5)	83 (51.9)	53 (33.1)	4 (2.5)	160 (100.0)	
Education							0.046*
≤ 2ry school	20 (16.7)	4 (3.3)	71 (59.2)	25 (20.8)	0 (0.0)	120 (100.0)	
> 2ry school	52 (16.3)	16 (5.0)	144 (45.0)	104 (32.5)	4 (1.3)	320 (100.0)	
Residence							0.000*
Urban	48 (14.1)	8 (2.4)	163 (47.9)	117 (34.4)	4 (1.2)	340 (100.0)	
Rural	24 (24.0)	12 (12.0)	52 (52.0)	12 (12.0)	0 (0.0)	100 (100.0)	
Marital status							0.000*
Single	24 (20.7)	0 (0.0)	52 (44.8)	40 (34.5)	0 (0.0)	116 (100.0)	
Married	48 (18.5)	20 (7.7)	123 (47.5)	68 (26.3)	0 (0.0)	259 (100.0)	
Divorced	0 (0.0)	0 (0.0)	16 (55.2)	13 (44.8)	0 (0.0)	29 (100.0)	
Widow	0 (0.0)	0 (0.0)	24 (66.7)	8 (22.2)	4 (11.1)	36 (100.0)	
Income							0.033*
Not enough	8 (10.4)	4 (5.20)	44 (57.1)	21 (27.3)	0 (0.0)	77 (100.0)	
Just Enough	32 (13.3)	12 (5.0)	117 (48.5)	76 (31.5)	4 (1.7)	241 (100.0)	
Enough and saving	32 (26.2)	4 (3.3)	54 (44.3)	32 (26.2)	0 (0.0)	122 (100.0)	

\*significant at  $p = 0.05$ .

diseases, while other study sample included only rheumatoid arthritis and lupus erythematosus patients.

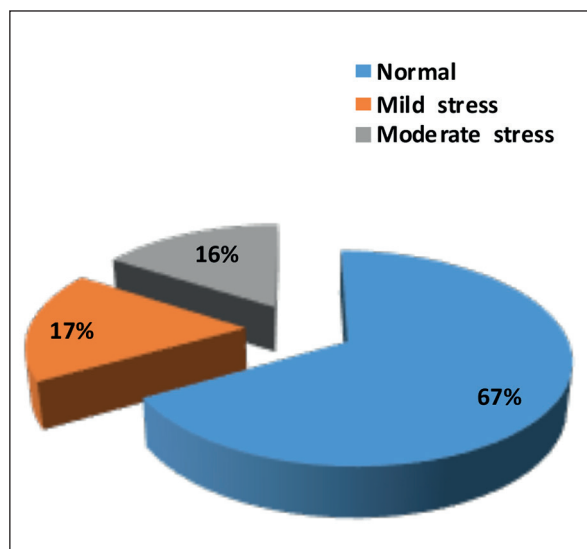
Concerning DASS21 depression score, the present study population showed mild-to-moderate depression (33.0% and 35%, respectively),

while severe depression was detected in 3.2% of cases. This was higher than that reported in Filipinos study<sup>20</sup>, where moderate-to-high severe depression was reported in 27.7% of cases.

Some researchers<sup>21,22</sup> explained the cause of increasing anxiety as psychological stress result in high production of inflammatory cytokines in the brain (IL-6, IL-1B), which are responsible for the initiation of anxiety and depression. Central catecholamine stimulates the release of IL-1B, which initiates microglia activation and monocytes attraction into the brain. These events lead to psychological diseases.

Regarding DASS21 stress score in the present study, normal stress score was detected in about two third of cases (67%). Nearly equal percent of cases had mild-to-moderate stress (17% and 16%, respectively), which come nearly similar to another study<sup>20</sup> which reported moderate to severe stress symptoms in 12.3% of the Filipinos patients with Rheumatoid Arthritis or Systemic Lupus Erythematosus.

On the other hand, in Egyptian study<sup>23</sup> to evaluate impact of COVID-19 pandemic on rheumatic diseases patients resulted in no difference in anxiety and depression levels between rheumatic diseases cases and healthy controls, and conclud-



**Figure 4.** DASS21 stress scoring in the study population.

**Table IV.** DASS21 stress scoring, according to the socio-demographic characteristics of the study population.

	DASS21 stress scoring			Total 440 (100.0)	$\chi^2/p$
	Normal 294 (66.8)	Mild stress 76 (17.3)	Moderate stress 70 (15.9)		
Gender					0.000*
Male	88 (85.4)	6 (5.8)	9 (8.7)	103 (100.0)	
Female	206 (61.1)	70 (20.8)	61 (18.1)	337 (100.0)	
Age group					0.00*
≤ 45 years	208 (74.3)	43 (15.4)	29 (10.4)	280 (100.0)	
> 45 years	86 (53.8)	33 (20.6)	41 (25.6)	160 (100.0)	
Education					0.204
≤ 2ry school	74 (61.7)	21 (17.5)	25 (20.8)	120 (100.0)	
> 2ry school	220 (68.8)	55 (17.2)	45 (14.1)	320 (100.0)	
Residence					0.000*
Urban	206 (60.6)	76 (22.4)	58 (17.1)	340 (100.0)	
Rural	88 (88.0)	(0.0)	12 (12.0)	100 (100.0)	
Marital status					0.000*
Single	76 (65.5)	23 (19.8)	17 (14.7)	116 (100.0)	
Married	194 (74.9)	36 (13.9)	29 (11.2)	259 (100.0)	
Divorced	12 (41.4)	9 (31.0)	8 (27.6)	29 (100.0)	
Widow	12 (33.3)	8 (22.2)	16 (44.4)	36 (100.0)	
Income					0.000*
Not enough	39 (50.6)	8 (10.4)	30 (39.0)	77 (100.0)	
Just Enough	153 (63.5)	52 (21.6)	36 (14.9)	241 (100.0)	
Enough and saving	102 (83.6)	16 (13.1)	4 (3.3)	122 (100.0)	

$\chi^2$  Chi square test; \*significant at  $p=0.05$ .

ed that similar degrees of anxiety and depression were felt by rheumatic diseases cases as well as by the general population during the pandemic<sup>23</sup>.

These results showed that, in chronic rheumatic diseased patients, psychological health issues highly increased due to the stressful COVID-19 situation, therefore, psychological support for those patients is needed in order to empower them, increase their endurance, and avoid over-thinking about their own risks of infection. Telemedicine and tele-assistance are effective methods that can be adopted and implemented<sup>24</sup>. Telemedicine can reduce the risk of patients' exposure to infection, keep the disease under control and reassure the patient; thus, potentially decreasing anxious and depressive symptoms<sup>25</sup>.

### Limitations

One limitation of this study represented by the fact that the study is totally based on a questionnaire, which considered patients' health status, mood, and perceptions at the only time of study.

### Conclusions

During COVID-19 lockdown, chronic rheumatic diseases patients presented a high level of

depression, anxiety, and stress symptoms, also moderate-to-high severity limitation of physical function, which negatively affected the rheumatic disease outcomes. Planned intervention should be performed to reduce mental health problems, and to overcome the disease worsening in this vulnerable population.

### Conflict of Interest

The Authors declare that they have no conflict of interests.

### Acknowledgements

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### Ethical Approval

The study protocol was approved by the Ethics Committee of Tanta University (ref. No. JYDLL2020002).

### Informed Consent

Informed online consent has been obtained through the first item of the questionnaire. All data were confidential and used only for the study purposes.

### Authors' Contribution

All authors contributed to the study conception and design. material preparation, data collection and analysis were performed by Hala Mostafa Elsabagh, Radwa Mostafa El Khouly, Marwa A. Abo El Hawa. The first draft of the manuscript was written by Hala Mostafa Elsabagh and Amira A. R. Moawad, all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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