The impact of COVID-19 pandemic on rheumatology practice and rheumatologists: a cross-sectional multinational study

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Abstract

Objective

To evaluate the impact of the COVID-19 pandemic on rheumatology practice and on the rheumatologists themselves, and to develop suggestions to improve the practice.

Methods

A cross-sectional web survey was designed by members of the Arab League of Associations for Rheumatology (ArLAR), validated by its scientific committee and disseminated through e-mail and social media. It included close-ended questions about the impact of the pandemic on the activities (in percentage, where 100% corresponds to complete suspension), and open-ended questions about unmet needs. Univariate and multivariable logistic regression analyses were used to evaluate the predictors of impact. Suggestions were developed to improve practice.

Results

A total of 858 rheumatologists were included in the analysis (27.3% of registered), 37% were 35-44 years-old, 60% were females and 48% worked in the private sector. The impact of COVID-19 was a decrease of 69% in hospitalizations, 65% in outpatient clinic, 56% in infusion centers and 43% in income. It was associated with the region (highest in the Gulf), the use of telemedicine, the impact on income and the practice sector (lowest in private). Telemedicine was mostly based on traditional telephone contacts and e-mails and reimbursed in 12%. Fifteen rheumatologists (1.8%) were infected and 156 cases of COVID-19 among patients were reported, of whom 22% died. The top-cited unmet needs were: access to drugs and a telemedicine platform.

Conclusion

The negative COVID-19 pandemic on rheumatology practice may compromise rheumatic diseases control. Better access to drugs and providing telemedicine platforms are recommended to improve the practice.

Introduction

The Coronavirus Disease 2019 (COVID–19) has emerged in December 2019 in Wuhan, China, to quickly become a global outbreak and a significant public health issue [1, 2]. On January 30, 2020, the World Health Organization (WHO) declared COVID–19 a public health emergency of international concern [3], and, on March 20, 2020, due to the devastating number of new cases reported globally, WHO declared it as a pandemic [4]. At the time of drafting this manuscript (June 28, 2020), the WHO reported more than 9.5 million COVID–19 cases and 495 760 deaths [5].

During the pandemic, health care professionals (HCP) were faced with many challenges in the fight against an unprecedented and rapidly spreading disease [4]. This has prompted the WHO and the Centers for Disease Control and Prevention (CDC) to publish recommendations for the prevention and control of COVID–19 for HCP by the end of January 2020 [6, 7].

Similar to all medical and non-medical fields, rheumatology practice was deeply disrupted by the pandemic, partially due to the lockdown and the social distancing constraints that were imposed by the governments [8, 9]. Moreover, rheumatologists had to face additional challenges.

Many rheumatology patients are immunocompromised and vulnerable to infection. Whether these patients had higher risk of infection with the novel severe acute respiratory syndrome coronavirus (SARS-CoV–2) was uncertain [10–16]. Several recommendations were developed worldwide to guide the rheumatologists in their therapeutic choices [17–22]. However, the decision to stop, pursue or initiate therapies had to be determined on a case-by-case basis, according to clinical judgment. Besides, many of these therapeutic decisions had to be made remotely, which poses serious difficulties in a specialty that is

mostly a hands-on discipline. In some cases, patients even decided to modify their treatment on their own without notifying their physician [23].

Moreover, some symptoms and signs may be overlapping between COVID–19 and immune-mediated disease flares, such as fever, myalgias, arthralgias, elevation of acute phase reactants, leucopenia, thrombopenia, acute interstitial pneumonia, and myocarditis [13, 15]. This may cause diagnostic confusion in some cases, resulting in perplexity about therapeutic decisions [24].

Furthermore, several rheumatology drugs are thought to have potential activity against the SARS-CoV–2, such as chloroquine, hydroxychloroquine (HCQ), anti-Interleukin (IL) 6 agents, anti-IL1 agents, and Janus Kinase inhibitors, thus leaving the rheumatology patients in drug shortage sometimes [25–27]. In these cases, the rheumatologists were forced to revise the management plan and to adapt it to the available therapies.

Finally, rheumatologists are regularly solicited by chronic patients for advice and by colleagues for assistance in rheumatology drugs prescription for COVID–19 cytokine storm management [28, 29], which could be mentally draining.

Therefore, COVID–19 pandemic is a truly challenging time for rheumatologists, particularly in the Arab countries. Unlike USA or Western Europe [30, 31], the concept of telemedicine is not well established in the Arab world. The main obstacles include the absence of a legal telemedicine framework and the reluctance of patients to renounce their privileged physician-patient direct communication. For this purpose, a group from the Arab League of Associations for Rheumatology (ArLAR) designed a survey to evaluate the difficulties faced by the rheumatologists in the Arab countries.

Objectives

The primary objective was to evaluate the impact of COVID–19 pandemic on rheumatology practice in the Arab countries.

The secondary objectives were to evaluate the impact of COVID–19 on the rheumatologists themselves and to develop suggestions to improve rheumatology practice in the region.

Methods

A 21-items web-based, cross-sectional survey was developed by ArLAR members, with a prospective data collection between May 9 and May 24, 2020. The survey was designed in English by the steering committee, based on the available literature and following the Checklist for Reporting Results of Internet E-Surveys (CHERRIES) guidelines [32]. It was validated by the ArLAR scientific committee, which consists of rheumatologists representing the 15 ArLAR countries.

The survey instrument was also translated and validated in French, and both versions were made accessible through a Google form link. A pilot test was run in both languages with six bilingual rheumatologists to evaluate the timing, readability, relevance, and acceptability. The questionnaire was considered easy to read, relevant and acceptable, and required around 3 minutes to complete.

The survey comprised 19 close-ended and simple numeric questions about the demographic characteristics, the impact of the pandemic on the rheumatology activity and practice income (expressed in percentages, where 0% corresponds to the absence of impact, and 100% corresponds to a complete suspension of activities), the direct impact on the personal life of the rheumatologists including personal infection with SARS-CoV–2, the impact on mental health, the attitude towards telemedicine, as well as two open-ended questions about the unmet needs and the ways to improve the current practice (Supplementary data 1).

The survey was disseminated to all the rheumatologists working in the 15 ArLAR countries through the ArLAR mass mailing system. It was also advertised on ArLARs' and Arab rheumatology societies' social media (Facebook, Twitter, and Instagram)

for 16 days. The study was named HARMONIC (How are the Arab RheuMatologists dealiNg with the COVID–19 pandemIC) on social media. Participation through Google forms was anonymous.

Based on the survey results, the authors developed a set of suggestions to help improve the rheumatology practice across the Arab countries.

Consent to participate and ethical considerations

The rheumatologists received the invitation to participate by mass e-mail through the ArLAR. Clicking on the button “fill out the form” was considered the equivalent of consent to participate in the survey. Confidentiality of personal information was maintained throughout the study by making participants’ information anonymous. The study was approved by the Saint-Joseph University Ethics Committee (number CEHDF 1654).

Statistical analysis

The number of rheumatologists in the participating countries is estimated to be around 3137 rheumatologists. We aimed at including around 25% of this total (600). Moreover, for the analysis, the countries of practice were grouped into three geographical regions: Levant (Iraq, Jordan, Lebanon, Palestine, Syria), Gulf (Bahrain, Kingdom of Saudi Arabia (KSA), Kuwait, Oman, Qatar, United Arab Emirates (UAE), Yemen) and North Africa (Algeria, Egypt, Libya, Morocco, Sudan, Tunisia).

Continuous variables were expressed by mean and standard deviation and categorical variables as numbers and percentages. Comparison of the rheumatologists’ characteristics and responses between the three regions was performed using the Pearson chi-square or Fisher test for the categorical variables and the T-test or ANOVA for the continuous variables.

Furthermore, the dependent variable “impact on clinical activity” was categorized into a binary variable: higher impact and lower impact, using the median as a cut-off. Univariate and multivariable binary logistic regression analyses were conducted to identify factors associated with this dependent variable. All independent variables with a p-value 0.1 in the univariate analysis were taken into account in the multivariable logistic regression analysis; p-values <0.05 were accepted as statistically significant. All statistical analyses were performed using SPSS v23 (IBM).

The results of the open-ended items were analyzed and assembled into themes. Discordances were resolved through discussion.

Results

Descriptive analysis of the HARMONIC study participants

Out of the 3137 rheumatologists registered in the 15 ArLAR societies, 1214 clicked on the survey link, and 865 responded to the survey (Figure 1: Flowchart of the participants). Seven responses reported a non-Arab current country of practice and were eliminated. Therefore, a total of 858 rheumatologists were included in the analysis (27.3% of total registered rheumatologists).

Over one third of the participants were in the 35–44 years age group. The rheumatologists had been 13.4 years in rheumatology practice (SD 9.7). Sixty percent were females. Around half of the participants worked in private sectors, and 45% worked in university hospitals; notably, 267 rheumatologists (31%) worked in more than one sector. Thirty-nine percent worked in institutions that were implicated in frontline management of COVID–19, and 22% were personally involved in the frontline management of the pandemic. There were significant differences between Levant, Gulf, and North Africa. The participants’ characteristics by region are presented in Table 1 and their participation rate by country in Supplementary data 2.

Impact of the COVID–19 pandemic on the rheumatology practice

The impact of the COVID–19 pandemic on the outpatient activity was estimated to be 65%, highest in the Gulf (76%), and lowest in the Levant (53%) ($p<0.001$). The impact was 56% on day hospital (infusion centers) and 69% on regular hospitalization, both lowest in the Gulf and highest in North Africa. The impact of the pandemic on the practice income was 43%, highest in the Levant (50%), and lowest in the Gulf (27%) (Figure 2).

The impact on the outpatient clinic activity was categorized into higher versus lower impact, using the median, 70%, as a cut-off. In univariate analysis, a higher impact was associated with age ($p<0.001$), years of practice ($p = 0.03$), region ($p<0.001$), country ($p<0.001$), number of sectors of activity ($p<0.001$), private sector of activity ($p<0.001$), using telemedicine ($p<0.001$), agreeing using telemedicine ($p = 0.001$), institution implicated in COVID–19 ($p<0.001$), frontline management of COVID–19 ($p = 0.009$), patient with COVID–19 ($p = 0.001$), HCQ shortage ($p = 0.067$), personal infection with SARS-CoV–2 ($p = 0.063$) and impact on income ($p<0.001$). In multivariable analysis, the region (higher impact in North Africa, followed by the Gulf then the Levant), using telemedicine and higher impact on income remained associated with a higher impact on the clinic activity, whereas working in the private sector was associated with a lower impact on the clinical activity (compared to working in the public sector and in university teaching hospital) (Table 2).

Impact of the COVID–19 pandemic on the logistics of the practice

During the visit to the outpatient clinic, 98.3% of the rheumatologists used additional precautions: 93.4% used masks for themselves, 60.7% used masks for the patients, 66.6% used gloves for themselves, 15.4% used gloves for the patients and 78.2% used more antiseptics than usual.

Because of the pandemic, there was a shortage of HCQ in 47% of cases (highest in North Africa (61.2%) and lowest in the Levant (26.1%) ($p<0.001$). Also, there was a difficulty in accessing HCQ in an additional 24.2% of cases. Regarding the practice of telemedicine, the rheumatologists reported to use in 70% of the cases: as a full facility in 10%, as a partial facility in 16%, and more traditional ways (telephone, e-mails) in 51% of cases, with a higher telemedicine practice in the Gulf ($p<0.001$). Telemedicine was reimbursed in 22% of cases in the Gulf, 10% in the Levant, and 8% in North Africa (12% in total). As for the agreement to use telemedicine, 54% fully agree to use it, 24% would agree if it's reimbursed, and 22% do not agree.

Impact of the COVID–19 pandemic on the rheumatologists

The mental impact related to the stress caused by COVID–19 was reported in 77% of the respondents. It was minor in 60.4% and major in 16.7% of cases. It was numerically higher in North Africa (80.2% of cases), but the difference between the regions was not statistically significant ($p = 0.158$).

Twenty-five percent of the rheumatologists felt they were totally prepared in case they were asked to work in the frontline management of COVID–19, 45% felt partially prepared, whereas 30% were not prepared at all. Preparedness was highest in the Gulf (86%) and lowest in North Africa (58%), $p<0.001$.

Infection with SARS-CoV–2

Fifteen rheumatologists (1.8%) were personally infected with SARS-CoV–2, five in each of the 3 regions. One third of these rheumatologists were involved as frontline physicians in the management of COVID–19. Also, 34 rheumatologists (3.96%) said they were in quarantine because of COVID–19, 22 of which were from Levant.

As for the rheumatology patients infected with SARS-Cov–2, 156 cases were reported by the rheumatologists (51 from the Gulf, 48 from the Levant, and 57 from North Africa). Of these 156 cases, 32 (20.5%) were treated in ambulatory, 59 (37.8%) were

hospitalized, 22 (14.1%) were admitted to the intensive care unit, 35 (22.4%) died. The outcome was unknown in 33 (21.1%) cases.

Unmet needs and ways to improve the practice

In the open-ended questions, 349 rheumatologists provided 509 comments about the unmet needs in the rheumatology practice in the Arab countries, and 294 rheumatologists provided 565 comments about the way to improve this practice. After the classification of the answers into themes, the top-cited needs and ways of improvement were: access to drugs (biologics and HCQ), a telemedicine platform, an organized rheumatology unit, personal protective equipment (PPE), patient education, continuous medical education for physicians and advocacy for rheumatology (the complete ranking of the comments is presented in Table 3).

Discussion

The current study showed a significant negative impact of the COVID–19 pandemic on the rheumatology practice. The impact was higher on the regular hospitalization, followed by outpatient clinic and the daily hospitalization for infusion. The differences in impact between the Levant, the Gulf, and North Africa are partly due to differences in the healthcare system (more private-based in the Levant, more public-based in the Gulf), as well as differences in the pandemic response pattern (earlier and more strict quarantine measures in the Gulf and North Africa, compared to the Levant).

This significant negative impact on the continuity of rheumatology care, coupled with the shortage in some cornerstone drugs, such as HCQ (47% in the current study), may have a substantial impact on the control of chronic rheumatic diseases, putting the patients at a high risk of disease flare and compromising the disease prognosis on the short and long term [33].

The impact on the practice also translated into a 43% impact on the income -so far-, reflecting the serious economic repercussions of the pandemic. This economic impact of the pandemic is global, as announced by a United Nations Conference on Trade and Development report [34]. Nevertheless, it is different from one country to another (lowest in the Gulf countries), reflecting the baseline socio-economic disparities between the countries.

A higher impact on the outpatient clinic was associated with higher use of telemedicine, probably to compensate compromised access of the patient to rheumatology care. However, telemedicine was mostly used in a “traditional way”, such as telephone or e-mail contact, which cannot replace a regular visit in rheumatology. Also, this traditional way may not be sustainable on the long term. In particular, the rheumatologists stated that telemedicine was reimbursed in only 12% of cases. This lack of appropriate compensation contributes probably to the reluctance of about half of the rheumatologists if implementing it in their practice.

The mental impact of the pandemic was also considerable, as 77% of the respondents had some sort of impact, even minor in 60%. This is expected, as healthcare professionals, in general, are faced with additional challenges during the pandemic, such as mental stress, physical exhaustion, separation from families, stigma, risk of personal infection, and the pain of losing patients and colleagues. In the current study, 22% of the rheumatologists were implicated in the frontline management of COVID–19, and 39% worked in frontline institutions, meaning that, even in a non-frontline specialty, physicians were highly implicated in the pandemic management.

The rate of rheumatologists’ infection with SARS-CoV2 was 1.8%, which may increase with time, as the pandemic evolves. Although this number may be underestimated, since the seriously infected rheumatologists may not be able to respond to this survey, it gives a preliminary estimate about the direct rate of infection among the rheumatologists, as this information is still lacking worldwide.

As for the reported patients’ infection, a high mortality rate (22% of the 156 reported cases) was noted in comparison to the figures reported by the COVID–19 Global Rheumatology Alliance physician-reported registry (9%) [13], and in cohort of patients

with chronic rheumatic diseases from Spain and Italy (6 to 10%) [16, 35]. This result mostly reflects a bias towards more severe cases that “come to the attention” of rheumatologists, relative to an increased mortality. Also, this bias may be due to the fact that only individuals with severe symptoms are being tested for COVID–19 in most Arab countries.

Based on the open-ended responses, the authors developed suggestions to improve the rheumatology practice during the pandemic and in the deconfinement period (Table 4). The authors highlighted the need for local guidance for rheumatologists and patients, for working with health authorities to guarantee the availability of drugs for patients and PPE for HCP, and for establishing a reliable telemedicine platform that will help to rationalize human resources, reduce infection risk and ensure the proper continuity of rheumatology care.

The study has some limitations. The questionnaire was developed *de novo,* based on the available literature. However, it was validated by an independent scientific committee and pilot-tested successfully for readability, acceptability, and timing.

Also, the study was cross-sectional, covering a period where the pandemic had already reached its peak in some countries, whereas it was still in the ascending part of the curves in others. Therefore, the responses reflect the status in each country in a particular time frame of the pandemic. Also, the young age of the participants reflect the users of social media in the Arab region [36], and may jeopardize the external validity of the study.

Besides, the data presented in this study were self-reported and partly dependent on recall ability; thus, they may carry subjectivity and recall bias. Moreover, duplicate data, although very unlikely, cannot be ruled out. However, not collecting personal identification data was a choice that the authors had to make it to favor anonymity.

Nevertheless, the current study provides valuable information about the impact of COVID–19 on the rheumatology practice in the Arab regions. Although many studies have addressed the patients’ condition during the pandemic, data on physicians and practice remain very limited. The current study has gathered significant information from 27% of all rheumatologists across 15 Arab countries within 16 days. It was disseminated in two languages, catching the broadest audience in the region, as most Arab countries study and practice medicine in English and French, except for Syria. Also, the study presented the first estimates about the rate of rheumatologists’ infection and the outcomes of patients’ with COVID–19 in the Arab regions. Finally, the results allowed the development of local suggestions to improve the rheumatology practice during the COVID–19 pandemic and for the deconfinement period.

Conclusion

The current study highlights the deleterious consequences of the COVID–19 pandemic on the rheumatology practice and on rheumatologists themselves. The compromised access to clinical care and to fundamental drugs is expected to affect the rheumatic disease control significantly. Suggestions were developed to improve practice and include developing unified local guidelines for rheumatologists and patients. The health authorities are asked to guarantee access of patients to their medications and to establish reliable telemedicine platforms.

Declarations

Funding : None

Conflicts of interest

The authors declare no conflicts of interest related to this study

Ethics approval

- The study complies with the Declaration of Helsinki
- The Ethics Committee of Saint-Joseph University, Beirut has approved the research protocol (CEHDF 1654)

Availability of data and material

Data can be made available upon request from the corresponding author

Authors' contribution

NZ, IH, LK designed the study and drafted the questionnaire. All the authors contributed substantially to the work, participated in the recruitment of participants, revised the manuscript critically, approved the submitted version, and agree to be accountable for all aspects of the work

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Tables

Table 1. Characteristics of the 858 rheumatologists

	Levant	Gulf	North Africa	All	p
Number (%)	255 (30%)	173 (20%)	424 (50%)	**858**	
Participation rate (% of all rheumatologists)	68.0	43.6	17.7	**27.0**	
Age Groups, N (%)					
25-34	21 (12%)	92 (36%)	93 (22%)	**207 (24%)**	<0.001
35-44	76 (44%)	70 (28%)	172 (41%)	**312 (37%)**	
45-54	50 (29%)	42 (17%)	84 (20%)	**179 (21%)**	
55-64	22 (13%)	40 (16%)	62 (15%)	**124 (15%)**	
65-74	3 (2%)	10 (4%)	12 (3%)	**25 (3%)**	
Male Gender, N (%)	137 (54%)	96 (56%)	106 (25%)	**341 (40%)**	<0.001
Rheumatology practice					
Mean years (SD)	11.8 (10.6)	11.9 (8.1)	15.0 (9.5)	**13.4 (9.7)**	<0.001
Sector, n (%)					
- Private sector	150 (59%)	50 (29%)	208 (49%)	**412 (48%)**	<0.001
- Public sector	112 (44%)	114 (66%)	91 (22%)	**319 (37%)**	
- University hospital	117 (46%)	43 (25%)	223 (53%)	**386 (45%)**	
Institution implicated in COVID-19 frontline, N (%)	81 (33%)	100 (59%)	121 (34%)	**304 (39%)**	<0.001
Physician involved in COVID-19 frontline, N (%)	45 (18%)	50 (29%)	90 (21%)	**187 (22%)**	<0.001

Table 2. Factors associated with a higher impact on the outpatient clinic activity

Variable	OR*	95% CI		p-value
Region				
North Africa	1			<0.001
Levant	0.268	0.166	0.434	<0.001
Gulf	0.598	0.383	0.935	0.024
Using telemedicine	1.712	1.199	2.443	0.003
Impact on income	1.011	1.005	1.018	<0.001
Private sector	0.477	0.292	0.779	0.003

*After adjusting on: age, agreeing using telemedicine, institution with COVID-19, frontline management of COVID-19, patient with COVID-19, HCQ shortage, personal infection with SARS-CoV-2, sectors' number

Table 3. Summary of the comments of the rheumatologists about the unmet needs in the rheumatology practice (509 comments) and the ways to improve the practice (563 comments), ranked by the number of the mentions by the rheumatologists

Rank	Unmet needs in the rheumatology practice	Ways to improve the rheumatology practice
1	Access to drugs (biologics, HCQ)	Medical education
2	Telemedicine platform	Access to drugs (biologics, HCQ)
3	Organized rheumatology unit	Organized rheumatology units
4	Personal Protective Equipment (PPE)	Telemedicine platform
5	Patient education	Advocacy for rheumatology
6	Medical education	Patient education
7	Referral to the rheumatologists	Tests availability (immunology, COVID-19)
8	Tests availability (immunology, COVID-19)	More rheumatologists
9	Health insurance	Health insurance
10	Multidisciplinary collaboration	Adequate financial compensation for physicians
11	Adequate financial compensation for physicians	Collaboration among rheumatologists and with other disciplines
12	Collaborative Research	Electronic medical records
13	Local guidelines	Collaborative research
14	More rheumatologists	Referral to rheumatologists
15	Registry	Registry
16	Rheumatology nurses	Local guidelines
17	Ultrasound access	Personal Protective Equipment (PPE)
18	Communication with patients	Hospital infrastructure
19	Advocacy for rheumatology	Communication with patients
20		Better HCP conditions

Table 4. Authors' suggestions to improve the rheumatology practice across Arab countries during and after the COVID-19 pandemic

Target	Suggestion
Rheumatologists	Develop unified practice guidelines for the rheumatologists in the Arab region during the pandemic and the transitional deconfinement period Promote continuous medical education
Patients	Develop unified guidance for rheumatology patients during the pandemic and the transitional deconfinement period Promote channels of patients' education and advocacy for rheumatology
Health authorities	Guarantee the availability of drugs for patients with chronic rheumatic diseases Guarantee the availability of personal protective equipment for health care professionals
Continuity of care	Discuss the modalities of telemedicine and its legal framework of implementation in the Arab region

Figures

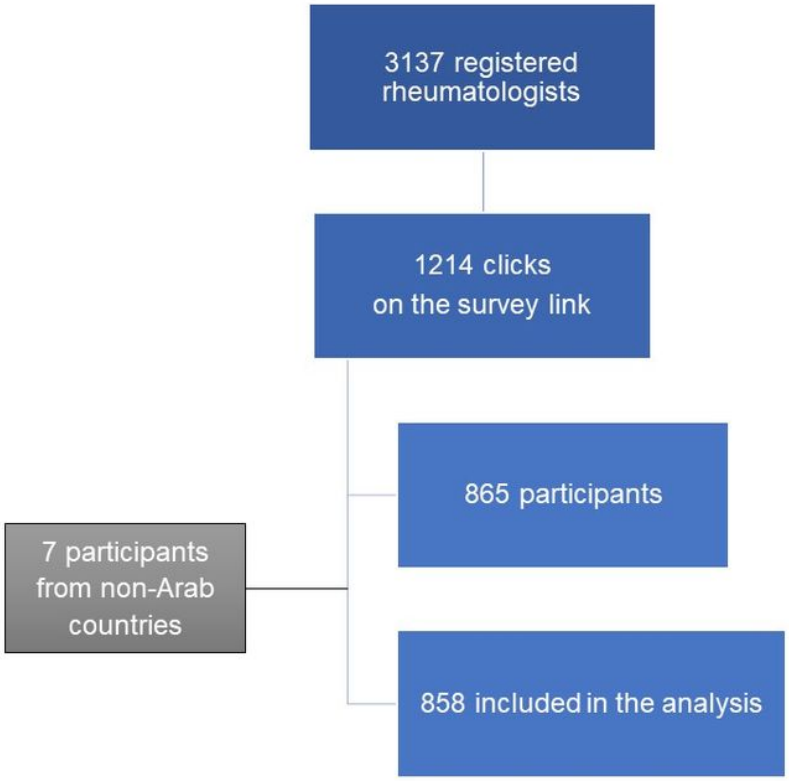

Figure 1

Flowchart of the study participants

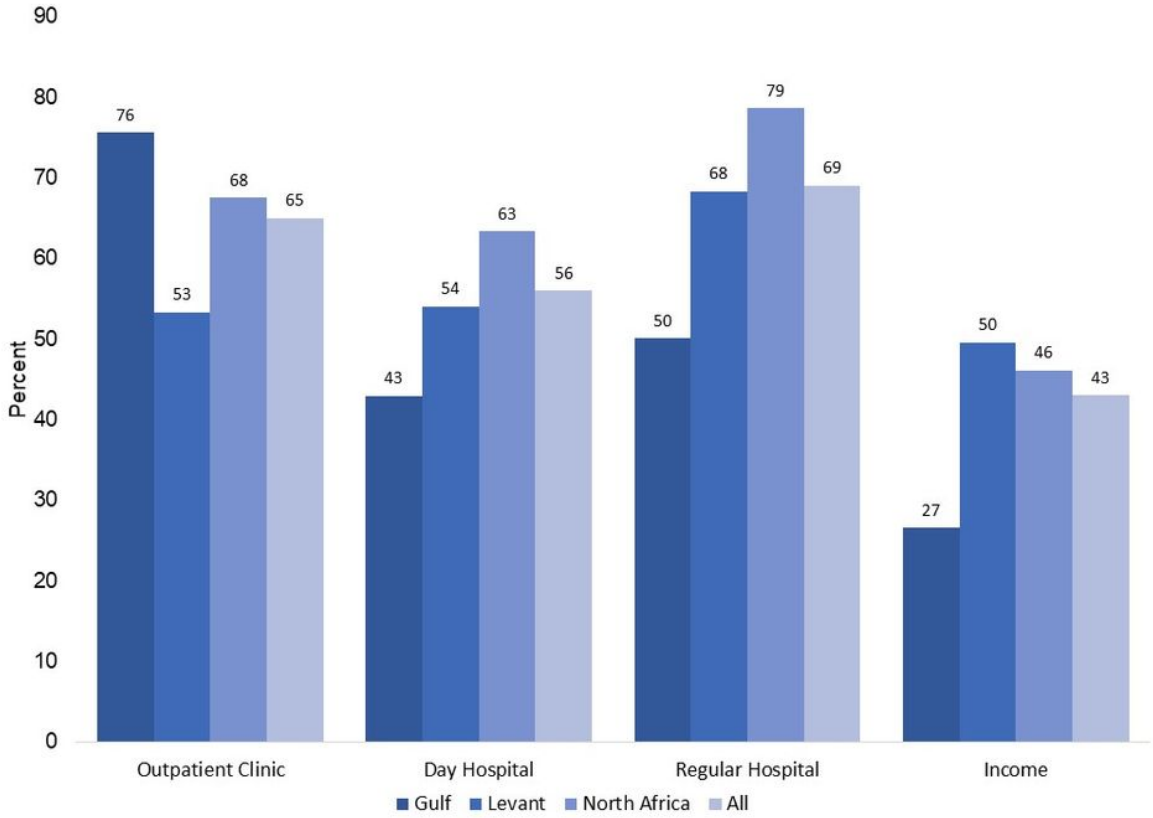

Figure 2

Impact of the COVID-19 on the rheumatology practice (outpatient clinic, day hospital, hospital and income)

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- HARMONICSupplementaryData1.docx
- HARMONICSupplementaryData2.docx