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# Impact of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV2) infection and disease-2019 (COVID-19) on the quality of life of rheumatoid arthritis patients in Benin

Zavier Zomaheto\*, Calixte Assogba, Hilaire Dossou-yovo

Rheumatology Department of National Hospital, University Hubert Koutoukou Maga of Cotonou, Benin

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## ABSTRACT

**Aim of the work:** To study the impact on the quality of life (QoL) of rheumatoid arthritis (RA) patients following up in a university hospital in Benin during the severe acute respiratory syndrome coronavirus 2 (SARS-CoV2) disease 2019 (COVID-19) pandemic.

**Patients and methods:** The QoL of 68 RA patients was assessed using Medical Outcome Study Short Form 36 (MOS-SF36) scale across the physical (PCS) and mental (MCS) components scores. The disease activity score (DAS28) was considered. Patients accepting to participate and having a mean of communication via social network, in particular WhatsApp were included.

**Results:** The mean age of the patients was  $49.9 \pm 12.1$  years (11–83 years) and were 65 females and 3 males. The mean DAS-28 at the start of the restriction measures was  $3.4 \pm 1.5$ , the mean PCS and MCS were  $71.1 \pm 20.3$  and  $67.1 \pm 16.02$  respectively and became  $4.7 \pm 2.04$ ,  $38.1 \pm 4.96$  and  $36.8 \pm 3.8$  respectively. After 2 months, none of the RA patients presented with classic symptoms of COVID-19 infection. 8 patients were screened by Rapid Diagnostic Test and Reverse Transcription-Polymerase Chain Reaction. Only 1 case was positive but asymptomatic. All patients had altered QoL according to MOS-SF36. Factors associated with this deterioration were stress related to SARS-CoV2 isolation ( $p = 0.001$ ), stress of having an activity flare-up ( $p = 0.001$ ), fear of being stigmatized ( $p = 0.009$ ). The economic factors were significantly associated with temporary unemployment, decrease in monthly income, and drug discontinuation ( $p = 0.001$ ,  $p = 0.002$  and  $p = 0.046$  respectively).

**Conclusion:** The impact of the SARS-CoV2 pandemic is negative on the QoL of RA patients and many factors were contributing.

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## 1. Introduction:

Current pandemic of coronavirus disease 2019 (COVID-19) is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Despite drastic containment measures, the COVID-19 outbreak has taken lives of more than 330,000 people worldwide, with the number of those contracting the virus surpassing 500,000,000 (as of May 22, 2020). Since WHO declared the SARS-cov2 pandemic, psychosis has been prevalent in all countries [1]. Environmental factors such as air pollution and smoking, as well as co-morbid conditions (hypertension, diabetes mellitus

and underlying cardio-respiratory disease) are likely to increase the severity of COVID-19 [2].

Rheumatic manifestations such as arthralgias and arthritis may be prevalent in about a seventh of individuals [3]. The presence of joint manifestations as symptoms of the disease is of great concern to rheumatologists and to patients suffering from chronic inflammatory rheumatism. These patients, as the majority of patients, are visiting fewer and fewer hospitals for fear of being infected. Teleconsultation and other forms of consultation have emerged in several countries. Patients suffering from chronic inflammatory rheumatism have received a lot of attention in recent weeks because of the possible beneficial effects of anti-rheumatic treatments in the fight against the virus [4]. However, the state of mind of the patients followed up in rheumatology during this crisis has not been addressed.

In Africa, the epidemic is progressing at a very slow pace where the number of cases of COVID-19 remains far lower than in Wes-

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\* Corresponding author at: Rheumatology Department of National Hospital, University Hubert Koutoukou Maga of Cotonou, BP: 2139 Abomey, Benin.

E-mail address: [zozaher@yahoo.fr](mailto:zozaher@yahoo.fr) (Z. Zomaheto).

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tern countries. In a north African country, Egypt, rheumatology patients visits were spaced, followed-up by phone and were instructed to remain on their latest regimens unless there is evidence of an active infection. In patients with stable disease or in remission, a slow taper of immune suppressants was considered on a case-by-case basis. Priority was for urgent and infection-related appointments [5].

In Benin, the alleged first case of COVID-19 was diagnosed on 11 March 2020 in the town of Cotonou. Among the 10 million inhabitants (including 0.8% of patients suffering from rheumatoid arthritis according to hospital surveys), the current number of cases diagnosed in May is 130 [6,7]. Despite the attempt to limit the outbreak to the defined “red zone”, by quarantining all citizens and denying entry or departure from the area similar cases were diagnosed in other cities without evident epidemiological correlation. These measures are not without socio-economic and psychological consequences for the population in general and for the rheumatoid arthritis (RA) patients in particular.

Even before the pandemic, sleep disturbances, depression and loneliness were frequently reported in RA patients and were associated with worse health outcomes [8]. Moreover, viral infections were reported in rheumatic diseases [9,10] and association to RA had a definite impact [11,12]. The aim of this work was to study the quality of life (QoL) of RA patients followed in rheumatology units in Cotonou (Benin) during the SARS-CoV2 pandemic.

## 2. Patients and methods:

This is a descriptive and analytical cross-sectional study for the period from May 1 to May 31, 2020, of 68 RA patients who followed up in the rheumatology department of the National Hospital University Hubert Koutoukou Maga for at least 1 year and were diagnosed according to the American College of Rheumatology/European League Against Rheumatism (ACR/EULAR) 2010 criteria [13]. Patients accepting to participate and having a mean of communication via social network, in particular WhatsApp were included. Patients with <1 year disease duration and those who cannot fill in the questionnaire data via WhatsApp or who are unable to travel to the hospital were excluded from the study. Informed consent was obtained from all patients after a full explanation of the study was provided. The study was approved by the Faculty of Health Sciences ethics committee.

The QoL of patients was assessed using the Medical Outcome Study Short Form 36 (MOS- SF36) scale through Physical Components Score (PCS) and Mental Components Score (MCS) [14]. Data were collected using a survey form filled out directly in consultation for patients who were able to visit the hospital during the study period or via a network (WhatsApp application) for other patients. Each patient completed a questionnaire on their QoL before and after the government measures. The questionnaire was constructed to involve the following aspects: A- Demographic features: age, sex; B- RA disease-related aspects: rheumatoid factor (RF) positivity, anti-cyclic citrullinated peptide antibody (ACPA) positivity, Visual Analogue Scale (VAS) for pain, the latest recorded disease activity score (DAS28) and the RA treatment used; C- SARS-CoV2 infection related aspects: Consultation appointments, COVID-19 symptoms and tests including rapid diagnostic test (RDT) and reverse transcription-polymerase chain reaction (RT-PCR), economic consequences (difficulty in obtaining food supplies or medicines, situation-related temporary unemployment, fear of becoming permanently unemployed, hard time dealing with the situation, decrease in monthly income), psychological effects (confinement-related isolation, stress related to the death of a loved one by COVID-19, fear of a rheumatic flare-up, fear of stigmatization).

**Statistical analysis:** It was carried out by Epi data 3.1 and SPSS statistics (18.0; IBM Corp., USA). Values were presented as means and standard deviations, ranges or frequencies and percentages. Variables were compared using the Mann-Whitney *U* test and categorical data using Fisher's exact test.  $p < 0.05$  were considered significant.

## 3. Results

Sixty-eight RA patients participated in the study. They were 65 females and 3 males (F:M 21.7:1). The mean age of the patients was  $49.9 \pm 12.1$  years (11–83 years). The mean DAS-28 was  $3.4 \pm 1.5$  (1.2–6.8). The general characteristics and the evolution of the QoL of the patients before and after the restriction measures are grouped in Table 1.

Regarding the data on SARS-CoV2 infection (Table 2), after 2 months of implementation of the measures only 2 of the 24 patients with an appointment in the period had been to the hospital. The main reason for absence was the fear of being isolated at the hospital. None of the RA patients presented with classic COVID-19 symptoms. 8 patients were screened by the TDR and RT-PCR of SARS-CoV2 and only 1 case was positive but asymptomatic. That patient has been on methotrexate (MTX) 15 mg/week and was in clinical remission for at least 1 year.

Factors associated with the deterioration of patient QoL during the confinement period were related to stress of getting COVID-19 infection ( $p = 0.001$ ), of having a disease activity flare ( $p = 0.001$ ) and fear of stigmatization ( $p = 0.009$ ). The economic factors associated with the deterioration in QoL were temporary unemployment related to the infection, decrease in monthly income, and drug discontinuation ( $p = 0.001$ ,  $p = 0.002$  and  $p = 0.046$  respectively). These factors are summarized in Tables 3 and 4.

**Table 1**

Characteristics and changes in rheumatoid arthritis patient quality of life (QoL) according to SF-36 before and after restriction measures.

Parameter	Restrictive measures in RA patients (n = 68)	
	Before	After
mean $\pm$ SD (range) or n (%)		
Age (years)	49.9 $\pm$ 12.1 (11–83)	
Sex-ratio (F:M)	65:3 (21.7:1)	
RF positivity	55 (80.9)	
ACPA	49 (72.1)	
VAS pain	32.1 $\pm$ 12.8 (0–63)	43.2 $\pm$ 13.9 (0–71)
DAS28	3.4 $\pm$ 1.5 (1.2–6.8)	4.7 $\pm$ 2.04 (1.2–7.5)
mild (<3.2)	16 (23.5)	
moderate ( $\geq$ 3.2–<5.1)	28 (41.2)	
high ( $\geq$ 5.1)	24 (35.3)	
<i>Treatment (doses)</i>		
Prednisone 15 $\pm$ 12.5 (5–30 mg/d)	51 (75)	
MTX 12.6 $\pm$ 6.8 (5–25 mg)/w	50 (73.5)	
LFN (n = 3) (20 mg/d)	20 (29.4)	
SAS 1.5 $\pm$ 0.5 (1–2 g/d)	22 (32.4)	
HCQ (400 mg/d)	18 (26.5)	
<i>MOS-SF36</i>		
PCS	71.1 $\pm$ 20.3 (49–79)	38.1 $\pm$ 4.96 (31–48)
MCS	67.1 $\pm$ 16.02 (48–72)	36.8 $\pm$ 3.8 (30–45)

RA: rheumatoid arthritis, RF: Rheumatoid factor, ACPA: anti-cyclic citrullinated peptide antibody, VAS: visual analogue scale, DAS28: disease activity score, MTX: methotrexate, LFN: leflunomide, SAS: sulfasalazine, HCQ: hydroxychloroquine, MOS-SF36: Medical Outcome Study Short Form 36, PCS: physical components score (PCS), MCS: mental components score.

**Table 2**

Data related to the severe acute respiratory syndrome coronavirus 2 (SARS-CoV2) infection among rheumatoid arthritis (RA) patients.

Parameter	RA patients
<i>Appointment during pandemic</i> (n = 24)	
present	2 (8.3)
absent	22 (91.7)
<i>Symptoms of COVID-19</i>	
	0/68 (0)
<i>SARS-CoV2 test (TDR/RT-PCR)</i> (n = 8)	
positive	1 (12.5)
negative	7 (87.5)

RA: rheumatoid arthritis, SARS-CoV2: severe acute respiratory syndrome coronavirus 2, COVID-19: coronavirus disease 2019, RDT: rapid diagnostic test, RT-PCR: reverse transcription-polymerase chain reaction.

#### 4. Discussion

Africa, despite having the world's greatest infectious disease burden, has a weak epidemiological surveillance system. Even in Europe, with its more advanced information systems, the official data on COVID-19 are controversial because of poor standardisation [15]. The COVID-19 pandemic poses a challenge not only for sub-Saharan African countries but also for those with well functioning health systems. The responsibility now for African scientists is to join forces and fight at local and regional levels to ensure the slow down and eventual halt of the spread of COVID-19 [16]. To date, the burden and outcomes associated with COVID-19 have varied substantially across the African continent. Specifically, 8 of the 54 African countries—South Africa, Egypt, Nigeria, Algeria, Ghana, Morocco, Cameroon, and Sudan—account for two thirds of all known COVID-19 cases [17]. The COVID-19 pandemic has come with many challenges for rheumatology healthcare providers and patients alike with a direct burden on health systems and a significant impact in the care and follow-up of patients with rheumatic and musculoskeletal diseases [18]. Furthermore, changes in treatment adherence behaviour

in rheumatic diseases during COVID-19 pandemic has been addressed [19]. However, COVID-19 incidence in patients with rheumatic autoimmune diseases seemed to be similar the general population in Northeast Italy [20]. An increased psychological distress has been proposed in patients with rheumatic diseases during the COVID-19 outbreak and their psychiatric symptoms were of considerable clinical concern, similar to the frequency in rheumatology staff members but significantly lower than that observed among hospital workers [21]. Moreover, the pattern of pro-inflammatory cytokines induced in COVID-19 has similarities to those targeted in the treatment of RA [22]. Patients with RD are susceptible to COVID-19. Various DMARDs or biologics may affect the viral disease course differently [23]. Concerns regarding the risk of COVID-19 among patients on anti-rheumatic drugs are common [24].

Patients with RA have increased risk of infection and are treated with medications that may increase this risk yet are also hypothesized to help treat COVID-19. In Benin, one of less developed countries, most of the patients suffering from RA are treated with, methotrexate alone or associated with salazopyrine or hydroxychloroquine. No biologic medication is taken because of the cost. This explains why two thirds of the patients were moderately or highly active requiring prednisone. This therapeutic difficulty linked to the cost of treatment is widely observed in most developing countries [25–27].

Insufficiently controlled rheumatology patients are at a reduced hospital attendance rate. This rate greatly weakened during the period of the restriction measures with only 2 patients present at the hospital during the 2 months of restriction. The main reason given was the fear of being infected with SARS-CoV2. This patient avoidance experience was recently mentioned by Michaud et al. [28]. On the other hand, of the 530 COVID-19 questionnaire respondents, 471 answered questions about changes in their rheumatology care. Of these, 42% reported some change in the previous two weeks; half of them cancelled or postponed appointments, 24% switched to teleconference, 14% reported changes to their medication list or dose, 11% reported physician directed changes to their medication list or dose, 10% were unable to obtain their medication, and 4% were unable to reach their rheumatology office.

**Table 3**

Psychic factors associated with the deterioration of the quality of life (QoL) of rheumatoid arthritis patients during the coronavirus disease 2019 (COVID-19) pandemic.

Psychic factors related to COVID-19	QoL in RA patients (n = 68)		OR	IC <sub>95%</sub>	p
	Affected n (%)	Unaffected n (%)			
<i>Isolation-related</i>					
Yes	5 (25)	5 (10.4)	2.9	0.7–11.3	0.13
No	15 (75)	43 (89.6)			
Total	20 (100)	48 (100)			
<i>Stress of infection</i>					
Yes	21 (65.6)	9 (25)	5.7	2.02–16.3	<b>0.001</b>
No	11 (34.4)	27 (75)			
Total	32 (100)	36 (100)			
<i>Death of beloved</i>					
Yes	31 (83.8)	2 (6.5)	2.3	0.7–8.2	0.18
No	6 (16.2)	29 (93.5)			
Total	37 (100)	31 (100)			
<i>Fear of a flare-up</i>					
Yes	37 (80.4)	8 (36.4)	7.1	2.3–22.3	<b>0.0006</b>
No	9 (19.6)	14 (63.6)			
Total	46 (100)	22 (100)			
<i>Fear of stigmata</i>					
Yes	27 (90)	22 (57.9)	1	1.5–23.9	<b>0.006</b>
No	3 (10)	16 (42.1)			
Total	30 (100)	38 (100)			

QoL: quality of life, RA: rheumatoid arthritis, COVID-19: coronavirus disease 2019, Bold values are significant at  $p < 0.05$ .

**Table 4**  
Economic factors associated with the deterioration of the quality of life (QoL) of rheumatoid arthritis patients during the coronavirus disease 2019 (COVID-19) pandemic.

Economic factors related to COVID-19	QoL in RA patients (n = 68)		OR	IC <sub>95%</sub>	p
	Affected	Unaffected			
<i>Difficulty to obtain food</i>					
Yes	2 (6.9)	1 (2.6)	2.8	0.2–32.02	0.41
No	27 (93.1)	38 (97.4)			
Total	29 (100)	39 (100)			
<i>Temporarily unemployed</i>					
Yes	23 (76.7)	12 (31.6)	7.11	2.3–21.1	<b>0.0004</b>
No	7 (23.3)	26 (68.4)			
Total	30 (100)	38 (100)			
<i>Permanent unemployed fear</i>					
Yes	19 (52.8)	21 (65.6)	0.51	0.2–1.5	0.28
No	17 (47.2)	11 (34.4)			
Total	36 (100)	32 (100)			
<i>Has hard time dealing</i>					
Yes	28 (80)	26 (78.8)	1	0.3–3.3	0.9
No	7 (20)	7 (21.2)			
Total	35 (100)	33 (100)			
<i>Decreased monthly income</i>					
Yes	43 (95.5)	14 (60.9)	13.8	2.6–71.7	<b>0.002</b>
No	2 (4.5)	9 (39.1)			
Total	45 (100)	23 (100)			
<i>Difficulty to obtain medicine</i>					
Yes	41 (93.2)	18 (75)	4.5	1–20.2	<b>0.046</b>
No	3 (6.8)	6 (25)			
Total	44 (100)	24 (100)			

QoL: quality of life, RA: rheumatoid arthritis, COVID-19: coronavirus disease 2019, Bold values are significant at  $p < 0.05$ .

Only 8 patients were tested for the new coronavirus but only 1 patient was positive and asymptomatic. The patient was on MTX and in clinical remission for at least 1 year. In the rheumatic diseases series of Michaud et al., [28] about half of respondents reported experiencing new symptoms potentially associated with COVID-19 in the two weeks prior to questionnaire completion. The most frequently reported new symptoms were fatigue (18%), anxiety (16%), headache (13%), muscle pain (12%), and cough (10%). Of the 530 respondents, 11 (2%) met COVID-19 screening criteria. Of those 11, 2 had sought testing and, despite 1 of them reporting exposure to a confirmed case, neither received it. In addition, six others who did not meet screening criteria reported an attempt to get tested for COVID-19, and three received testing. None tested positive for SARS-CoV-2. The response to contact with the virus therefore varies greatly depending on the individual's circumstances, but RA patients seem to suffer less from this infection, thus raising the question 'Is it an immunosuppressive effect of taking immunosuppressive drugs?' [29].

The restrictive measures in addition to the barrier actions imposed in most countries around the world are not without consequences for patients, particularly on disease activity and QoL for RA patients. Thus, a deterioration in the QoL of patients during the months of restriction in Benin has been observed. To date, no studies have looked at the QoL of RA patients during the pandemic. However, in a recent work, Michaud et al. [28] studied the experiences of patients suffering from chronic inflammatory rheumatic disease and identified four major themes from 211 respondents' free response on the emotions in response to COVID-19-related experiences, perceptions of risk, protective measures to reduce risk of COVID-19 infection, and impacts on rheumatic disease treatment and access to care including medications and rheumatology consultations. The most commonly reported emotions were anxiety, nervousness, worry and fear. Respondents worried about being infected and developing COVID-19, whether they would survive an infection, how their medications would affect their risk, and the impact of the pandemic on access to medications and health care. Some noted that anxiety and stress seemed to worsen their arthritis symptoms. In response to the threat of COVID-19, most respondents reported a desire to reduce their risk and take actions to

protect themselves. Only a small minority of participants expressed a lack of worry towards COVID-19. Respondents also reported practicing social distancing caused feelings of sadness and loneliness in respondents who could no longer see family and friends in person.

Stress, fear and the stigma of COVID-19 infection have contributed significantly to the deterioration of patients QoL. It is urgent for governments to provide solutions through accompanying measures to reduce these factors which will certainly improve the QoL of these suffering patients. Among the limitations of this work are the very wide age range including juvenile cases, the limited number of males included, the small number of the studied cohort and the cross sectional study design.

In conclusion, the impact of the SARS-CoV2 pandemic is very negative on the QoL of Beninese RA patients. The factors associated with this deterioration in QoL are economic and psychological. There is an urgent need to provide support measures and a rapid lifting of restrictive measures through rapid control of the pandemic in order to restore well-being among RA patients.

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The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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