The Incidence of Musculoskeletal Manifestations among Patients with COVID 19 Infection

Sheelan Faroz Aref[1], Aryan Mohamadfatih Jalal[1], Shwan Kader Media[2]

[1]Student of Kurdistan Board for Medical Specialities, Department of Rheumatology, Rizgari Teaching Hospital, Erbil, Iraq, [2]Assistant professor of Rheumatology, Hawler Medical University, College of Medicine, Erbil, Iraq

Abstract

Background- Patients with COVID-19 may manifest musculoskeletal symptoms; myalgia is frequently detected in COVID-19 infected patients. The study aims to examine the incidence of musculoskeletal manifestations in the Iraqi Kurdistan Region and its correlation with the disease severity, and the patient's outcomes. Further, it attempts to correlate the disease severity with the smoking.

Method-A sample of one thousand (1000) COVID-19 infected patients from the Iraqi Kurdistan Region, were examined in an observational cross-sectional study to obtain relevant data for the patients treated in the COVID-19 care centres in Erbil city. The study lasted from 15 August 2020 to 15 June 2021.

Conclusion- The study shows that the musculoskeletal manifestations are frequent in COVID-19 infected patients; 79.4% of patients had fatigue, 66.8% had myalgia, 56.9% had backache, and 41.5% had arthralgia, fatigue is the most common symptom. The smokers manifest severe or critical conditions of the disease.

Keywords- *COVID-19, musculoskeletal symptoms, smoking, blood group, Iraqi Kurdistan Region.*

Introduction

The first case of the 2019 corona virus (COVID-19) was detected in Wuhan, China on 31 December 2019, and World Health Organization (WHO) deemed it as a global pandemic on 11 March 2020. By the end of April 2020, the virus had spread worldwide with fear-evoking death reports[1]. In early March 2020, the Kurdistan Regional Government's Ministry of Health announced the first confirmed cases of COVID-19 in the Iraqi Kurdistan Region[2].

Myalgia, defined as muscle pain, has been frequently reported in COVID-19 infected patients with a prevalence range from 11 to 50% in large cohort studies[3]. Arthralgia has also been reported in 2.5% of patients[4]; meanwhile, fatigue is the most common musculoskeletal symptom reported in 63%, followed by back pain 50.5% in patients with COVID 19 [5]. As such, the musculoskeletal symptoms reported in early stage of COVID-19 infection may also be reported in patients, who needed intensive care unit [6].

Evidence on smoking impacting the disease progression and death in COVID-19 infected patients is still conflicting[7]. Furthermore, some studies reported no relation between active smoking and COVID-19

Corresponding author:
Aryan Mohamadfatih Jalal
Student of Kurdistan Board for medical specialities, Rizgari teaching Hospital, Erbil –Iraq.
ORCID ID: 0000-0001-8666-4120,
E-mail: aryan.jalal87@yahoo.com

severity, whereas others reported that smoking was associated with severity and mortality [8,9,10].

Material and Methods

Study Design and Participants- The study is an observational cross-sectional study, the data conducted from COVID-19 infected patients in the Iraqi Kurdistan Region; the participants were either treated at COVID-19 care centres in Erbil city, such as Rizgari Teaching Hospital, West Erbil Emergency hospital and in some private hospitals. Based on a Google Forms survey conducted by the study, the participants were either from inside or outside Erbil city (Duhok and Sulaimani). Confidentiality of the survey data was guarantee. The Epi info 7 computer program was used for sample size estimation[11], then the following information were entered into the program: Population size (estimated number of COVID-19 cases during the study period in Kurdistan) 185716 patients[2], the estimated prevalence of musculoskeletal manifestations was set at 85.3% [1], absolute precision was set at 2.5%, and the confidence level was set at 95%. Accordingly, the estimated sample size was 768. For convenience and to overcome the possibility of non-response, Therefore, 1000 patients were included in the study between the 15 August 2020 to 15 June 2021.

Questionnaire Design and data collection- the study researchers developed a paper based and an online questionnaire through using Google Forms link shared on specific Facebook pages and via popular messaging applications in Iraq. The research team members reviewed, and pilot tested the questionnaire segments, the questionnaire covered the contact detail, demographic characteristics, comorbidities, current medications, and outcomes.

Inclusion Criteria- both genders, age between 18 to 80 years, the patients who confirmed to have COVID-19 infection based on one or more of the followings - Real Time Polymerase Chain Reaction (RT-PCR) by nasopharyngeal swab, CT scan of the chest, clinical sign, and symptoms of COVID-19 as well as serological tests.

Exclusion Criteria- Pregnant women, patients with malignancy, and those who were on invasive ventilation.

Statistical Analysis- The study utilized the Statistical Package for Social Sciences (SPSS, version 25) application to analyse the outcome data. The variables were coded and analysed for socio-demographics; Chi square test of association was used to compare proportions. Fisher's exact test was used when the expected frequency (value) was less than 5 of more than 20% of the cells of the table. The P value of ≤ 0.05 was considered as statistically significant.

Result(s)

One thousand patients with COVID-19 infection were included in the study their mean age ± SD was 46.5 and ± 14.9 years, with their real age data ranging from 19 to 78 years old; the median was 44 years. The study has also found that only 11.3% of the patients were aged less than 30 years, and 9% were aged ≥ 70 years (see Table 1 below).

Additionally, the study analysis found that more than half (58.9%) of the patients were females. In terms of the participants' blood groups, 29.5% as the largest proportion of the study sample was O+ blood group, 25% was A+ blood group, and 20.5% was B+ blood group. Based on the study analysis, the most common symptoms included 80.5% malaise, 77.3% fever, and 75.2% headache.

Since it was based on clinical findings in 32% of the patients, the diagnosis depended on the results of PCR alone in 33.2% of the patients and on CT scan images alone in 8.9% of the patients. The mentioned methods were used to diagnose the rest of the patients;

around half of the cases were either severe (41.5%) or critical (2.7%). The co-morbidities, 63.1% of the patients had no co-morbidity, 10.5% had hypertension, and 5.6% had diabetes (see Table 1).

Table 1: Basic Characteristics of the Study Sample

	No.	Percentage (%)
Age (years)		
< 30	113	(11.3)
30-39	271	(27.1)
40-49	254	(25.4)
50-59	122	(12.2)
60-69	150	(15.0)
≥ 70	90	(9.0)
Gender		
Male	411	(41.1)
Female	589	(58.9)
Smoking		
Yes	184	(18.4)
No	816	(81.6)
Blood group		
A+	250	(25.0)
A-	31	(3.1)
B+	205	(20.5)
B-	46	(4.6)
AB+	118	(11.8)
AB-	20	(2.0)
O+	295	(29.5)
O-	35	(3.5)
Method of diagnosis		
PCR	332	(33.2)
CT	89	(8.9)
Clinical	320	(32.0)
All	259	(25.9)
Severity		
Mild	303	(30.3)
Moderate	255	(25.5)
Severe	415	(41.5)
Critical	27	(2.7)
Co-morbidities		
None	631	(63.1)
Hypertension (HTN)	105	(10.5)
Diabetes (DM)	56	(5.6)
Ischemic heart disease (IHD)	20	(2.0)
HTN+DM+IHD	139	(13.9)
Rheumatic disease	6	(0.6)
Others	43	(4.3)
Total	1000	(100.0)

*More than one symptom may emerge in one patient.

Figure 1 shows that the majority (95.8%) of the patients had at least one musculoskeletal symptom, 79.4% of them had fatigue, 66.8% of them had myalgia, 56.9% with back pain, and 41.5% had arthralgia.

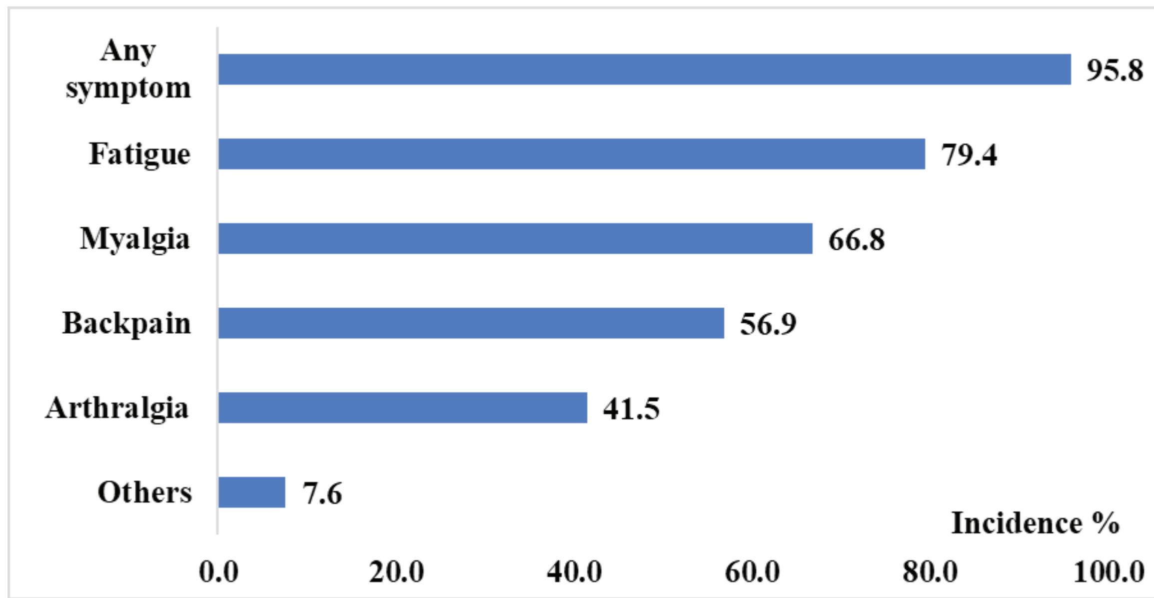

Figure 1: Incidence of Musculoskeletal Manifestations

Furthermore, significant differences were detected between the degrees of COVID-19 severity and the incidence rates of back pain, fatigue, and myalgia. These rates didn't obviously correlate with the grades of severity, i.e., the occurrence rates wouldn't steadily increase with the increase of the disease severity. See Table 2 below showing that no significant association was detected with arthralgia (p = 0.083).

Table 2: Association between the incidence of Musculoskeletal Symptoms with the Disease Severity

	Severity of COVID-19				
	Mild (n = 303)	**Moderate (n = 255)**	**Severe (n = 415)**	**Critical (n = 27)**	**P**
	No. (%)	**No. (%)**	**No. (%)**	**No. (%)**	
Backache	166 (54.8)	159 (62.4)	238 (57.3)	6 (22.2)	0.001
Fatigue	223 (73.6)	206 (80.8)	347 (83.6)	18 (66.7))	0.003
Arthralgia	113 (37.3)	121 (47.5)	172 (41.4)	9 (33.3)	0.083
Myalgia	176 (58.1)	190 (74.5)	285 (68.7)	17 (63.0)	< 0.001

In addition, no significant association was detected between the outcome of COVID-19 with back pain (p = 0.058), fatigue (p = 0.248), arthralgia (p = 0.610), and myalgia (p = 0.455) (see Table 3).

Table 3: Association between the incidence of Musculoskeletal Symptoms with the Disease Outcome

	Outcome of COVID-19			P
	Recovered (n = 939)	RCU (n = 48)	Died (n = 13)	
Back pain	530 (56.4)	34 (70.8)	5 (56.9)	0.058
Fatigue	743 (79.1)	42 (87.5)	9 (69.2)	0.248
Arthralgia	389 (41.4)	22 (45.8)	4 (30.8)	0.610
Myalgia	623 (66.3)	36 (75.0)	9 (69.2)	0.455

Moreover, over half of the smokers had either severe disease (51.1%) or critical disease (3.3%) compared with 39.3% and 2.6% among the non-smokers (p = 0.015) respectively.

Table 4: COVID-19 Severity per Smoking Status

	Smoker		Non-smoker		Total		
Severity	No.	(%)	No.	(%)	No.	(%)	P
Mild	41	(22.3)	262	(32.1)	303	(30.3)	
Moderate	43	(23.4)	212	(26.0)	255	(25.5)	
Severe	94	(51.1)	321	(39.3)	415	(41.5)	
Critical	6	(3.3)	21	(2.6)	27	(2.7)	0.015
Total	184	(100.0)	816	(100.0)	1000	(100.0)	

Discussion

Our study conducted among COVID-19 patients the median age of the participants were 44 years old, more than 55% of the patients were female. Among the most common symptoms observed and found in the patients were malaise followed by fever and headache (80.5%). In a comparison to a study that conducted by Wang D et al, the participants' median age was 56 years old among 138 hospitalized patients; 54.3% of the patients were men and 45.7% were female. The most common symptoms regardless of the disease's severity was as follow: fever 98.6%, fatigue 69.6%, dry cough 59.4%, myalgia 34.8%, and dyspnoea 31.2% respectively[12].

According to a study by Sansin Tuzun et al that examined 150 COVID-19 infected patients, the most

common musculoskeletal symptoms were 85% fatigue followed by 68% myalgia[13]. Their study's findings were close to our study,which shows that the most common symptoms were 79.4% fatigue, followed by 66.8% myalgia. Moreover, our study revealed that 56.9%, 41.5%, and 7.6% of the patients had back pain, arthralgia, and other symptoms respectively (see Figure 1).

The mortality rate as revealed in our study was 13 (1.3%) deaths out of 1000 participants, which was less than the mortality rate (2.6%) found in a study conducted in Korea that included 18 deaths out of 694 patients[14].

Furthermore, debates have been made whether smoking is associated with increased risk of COVID-19 infection and related mortality[7]. A study conducted by Albert Pratis UB et al reported that there was no association between COVID-19 infection and smoking[15]. however, in our study half of the smokers had either severe disease (51.1%) or critical disease (3.3%) and it was statistically significant. These findings may come handy in future to assess the correlation of COVID-19 severity with smoking and the need for further research (see Table 4).

During the severe acute respiratory syndrome coronavirus (SARS-CoV-2) pandemic, several observations suggested that ABO blood type may contribute to the disease[16].The study conducted by Göker H observed that blood group A was more frequent, and the blood group O was less frequent in COVID-19 patients[17]. Moreover, the higher proportion of our study sample included (29.5%) blood group O+ (see Table 1). In the Middle East countries like Iraq, blood group O is the most common even globally followed by A, B, and then AB blood groups[16]. This might also explain why the blood group O in our study result was more frequent in the COVID-19 infected patients.

The limitations of the study

The study had faced some limitations despite good efforts to eliminate them. The use of online-based questionnaires to collect data posed limitation to the study. we anticipated that rural inhabitants with poor to low education level wouldn't afford Internet connectivity, leading to insufficient response to the online survey.

Conclusion

The study shows that the musculoskeletal manifestations are frequent in COVID-19 infected patients; 79.4% of patients had fatigue, 66.8% had myalgia, 56.9% had backache, and 41.5% had arthralgia, fatigue is the most common symptom. The smokers manifest severe or critical conditions of the disease.

Ethical Clearance- taken from the Ethics and Scientific Committees of Kurdistan Board for Medical Specialties.

Source of Funding: self

Conflict of Interest: nil

References

1. Cipollaro L, Giordano L, Padulo J, Oliva F, Maffulli N. Musculoskeletal symptoms in SARS-CoV-2 (COVID-19) patients. The Journal of Orthopaedic Surgery and Research (2020) 15:178
2. COVID-19: Situation Update-GOV.KRD.2020-2021. https://gov.krd/coronavirus-en/situation-update/
3. Paliwal VK, Garg RK, Gupta A, Tejan N. Neuromuscular Presentations in Patients with COVID-19. Neurological Sciences. 2020 Sep 15:1-8.
4. Bogdanova-Petrova S, Georgiev T, Gerganov G, Hristova S, Dimitrov S, Shivacheva T.

POS1224 RHEUMATIC MANIFESTATIONS IN COVID-19 PATIENTS-SINGLE-CENTER EXPERIENCE AMIDST THE PANDEMIC. Annal of rheumatic diseases. 2021:volume80:896-896.

5. UZ C, UMAY E, GUNDOGDU I, UZ F. Back Pain and Related Factors in Patients with COVID-19. https://doi.org/10.21203/rs.3.rs-121763/v1(preprint)
6. Disser NP, De Micheli AJ, Schonk MM, Konnaris MA, Piacentini AN, Edon DL, et al, Musculoskeletal consequences of COVID-19. JBJS. 2020 Jul 15;102(14):1197-204.
7. Williamson EJ, Walker AJ, Bhaskaran K, Bacon S, Bates C, Morton CE, et al. Factors associated with COVID-19-related death using Open SAFELY. Nature. 2020 Aug;584(7821):430-6.
8. Guo FR. Active Smoking is Associated with Severity of Coronavirus Disease 2019 (COVID-19): an Update of a Meta-Analysis. Tobacco Induced Diseases.2020;18.
9. Zhao Q, Meng M, Kumar R, Wu Y, Huang J, Lian N, Deng, et al. The impact of COPD and smoking history on the severity of COVID-19: A systemic review and meta-analysis. Journal of medical virology. 2020 Oct;92(10):1915-21.
10. Vardavas CI, Nikitara K. COVID-19 and smoking: A systematic review of the evidence. Tobacco induced diseases. 2020;18.
11. Epi info 7 computer program sample size calculator. February 2,2018. .https://www.cdc.gov/epiinfo
12. Wang D, Hu B, Hu C, Zhu F, Liu X, Zhang J, et al. Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus–infected pneumonia in Wuhan, China. Jama. 2020 Mar 17;323(11):1061-9.
13. Tuzun S, Keles A, Yildiran T, Palamar D. Assessment of musculoskeletal pain, fatigue and grip strength in hospitalized patients with COVID-19.researchgate.com.preprint. August 12th, 2020. https://doi.org/10.21203/rs.3.rs-56548/v1.
14. yeon Lee J, Hong SW, Hyun M, Park JS, Lee JH, Suh YS, et al. Epidemiological and clinical characteristics of coronavirus disease 2019 in Daegu, South Korea. International Journal of Infectious Diseases. 2020 Sep 1;98:462-6.
15. Prats-Uribe A, Xie J, Prieto-Alhambra D, Petersen I. Smoking and COVID-19 Infection and Related Mortality: A Prospective Cohort Analysis of UK Biobank Data. Clinical Epidemiology. 2021;13:357.
16. Cooling L. Blood Groups in Infection and Host Susceptibility. Clinical Microbiology Reviews. 2015 Jul;28(3):801-70.
17. Göker H, Karakulak EA, Demiroğlu H, Ceylan ÇM, Büyükaşik Y, et al. The effects of blood group types on the risk of COVID-19 infection and its clinical outcome. Turkish journal of medical sciences. 2020 Jun 23;50(4):679-83.