Impact of COVID-19 Pandemic on Patients with Rheumatic and Musculoskeletal Diseases: Disruptions in Care and Self-Reported Outcomes

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Abstract
The COVID-19 pandemic presented a challenge to the care of patients with rheumatic and musculoskeletal diseases (RMDs). The objective of this study was to evaluate the impact of the pandemic on the care of RMDs patients and their health and well-being. This cross-sectional study involved 120 RMDs patients at the rheumatology department at Suez Canal University Hospital in Ismailia, Egypt, in July 2020. Patients were interviewed for sociodemographic and disease-related history. Further assessments were performed using Kessler 6-items, fears of COVID-19, and COV19-impact on quality of life scales. Rheumatoid arthritis and systemic lupus erythematosus represented the majority of our sample of RMDs patients (72.5% and 19.2%, respectively). About 50% of patients reported experiencing limitations in the access to rheumatologic care, and a similar percentage had changed or discontinued their medications. Disease-modifying antirheumatic drugs shortage and concerns about the increased risk of COVID-19 infection due to immunosuppressive drugs were the most frequently reported reasons for nonadherence. The percentage of patients with uncontrolled disease had significantly increased from 8.3% prior to the COVID-19 pandemic to 20% during the pandemic. About 60% of patients reported a high level of psychological distress.

In conclusion, the pandemic negatively influenced mental health, quality of life, adherence to medications, access to rheumatology care, and the degree of disease control of RMDs patients.

Keywords
COVID-19, medication adherence, healthcare access, mental health, quality of life, RMDs

Introduction
Since the novel coronavirus disease 2019 (COVID-19) emerged in December 2019 in Wuhan, China, it constituted a major public health issue. The World Health Organization (WHO) declared it a pandemic on 11 March 2020 (1). As of March 10, 2022, the WHO reported more than 450 million confirmed cases of COVID-19 and about 6 million deaths worldwide (2).

The COVID-19 is now viewed as a complex multisystem disorder ranging from asymptomatic to severe or critical disease (3). Severe disease is particularly prevalent among older people and patients with preexisting chronic diseases such as chronic rheumatic and musculoskeletal diseases (RMDs), which was defined as a diverse group of diseases that commonly affect the joints, but can affect any organ of the body, affecting both children and adults, and usually caused by problems of the immune system, inflammation, infections, or gradual deterioration of joints, muscles, and bones (4,5). RMDs include more than 200 diseases (eg, rheumatoid arthritis [RA], psoriatic arthritis, ankylosing spondylitis, systemic lupus erythematosus [SLE], Sjögren syndrome, etc), which commonly result in chronic and progressive pain, limitation of function leading to significant

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disability, and a substantial impact on the quality of life (QoL) and life expectancy (5,6).

The COVID-19 pandemic came with many challenges for both RMDs patients and the rheumatology healthcare providers with a substantial impact on the care and follow-up of these patients (7–9). However, the burden of the impact differs significantly with the health systems and the preventive public health measures applied across the countries, particularly in the Arab countries (8–10). Previous evidence showed that concerns have evolved among patients with RMDs regarding the increased risk of severe acute respiratory syndrome-coronavirus-2 (SARS-CoV-2) infection and poor COVID-19 outcomes, particularly patients on immunosuppressive and immunomodulatory medications, and patients with disease activity and multimorbidity (11–13). Perception of such increased risks could lead to a greater impact on the disease management and patient’s adherence to treatment, such as avoidance of medical visits or diagnostic testing or discontinuing immunomodulatory medications (14–16).

The COVID-19 pandemic has been shown to have an impact on the access to care among individuals with RMDs. Disruptions in the access to healthcare services and medications due to the lockdown and the social distancing constraints, as well as increasing the off-label use of many RMDs medications for the treatment of COVID-19, represented additional challenges to this population (10,11,15–18). Prior to COVID-19, evidence showed the inherent impact of RMDs on patients’ QoL (19), while patients’ during COVID-19, the increased concerns, psychological distress, and fears had a substantial added impact on patients’ QoL (20, 21).

Little is known about the impact of COVID-19 on people with RMDs on their health and well-being. Therefore, our study primarily aimed to evaluate the impact of the COVID-19 pandemic on RMDs patients regarding their access to healthcare services and medications, adherence, mental health, and QoL. Secondary aims of this study included the evaluation of the associations between the fear of COVID-19 and psychological distress, and the medication adherence, disease control, and COVID-19-impact on QoL.

Methods

Study Design: This is a cross-sectional study conducted from July 1, 2020, to July 31, 2020.

Study Setting: The study was carried out at the Physical Medicine, Rheumatology, and Rehabilitation Outpatient Clinic at Suez Canal University Hospital in Ismailia, Egypt. This hospital is a large teaching hospital affiliated with the Suez Canal University with a capacity of more than 400 beds and provides the tertiary care for patients in the Suez Canal region (including 5 governorates: Ismailia, Suez, Port-said, North Sini, and South Sini).

Participants and Sampling: Patients with a confirmed diagnosis of RMDs for at least 1-year duration on July 1, 2020, were eligible to participate in this study. All RMDs patients who were registered at Suez Canal University Hospital were screened for eligibility (N = 148) of whom 126 patients were eligible. A total of 120 patients were eligible and gave their consent to participate in this study (6 patients refused to participate in the study). Participants were subject to an appointment for a face-to-face interview during their first visit to the hospital either for follow-up or to get their medications after July 1, 2020. During the interview, the investigator used a structured questionnaire to ask respondents about the different study variables.

Outcomes & Measures: Dependent variables included adherence to medications, disease control, and the impact of the COVID-19 pandemic on the QoL. Patients were asked if they were taking their medications as prescribed or not, and if they did not they listed the reasons for nonadherence (eg, forgetfulness and discontinuation). Nonadherence was evaluated before and during the pandemic. The frequency and severity of flares and the need for RMDs-related hospitalization were used as secondary outcomes for disease control status during the pandemic and before the date of declaration of the pandemic (ie, March 11, 2020). Although the main source of information was the patients’ recall, patients’ medical records were reviewed to match the information about hospitalization and frequency of visits due to flares. Patients were also asked to identify the reasons or context that lead to a worsening of their symptoms. The impact of the COVID-19 pandemic on the QoL was evaluated using the COV19-Impact on QoL scale (COV19-QoL scale), which has been validated for use in the general population and clinical sample of mental illnesses with satisfactory psychometric properties (Cronbach’s alpha = 0.885 and 0.856, respectively) (22). The higher the total score of the COV19-QoL scale, the greater the impact of the pandemic on the QoL as perceived by the participants (23).

Independent variables included psychological distress and fears related to the COVID-19 pandemic. Psychological distress was measured by using the Kessler 6-items scale (K6), which demonstrated excellent internal consistency and reliability (Cronbach’s alpha = 0.89), and had consistent psychometric properties across major sociodemographic subsamples, and strongly discriminates against individuals with severe mental illness (24). The total K6 score ranges from 0 to 24, which could be interpreted as follow: 0 to 7 as low distress, 8 to 12 as moderate distress, and 13 to 24 as high risk of psychological distress (25). COVID-19-related fears were measured by the fears of COVID-19 scale (FCV-19S), which showed high internal consistency (Cronbach’s alpha = 0.90) and satisfactory discrimination validity (26). The total score calculated as the sum of all item scores ranges from 7 to 35, with higher scores indicating greater levels of COVID-19 fear (21,27). Covariates included sociodemographic characteristics, medical history including type RMDs, disease duration, medication, access to healthcare services and medications, methods of healthcare services delivery during the
COVID-19 pandemic, and COVID-19 exposure. The patients’ perceived health and well-being (eg, physical health, mental health, and social life), were measured on a 5-point rating scale, while the perceived overall QoL was measured on a 10-point rating scale.

**Statistical Analysis**

All statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS version 25.0; IBM Corporation). Demographic and clinical characteristics were presented as frequencies and percentages (%) if categorical or mean (standard deviation) if continuous variables. Changes in the distribution of disease control status and adherence to medications before and during the COVID-19 pandemic were tested for statistical analysis by the McNemar test or Fisher’s exact test (if >20% of expected values were <5). Binary logistic regression was performed to test for the association between nonadherence to medications (yes/no) and uncontrolled disease (yes/no) as dependent variables.

**Table 1. Distribution of the Studied Patients by Their Sociodemographic Characteristics (N = 120).**

| Sociodemographic variables                                    | No. (%) |
|---------------------------------------------------------------|---------|
| **Age, mean (SD), range**                                     | 45.2 (11.1), 22–72 |
| Age groups (years)                                            |         |
| <40                                                           | 38 (31.7%) |
| 40–49                                                         | 39 (32.5%) |
| 50–59                                                         | 29 (24.2%) |
| 60 or older                                                   | 14 (11.7%) |
| **Gender**                                                    |         |
| Male                                                          | 12 (10.0%) |
| Female                                                        | 108 (90.0%) |
| **Residence**                                                 |         |
| Urban                                                         | 52 (43.3%) |
| Rural                                                         | 56 (46.7%) |
| Remote areas (other governorates)                             | 12 (10.0%) |
| **Marital status**                                            |         |
| Married                                                       | 111 (92.5%) |
| Single/divorced or widowed                                    | 9 (7.5%) |
| **Number of offspring**                                       |         |
| None                                                          | 12 (10.0%) |
| 1–2                                                           | 34 (28.3%) |
| More than 2                                                   | 74 (61.7%) |
| **Education**                                                 |         |
| Illiterate                                                    | 63 (52.5%) |
| Basic                                                         | 20 (16.7%) |
| Secondary                                                     | 32 (26.7%) |
| University                                                    | 5 (4.2%) |
| **Work**                                                      |         |
| Housewife                                                     | 94 (78.3%) |
| Full-time job                                                 | 15 (12.5%) |
| Not working/retired                                           | 9 (7.5%) |
| **Cigarette smoking**                                         |         |
| Never smoker                                                  | 111 (92.5%) |
| Ex-smoker                                                     | 7 (5.8%) |
| Current smoker                                                | 2 (1.7%) |

**Table 2. Distribution of the Studied Patients by the Disease and Health-Related Characteristics (N = 120).**

| Variables | No. (%) |
|-----------|---------|
| **RMDs**  |         |
| RA        | 87 (72.5%) |
| SLE       | 23 (19.2%) |
| Others    | 10 (8.3%)  |
| **Duration of RMDs (years)**                                 |         |
| <5        | 50 (41.7%) |
| 5–10      | 41 (34.2%) |
| More than 10 | 29 (24.2%) |
| **Medications for RMDs**                                     |         |
| NSAIDS    | 21 (17.5%) |
| Steroids  | 9 (7.5%)  |
| Nonbiologic DMARDs: 1–2                                      |         |
| 89 (74.2%) |
| 3+        | 5 (4.2%)  |
| Biologic DMARDs                                             |         |
| ACEI      | 80 (66.7%) |
| Vitamin D   | 40 (33.3%) |
| **Frequency of dispensing the RMDs treatment**                |         |
| Monthly                                              | 118 (98.3%) |
| Others                                               | 2 (1.7%)  |
| **Dispensing person of the RMDs treatment**                 |         |
| Patient                                             | 118 (98.3%) |
| Caregiver                                          | 2 (1.7%)  |
| **Health insurance**                                      |         |
| Public insurance                                    | 112 (93.3%) |
| Out-of-pocket                                      | 1 (0.8%)  |
| **Comorbid conditions**                                  |         |
| None                                                | 80 (66.7%) |
| Single                                             | 12 (10.0%) |
| Multiple                                           | 28 (23.3%) |
| **Types of comorbidities**                              |         |
| Hypertension                                        | 12 (10.0%) |
| Diabetes mellitus                                    | 13 (10.8%) |
| Others                                             | 38 (31.7%) |
| **COVID-19-related history**                            |         |
| Confirmed positivity                                 | 4 (3.3%)  |
| Contact with confirmed cases                          | 6 (5.0%)  |
| **Perceived health and well-being, mean (SD), range**     |         |
| Physical health                                      | 1.80 (0.89), 0–4 |
| Mental health                                       | 1.04 (1.16), 0–4 |
| Social life                                         | 1.58 (0.84), 0–4 |
| Overall quality of life                              | 4.93 (0.70), 0–10 |
| FCV-19S, mean (SD), range                            | 26.0 (7.6), 7–35 |
| COV19–impact on QoL, mean (SD), range                | 22.6 (6.7), 6–30 |
| Kessler’s scale for psychological distress (K6), Mean (SD), range | 16.5 (6.2), 0–24 |

**Notes:** RMD = rheumatic and musculoskeletal disease; RA = rheumatic arthritis; DMARDs = disease-modifying antirheumatic drugs; ACEI = angiotensin-converting enzyme inhibitors; FCV-19S = fear of COVID-19 scale; SLE = systemic lupus erythematosus; QoL = quality of life; NSAID = non-steroidal anti-inflammatory drugs.
variables and each fear of COVID-19 and K6 psychological distress scores as independent variables, in separate models as both independent variables were highly correlated. These associations were adjusted for a list of covariates that were statistically significant on bivariate associations. Likewise, linear regression was used to test for the association between the COVID-19-impact on QoL as a dependent variable and each fear of COVID-19 and K6 scores, adjusted for other covariates. A \( p \)-value < .05 was considered statistically significant.

Results

One-hundred and twenty RMDs patients were included with a mean age of 45 years (ranging from 22 to 72 years), and 90% were females. Table 1 summarizes other demographic characteristics of study respondents. Table 2 shows that RA and systemic lupus erythematosus represented the majority of all RMDs (72.5% and 19.2%, respectively). About one-fourth of patients had it for more than 10 years. Almost all patients (97.5%) were on nonbiologic disease-modifying antirheumatic drugs (DMARDs), while only 4 cases (4.2%) were on biologic DMARDs. They were mostly dispensing their medication monthly (98.3%). One-third of patients had chronic comorbidities. Six cases had a positive COVID-19 exposure history and 4 cases had a polymerase chain reaction-confirmed COVID-19 diagnosis.

As described in Table 2, health and well-being perceptions were below average, particularly the mental health and social life (1.04 and 1.58, respectively). They perceived their overall QoL as average (4.93 on a rating scale from 0 to 10). Furthermore, the mean fear of COVID-19 score was 26 (\( \pm 7.6 \)) and ranged from 7 to 35 points while the mean COV19-QoL was 22.6 (\( \pm 6.7 \)) and ranged from 6 to 30 points. The mean Kessler’s score for psychological distress was 16.5 (\( \pm 6.2 \)) and ranged from 0 to 24 points. Further classification of Kessler’s score indicated that 60% of patients had a high level of psychological distress while 32% had moderate psychological distress.

Table 3 shows that the percentage of patients with uncontrolled disease had significantly increased from 8.3% prior to the COVID-19 pandemic to 20% during the pandemic (ie, 1.4 times increase, \( p = .01 \)). The frequency and severity of flares had also increased during the pandemic but were not significantly different from the prepandemic levels. Furthermore, the frequency of nonadherence to medications had significantly increased from 32% to 51% (ie, 60% increase from the prepandemic frequency, \( p = .003 \)). In particular, increased nonadherence during the pandemic was attributed mainly to the discontinuation of medications (from 23.3% to 44.2%). During the pandemic, studied patients had experienced some limitations in their access to healthcare services (5.8% for inpatient care and 2.5% for outpatient care) but the major limitation was in their access to DMARDs medications (42.5%). Limitations in patients’ access to inpatient care and DMARDs medications during the pandemic were significantly higher than before the pandemic, while the limitation in outpatient care was not significantly different. Furthermore, about 14% of patients had tried the remote methods for healthcare services (ie, telemedicine) during the pandemic, compared to none of them before the pandemic (\( p < .001 \)). However, about 50% rated their experiences with these methods as 5 or less on a 10-point scale (Table 3).

Figure 1 shows the reasons for limited access to healthcare services and medications among the study respondents. Shortage in DMARDs medications (42.5%), patients’
concerns about the immunosuppressive effect of DMARDs medications (19.2%), and the fear of exposure to COVID-19 in healthcare settings (17.6%) constituted the most frequent reasons for limited access to healthcare services and DMARDs medications during COVID-19 pandemic. Figure 2 shows that the most frequent reasons for nonadherence—other than forgetfulness (13.1%)—were the shortage of DMARDs medications (42.5%), patients’ fear of the increased risk of COVID-19 infection due to the immunosuppressive effect of DMARDs (19.2%), and patients’ boredom and dissatisfaction with the daily medication (10%).

Table 4 shows that nonadherence to medication was significantly associated with increasing fear of COVID-19 (model $\chi^2 = 17.6, df = 5, p\text{-value} = .003; R^2 = .18$; discrimination ability $= 84.2%$; adjusted for age groups, work status, types of RMDs, medication adherence before the pandemic, and psychological distress) and psychological distress (model $\chi^2 = 18.2, df = 5, p\text{-value} = .003; R^2 = .19$; discrimination ability $= 86.4%$; adjusted for age groups, work status, types of RMDs, medication adherence before the pandemic, and fear of COVID-19). For every 1-point increase on the fear of COVID-19 scale and Kessler’s scale for psychological distress, the odds for nonadherence significantly increase by 7% and 9%, respectively. However, the uncontrolled disease was significantly associated with only increasing psychological distress; a 1-point increase in Kessler’s scale was associated with a 12% increase in the odds for uncontrolled disease (model $\chi^2 = 20.3, df = 6, p\text{-value} = .002; R^2 = .25$; discrimination ability $= 80.8%$; adjusted for work status, education, types of RMDs, adherence before the pandemic, disease control before the pandemic, COVID-19 exposure, and fear of COVID-19).

Furthermore, the COVID-19-impact on QoL score was significantly associated with both increasing fear of COVID-19 ($F = 434.1, df(5,114), p\text{-value} < .001; R^2 = .95$; adjusted for age groups, types of RMDs, medication adherence during the pandemic, and disease control during the pandemic), and psychological distress ($F = 149.0, df(5,114), p\text{-value} < .001; R^2 = .87$; adjusted for age groups, types of RMDs, medication adherence during the pandemic, and disease control during the pandemic). Every 1-point increase on the fear of COVID-19 scale and Kessler’s scale for psychological distress was significantly associated with a 0.86 and 1.0 increase on the fear of COVID-19 and Kessler’s scores, respectively.

**Discussion**

The current study highlighted the negative impacts of the COVID-19 pandemic on a sample of patients with RMDs in Egypt. It showed that the pandemic negatively influenced the delivery of rheumatology care to about half of the patients. This finding was in line with earlier studies by George et al (11) and Michaud et al (14) who reported that 56.6% and 42% of patients, respectively, had a change in their rheumatology care or they avoided clinic visits due to the pandemic. In contrast, Ziade et al (10) in a web-based survey in 15 Arab countries reported that 82% of patients with RMDs experienced limited access to their rheumatology care. A study by Zomalheto et al (20) reported also that 92% of 68 Beninese patients with RA were negatively impacted. These wide variations across the studies could be linked to how much strict were the restrictive measures, the health system performance, and patients’ concerns and fears of COVID-19, and the level of psychological distress.

In Egypt, most RMDs patients receive their prescribed medications from the public hospital they have registered in to get the rheumatology care (ie, through public health insurance services). However, some patients may choose to get their prescriptions from private pharmacies (ie, out-of-pocket). During the COVID-19 lockdown, all patients have experienced a hardship reaching their suppliers and shortage in their medications. Moreover, most of the public clinics, healthcare facilities, and pharmacies were working with limited capacity and emergency services as a priority. Private pharmacies were not closed but they were struggling with supply restrictions. Our study showed that the pandemic negatively influenced the adherence to medications in about half of our patients. These results support Michaud et al (14) who reported that 42% of patients had changed or discontinued their treatment due to the pandemic. In contrast, other studies (8–11,16,17) have reported lesser rates of nonadherence; ranging from 5.2% in Ma et al (16) to 27.4% in Ziade et al (10).

DMARDs shortage and concerns about the increased risk of COVID-19 infection with the immunosuppressive drugs were the most frequently reported reasons for nonadherence in our study (42.5% and 19.2%, respectively). These findings were consistent with Pineda-Sic et al (8), who reported that 48% of nonadherence was due to lack of drug availability and 25% due to fears of COVID-19 infection. In Ma et al (16), worries about the increased risk of COVID-19, due to medications, contributes to nonadherence in 36.8% of studied patients. Studies by Ziade et al (10) and Fragoulis et al (9) reported lower contributions, as low as 3.8% and 2.2% for drug shortage and fear of immunosuppression, respectively. These findings suggest that the challenge for rheumatologic care during the pandemic is not only to encourage adherence to medication but also to ensure adequate access to medication, and correct information regarding the uncertainties about these medications and the increased risk for COVID-19 infection.

Mental health was also negatively impacted during the pandemic in about 92% of our patients with 60% reporting high levels of psychological distress. These findings were in line with Ziade et al (10) study in which 73.3% of RMDs patients experienced a minor or major impact on their mental health, and Koppert et al (21) study, which reported that about half of Dutch participants had experienced more stress during the pandemic. Although Kessler K6 is a widely-used distress scale for the screening of severe mental illness (defined as a K6 score ≥ 13), it is nonspecific and usually fails to capture individuals struggling...
with more moderate mental distress that warrants mental health intervention (28).

Besides its direct effect on health and well-being, it could trigger RMDs flares and contribute to uncontrolled disease (10,14,15,20,29,30). In our study, increasing psychological distress was significantly associated with the likelihood of medication nonadherence, uncontrolled disease, and increased COVID-19-Impact on QoL. These findings support Ziade et al (10) study in which the negative impact of the pandemic on mental health was significantly associated with medication nonpersistence. Further studies by Zomalheto et al (19) and Cleaton et al (29) reported that the QoL of RMDs patients was negatively impacted during the COVID-19 pandemic.

Since the COVID-19 pandemic has negatively affected the delivery of rheumatology services, remote management of rheumatologic patients introduced a potential solution to the drawbacks of restrictive measures on service delivery (31). In our study, remote methods or telemedicine methods were used by only 4% of study participants with low acceptability and satisfaction. In contrast, telemedicine appointments were used more frequently by RMDs patients in studies by Ziade et al (10), Michaud et al (14), and Banerjee et al (17) (28.9%, 24%, and 44%, respectively). Telemedicine utilization was low in our sample due to either the low acceptability of these methods among our patients, particularly about two-thirds of the sample were illiterate or low-educated individuals, or due to the limited resources for the care providers and the patients. Continued research is needed on the effectiveness of integrating telemedicine into routine rheumatology care.

On the other hand, the percentage of patients with confirmed SARS-CoV-2 infection in our sample was low (3.3%), which is in line with previous studies. A Spanish cohort of 3,591 RMDs patients reported a 3.4% incidence of COVID-19 (32). In another study in more than 15 Arab countries, a web-based survey of 2,163 RMDs patients revealed a 2.8% prevalence of COVID-19 (15). Our study respondents did not report directly their strategies to limit their exposure to COVID-19. However, 17.6% expressed their fears of exposure to COVID-19 in healthcare settings, which might make them avoid or postpone their medical appointments. Also, 5% of respondents reported that they follow home isolation after contact with COVID-19 cases, while 19.2% were concerned about the immunosuppressive drug they use leading to nonadherence or discontinuing these medications.

![Figure 1. Reasons for limited access to healthcare services/medications among rheumatic and musculoskeletal diseases (RMDs) patients during the COVID-19 pandemic (N = 120).](image1)

![Figure 2. Reasons for nonadherence to medications among rheumatic and musculoskeletal diseases (RMDs) patients during COVID-19 (N = 120).](image2)
Table 4. Associations Between the Fear of COVID-19 and Psychological Distress, and the Medication Adherence, Disease Control, and COVID-19-Impact on QoL.

| Variable               | Nonadherence to medication OR* (95% CI), p-value | Uncontrolled disease OR* (95% CI), p-value | COVID-19-Impact on QoL β (Std. Error), p-value |
|------------------------|------------------------------------------------|------------------------------------------|---------------------------------------------|
| Fear of COVID-19       | 1.07 (1.01–1.13), .019                           | 1.07 (0.99–1.15), .092                   | 0.86 (0.02), <.001                           |
| Psychological Distress | 1.09 (1.02–1.17), .014                           | 1.12 (1.02–1.23), .022                   | 1.00 (0.04), <.001                           |

*Adjusted for age groups, work status, types of RMDs, medication adherence before the pandemic, and psychological distress (or fear of COVID-19).

In conclusion, we found that besides the substantial indirect impacts of the COVID-19 pandemic on the mental health and QoL of RMDs patients, it negatively impacted their adherence to medications, access to rheumatology care, and the degree of RMDs control. These substantial indirect impacts of the COVID-19 on RMDs patients—which may be more deleterious than the direct impact of the SARS-CoV-2 infection—highlight the public health perspective of the pandemic in this vulnerable population and suggest a space for policy intervention.

**Authors’ Note**

This study was approved by the Ethical approval to report this case was obtained from the Ethics Committee of the Faculty of Medicine, Suez Canal University, Ismailia, Egypt (Approval Number: 4240/2020). All procedures in this study were conducted in accordance with the Research Ethics Committee of Faculty of Medicine, Suez Canal University (Approval Number: 4240/2020) approved protocols. Written informed consent was obtained from all studied patients for their anonymized information to be published in this article.

**Declaration of Conflicting Interests**

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