

Clinical Profile of Covid-19 Infected Patients Admitted in a Tertiary Care Hospital in North India

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ABSTRACT

Background: The novel coronavirus (Covid-19) continues to wreck havoc across China, European countries, USA and now seems to gain a strong foothold in India. The aim of this report is to describe the clinical profiles of these Covid-19 infected patients admitted in Sawai Mansingh Hospital(S.M.S), Jaipur ranging from their age, sex, travel history, clinical symptoms, laboratory evaluation, radiological characteristics, treatment provided along with common side effects and the final outcome. The described cases are one of the earliest cases of Covid-19 in the Indian subcontinent.

Methods: Epidemiological, clinical, laboratory, and radiological characteristics and treatment and outcomes data were obtained with data collection forms from electronic medical records and history given by 21 Covid-19 infected patients admitted in S.M.S., Jaipur. Patients were tested for Covid-19 by real-time reverse transcription polymerase chain reaction (RT-PCR) assay of 2019-nCoV RNA.

Results and Discussion: During the course of this study 21 Covid-19 positive patients were admitted in S.M.S Hospital, Jaipur. Male patients constituted 66.66% of total patients and majority of the patients (80.90%) were below 60 years of age. Most of the patients (71.40%) were either foreigners or had a history of foreign travel suggesting that these cases were not community acquired except for 4 cases from textile producing district Bhilwara (known as Manchester of India), an epicenter of North India. Approximately 33.33% patients were completely asymptomatic and of those who were symptomatic cough was the most common symptom (85.71%) followed by fever (78.57%), myalgia (64.28%), headache (28.57%) and dyspnea (28.57%). Three patients (14.28%) had underlying co-morbidity in the form of hypertension, diabetes mellitus, hypothyroidism, chronic kidney disease or coronary artery disease. 11 patients (52.38%) had lymphopenia in their hemogram during the course of admission. 3 patients (14.28%) had leucocytosis and 4 patients (19.04%) presented with thrombocytopenia. All 4 patients in the severe category had raised FDP, D-Dimer levels and they needed oxygen support. These patients had deranged liver functions and had elevated pro-calcitonin levels, serum ferritin levels and LDH levels. 1 out of these 4 cases went into ARDS during the course of treatment. 10 patients yielded negative results for Covid-19. The mean duration from admission to getting 1st Covid-19 sample negative was 8.3 days. 18 patients (85.71%) are still under treatment.

Conclusion: Clinical investigations in initial Covid-19 patients in the Indian subcontinent reveal lymphopenia as predominant finding in hemogram. Patients with older age and associated comorbid conditions (COPD and diabetes) seem to have greater risk for lung injury thereby requiring oxygen support during the course of disease and these patients also had greater derangement in their biochemical profile.

Keywords: Corona, Covid-19, Lymphopenia in Covid-19, ARDS

INTRODUCTION

In December 2019 a new respiratory tract infecting agent emerged in Wuhan city of China, known as the coronavirus. It was later named Covid-19. Full-genome sequencing and phylogenetic analysis indicated that 2019-nCoV is a form of betacoronaviruses associated with human severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS).¹ The 2019-nCoV has close similarity to bat coronaviruses, and it has been postulated that bats are the primary source. While the origin of the 2019-nCoV is still being investigated, current evidence suggests spread to humans occurred via transmission from wild animals illegally sold in the Huanan Seafood Wholesale Market.² It spread rapidly through China infecting more than 85,000 people. Within a few months it engulfed the Europe causing massive loss of life and property in Italy, Spain, France, Germany, UK and then USA. It is now set to gain a foothold in India which is the second most populous country of the world. As of now more than 650,000 people have been infected and 28,000 people have succumbed to the illness across the globe. The WHO declared Covid-19 a global pandemic on 11th March 2020. Illness ranges in severity from asymptomatic or mild to severe; a significant proportion of patients with clinically evident infection develop severe disease. Mortality rate among diagnosed cases (case fatality rate) has a variable range; true overall mortality rate is uncertain, as the total number of cases (including undiagnosed persons with milder illness) is unknown.³ Before 3rd March, India had 3 cases of coronavirus in Kerala all of which were treated and discharged. On 3rd March, India's 4th case was diagnosed in the state of Rajasthan and it was later found that this patient had infected 17 other Italians who were on a tour to India. Within this period 21 Covid-19 infected patients were admitted in Sawai Mansingh Hospital, Jaipur. The objective of this paper is to describe the clinical profiles of these patients ranging from their age, sex, travel history, clinical symptoms, laboratory evaluation, radiological characteristics and treatment provided along with common side effects and outcome.

STUDY DESIGN

All consecutive patients with confirmed Covid-19 infection admitted to SMS Hospital, Jaipur from 1st March upto submission of paper, were enrolled. Oral consent was obtained from patients. The clinical outcomes (i.e., discharges, mortality, and length of stay) were monitored upto submission of paper.

DATA COLLECTION

The medical records of patients were analyzed by the research team of the Department of Medicine, SMS Hospital, Jaipur. Epidemiological, clinical, laboratory, and radiological characteristics and treatment and outcomes data were obtained with data collection forms from electronic medical records and history given by patients. All data was reviewed by internal medicine specialists. Information recorded included demographic data, medical history, exposure history, underlying comorbidities, symptoms, signs, laboratory findings; chest computed tomographic (CT) scans, and treatment measures (antiviral therapy, Anti-retroviral therapy, anti-malarial therapy, respiratory support). Berlin definition was used to define ARDS.⁴

REAL-TIME REVERSE TRANSCRIPTION POLYMERASE CHAIN REACTION (RT-PCR) ASSAY FOR COVID-19

Throat swab samples were collected for extracting 2019-nCoV RNA from patients suspected of having 2019-nCoV infection and were placed into a collection tube containing virus transport medium (VTM) for extraction of total RNA. This process was tried to be completed in minimum possible time. Optimum amount of cell lysates were transferred into a collection tube and were later centrifuged. The suspension was used for RT-PCR assay of 2019-nCoV RNA. This diagnostic criterion was based on the recommendation by the National Institute of Virology (Pune).

SELECTED CASE PROFILES

Case 1: A 67 year old male, chronic smoker (40 pack years), resident of Italy presented to S.M.S Hospital with chief complaints of fever, cough and shortness of breath. He was started on a combination therapy of Tab chloroquine, Tab Lopinavir + Ritonavir and Cap Oseltamivir along with appropriate antibiotics when his report came positive for Covid-19. He was able to maintain saturation on Non-invasive BiPap form of ventilation for 19 days but due to progression into ARDS (Figure 1), he was later intubated. He became corona negative on 12th day of his hospitalization and was referred to other hospital as per request of Italian embassy.

Case 2: An 85 year old male, known case of Type 2 Diabetes mellitus, Coronary Artery Disease, Hypothyroidism, Chronic Kidney Disease, Hypertension and had a travel history to Dubai presented with fever and shortness of breath. He had bilateral pneumonitis (Figure 2) and was also diagnosed as a case of corona on 10th March 2020. He was started on same drug combination as Case 1 and he turned negative on 5th day of his treatment. Antibiotics were started according to culture sensitivity. He was discharged and advised home quarantine for 14 days and is doing well in follow up.

Case 3: A 24 year old male with history of travel to Spain presented with fever and myalgia. He had no shortness of breath. He developed chest pain on 4th day of his hospitalization. His ECG (Figure 3) was suggestive of Tall T waves and ST elevation, though Trop-T was normal.

Case 4: A 38 year old male, healthcare worker by occupation presented with fever and cough since 5 days. He is a physician in Bhilwara district of Rajasthan. He was diagnosed as a case of Covid-19 on 18th March 2020. His Chest Xray PA view was suggestive of bilateral pneumonitis and CT scan (Figure 4) was done outside before being admitted in S.M.S. Hospital, Jaipur. We relied more on serial chest Xray and clinical evaluation rather than CT scan of chest as going for CT scan may have posed a risk to other patients.

RESULTS

Demographics, clinical features and laboratory findings:

A total of 21 patients diagnosed as Covid-19 were included in this study with 4 patients not maintaining oxygen saturation on room air and needed oxygen support and rest 17 patients who did not require oxygen support. The median age for all patients was 43.5 years ranging from 2 to 85 years and the majority (80.90%) of them were below 60 years of age (Table 1). 66.66% of patients were male, while all patients who needed oxygen support were male. Four patients (19.04%) out of 21 were healthcare workers. 3 patient (14.28%) had underlying co-morbidity in the form of hypertension, diabetes mellitus, hypothyroidism, chronic kidney disease or coronary artery disease. One patient (4.76%) had history of being a chronic smoker. 3 out of 4 patients requiring oxygen support had one or the other co morbidity (Table 2) in the form of diabetes (50%), hypertension (50%), hypothyroidism (50%), COPD (25%).

Seven patients (33.33%) of total were asymptomatic (Table 1). Of those who were symptomatic 11 patients (78.57%) presented with fever, 12 patients (85.71%) had cough, 9 patients (64.28%) had myalgia, 4 patients had headache

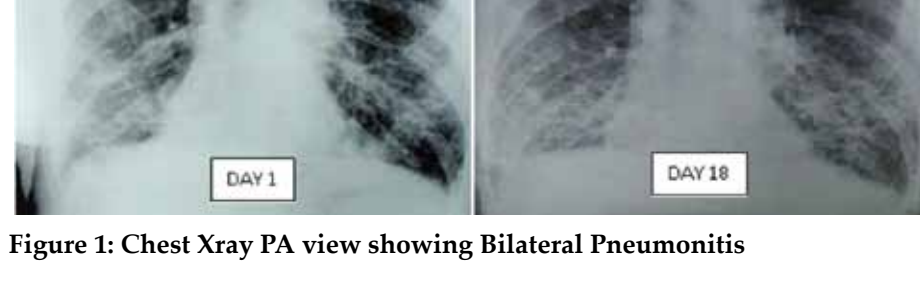


Figure 1: Chest Xray PA view showing Bilateral Pneumonitis



Figure 2: Chest Xray PA view showing Bilateral Pneumonitis with LV type cardiomegaly

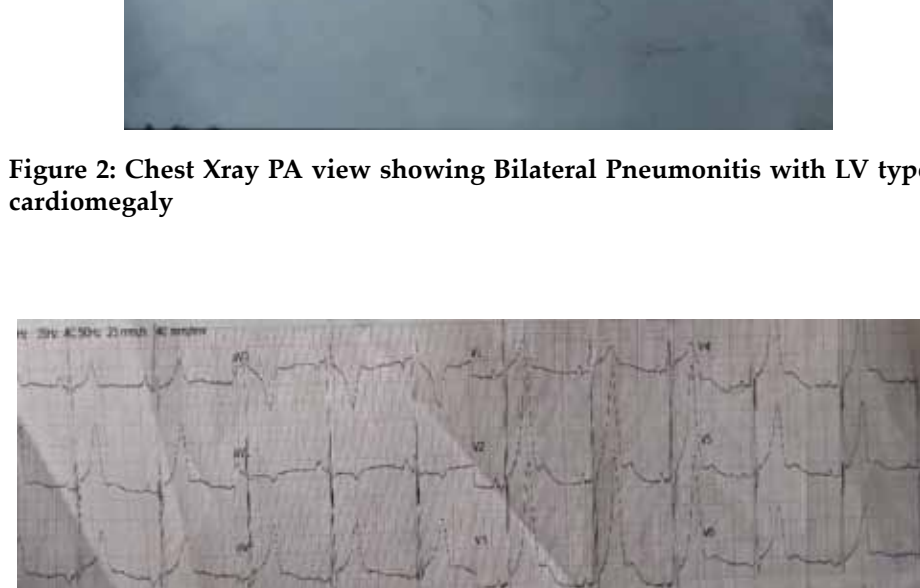


Figure 3: ECG showing Tall T waves and ST elevation

Table 3: Patient's Demographic /Treatment /Outcome Details

Age/ Sex	Nation	Travel h/o	Symptoms	Treatment	Adverse Events	Positive On	1st Negative On	2nd Negative On				
			Lopinavir + Ritonavir	Oseltamivir	Chloro-quine	O2 support						
1	67 M	Italian	Italy	Fever, Dyspnea, Cough	✓	✓	✓	✓	Diarrhoea	2nd Mar	14th Mar (Day12)	15th Mar (Day13)
2	85 M	Indian	Dubai	Fever, Dyspnea, Cough	✓	✓	✓	✓	Diarrhoea	10th Mar	14th Mar (Day4)	15th Mar (Day5)
3	70 F	Italian	Italy	Asymptomatic	×	×	×	×	None	3rd Mar	9th Mar (Day6)	11th Mar (Day8)
4	24 M	Indian	Spain	Fever, Myalgia	✓	✓	×	×	Diarrhoea, Chest Pain	13th Mar	-	-
5	29 F	Indian	Spain	Headache, Cough	×	×	✓	×	None	19th Mar	28 th Mar (Day 9)	-
6	2 F	Indian	Italy	Asymptomatic	×	×	×	×	None	19th Mar	27th Mar (Day8)	-
7	32 F	Indian	Italy	Myalgia	✓	✓	✓	×	Gastritis	19th Mar	27th Mar (Day8)	-
8	30 M	Indian	Italy	Asymptomatic	✓	✓	✓	×	Gastritis	19th Mar	-	-
9	27 M	Indian	Switzerland	Fever, Cough, Headache	×	×	×	×	Diarrhoea	19th Mar	-	-
10	38 M	Indian	Bhilwara	Fever, Cough	✓	✓	✓	×	Diarrhoea	20th Mar	28 th Mar (Day 8)	-
11	37 M	Indian	Bhilwara	Fever, Dyspnea, Cough	✓	✓	✓	✓	None	18th Mar	28 th Mar (Day 10)	-
12	31 M	Indian	Spain	Headache, Cough	×	×	✓	×	Diarrhoea	19th Mar	28 th Mar (Day 9)	-
13	27 F	Indian	New York	Cough	×	✓	✓	×	Diarrhoea, Vomiting	19th Mar	28 th Mar (Day 9)	-
14	44 M	Indian	Dubai	Asymptomatic	✓	✓	✓	×	Gastritis	23rd Mar	-	-
15	45 M	Indian	Oman	Fever, Cough	×	×	✓	×	None	25th Mar	-	-
16	33 M	Indian	Dubai	Fever, Cough, Headache	×	×	✓	×	None	26th Mar	-	-
17	58 M	Indian	Bhilwara	Fever, Cough	✓	✓	✓	✓	Diarrhoea	25th Mar	-	-
18	54 F	Indian	Bhilwara	Fever	×	×	✓	×	Constipation	25th Mar	-	-
19	21 M	Indian	Saudi Arabia	Asymptomatic	×	×	✓	×	None	26th Mar	-	-
20	60 F	Indian	Salasar	Asymptomatic	×	×	✓	×	None	27-Mar	-	-
21	47 M	Indian	Ramganj	Asymptomatic	×	×	✓	×	None	27-Mar	-	-

Table 4: Laboratory Evaluation Of Patients

Age/ Sex	Hemogram	Raised SGOT/SGPT	Raised Pro-calcitonin	Raised CRP	Raised Ferritin	Raised LDH	Deranged Lipid Profile	Raised FDP	Raised D-Dimer
1	67 M	Leucocytosis	Lymphopenia	✓	✓	✓	✓	✓	✓
2	85 M	Leucocytosis	Lymphopenia	✓	✓	✓	✓	✓	✓
3	70 F	Leucocytosis	Lymphopenia	✓	×	×	×	×	×
4	24 M	Leucopenia	Lymphocytosis	×	×	×	×	×	×
5	29 F	Normal		×	×	×	×	×	×
6	2 F	Normal		×	×	×	×	×	×
7	24 M	Leucopenia		×	×	×	×	×	×
8	30 M	Leucopenia		×	×	×	×	×	×
9	27 M	Leucopenia	Thrombocytopenia	×	×	×	×	×	×
10	38 M	Lymphopenia		✓	×	×	×	×	×
11	37 M	Lymphopenia		✓	✓	✓	×	✓	✓
12	31 M	Normal		✓	×	×	×	×	×
13	27 F	Lymphopenia		×	×	×	×	×	×
14	44 M	Thrombocytopenia	Eosinopenia	✓	×	×	×	×	×
15	45 M	Lymphopenia	Eosinopenia	×	×	×	×	×	×
16	33 M	Lymphopenia	Thrombocytopenia	×	×	×	×	×	×
17	58 M	Thrombocytopenia	Lymphopenia	✓	✓	✓	×	✓	✓
18	54 F	Normal		×	×	×	✓	×	×
19	21 M	Normal		×	×	×	×	×	×
20	60 F	Normal		×	×	×	×	×	×
21	47 M	Thrombocytopenia	Lymphopenia	×	×	×	×	×	×

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(28.57%) and 4 patients (28.57%) had shortness of breath. All four patients requiring oxygen support had fever, cough and dyspnea.

Five patients (23.8%) were either residents of Italy or had history of travel to Italy. Three patients (14.28%) had history of travel to Spain. Four patients (19.04%) had travelled to Dubai. 15 Covid-19 positive patients (71.42%) were either foreigners or had history of foreign travel except and four patients (19.04%) who were residents of Bhilwara and one from Ramganj, Jaipur (Table 3).

Four patients (19.04%) of the total needed oxygen support (Table 3). 10 patients (50%) turned Covid-19 negative with mean duration of first negative sample after commencing treatment was 8.3 days. All patients who were given Lopinavir + Ritonavir developed either gastritis or diarrhea. None of them developed QT prolongation. 11 patients (52.38%) were given oseltamivir of which 5 patients (45.45%) turned negative. 18 patients (85.71%) were given chloroquine. Diarrhoea was the most common side effect reported among patients (38%). One young patient developed long T wave in ECG (Figure 3) with slight transient asymptomatic dip in blood pressure but with normal 2D echo and serial quantitative Trop-T. 1 post-corona, 2 samples negative patient was shifted to another hospital as per request of Italian Embassy for the management of ARDS and residual illness, remaining 2 post-corona patients with 2 negative samples were discharged. 18 patients (71.42%) are still under treatment.

Five patients (23.80%) of total had lung infiltrates and rest had normal x rays. The HRCT chest of 2 patients could be done and it was suggestive of bilateral multiple ground glass opacities with predominantly peripheral predilection. Serial X ray and close monitoring of oxygen saturation with ABG / pulse oximeter was done to monitor development of ARDS.

12 patients (57.14%) had lymphopenia in their hemogram (Table 4) during the course of admission. 3 patients (14.28%) had leucocytosis. 5 patients (23.81%) presented with thrombocytopenia. 4 patients (19.04%) had leucopenia and 2 patients (9.5%) had eosinopenia. 14 patients (14.28%) had lymphopenia with thrombocytopenia. Nine out of 13 male patients had lymphopenia (64.28%) while only 2 female patients (28.57%) demonstrated lymphopenia. Seven patients (33.33%) had completely normal hemogram. Six patients (28.57%) had derangement in the liver function tests. Three patients (14.28%) had a deranged lipid profile in the form of hypertriglyceridemia.

Special comments for severe cases:

4 patients (19.04%) needed oxygen support and all of them were male. 3 out of these patients had one or the other co-morbidity in the form of diabetes (50%), hypertension (50%), hypothyroidism (50%) or COPD (25%). 3 of the patients in the severe category belonged to the healthcare workers. Median age was 61 years in this group as compared to 36 years in those who did not require oxygen support. All 4 patients had lymphopenia, 2 patients had leucocytosis and one patient had thrombocytopenia during the course of hospital stay and all of them also suffered with deranged liver functions and elevation in serum bilirubin levels. Elevated pro-calcitonin levels, serum ferritin levels, LDH levels, FDP and D-Dimer levels were found in all 4 patients with oxygen support. 1 out of these 4 (25%) went into ARDS during the course of treatment.

DISCUSSION

This study included 21 Covid-19 affected patients with the median age being 43.5 years, which is a decade younger than that reported by Wang et al⁵ (56.0 years), Chen et al⁶ (55.5 years) and closest to that in Huang et al⁷ (49.0 years). Most of the patients requiring oxygen support were above 55 years of age, thus demonstrating that elder patients were more likely to have lung injury and require ventilator support. Patients requiring oxygen support were more likely to have underlying co morbidities (75%) including either of diabetes, hypertension, COPD or hypothyroidism.

Most of the patients having Covid-19 were male (66.66%) which was similar to that reported by Huang et al and Chen et al which show 73.0% male predominance but higher than that reported by Wang et al (54.3%). This male predominance may have happened due to increased foreign travel by males for occupational or educational purposes. Only 1 (4.76%) patient in our study had COPD as compared to that in Guan et al⁸ (1.1%). This variation maybe due to difference in sample size.

Most of the patients who were Covid-19 infected were foreigners or had history of foreign travel suggesting that these cases were not community acquired except for 4 cases from textile producing district Bhilwara, an epicenter of North India with maximum number of community acquired cases in India from a single district.

In our study cough was the most common symptom present in our patients (85.71%) followed by fever (78.57%) which was in contrast to that reported in Huang et al and Wang et al where fever was the most common symptom found (91.7%) and Guan et al⁸ (87.9%). 7 of our patients (33.33%) were asymptomatic at the time of presentation.

11 patients (52.38%) in our study presented with lymphopenia which is lesser than reported by Zhang et al⁹ (75.4%). Some patients also presented with lymphopenia with thrombocytopenia (14.28%). Lymphopenia was much more commonly seen in male patients (64.28%) as compared to females (28.57%). All patients requiring oxygen support, presented with lymphopenia indicating, that occurrence of lymphopenia can be used as a marker of prognosis. The laboratory evaluation of patients requiring oxygen support to maintain saturatio demonstrated deranged liver function tests and elevated levels of pro-calcitonin, LDH, ferritin, FDP and D-Dimer levels which were significantly higher than in patients who did not require oxygen support.

HRCT chest of patients demonstrated predilection for peripheral lung fields in the form of patchy ground glass opacities.

LIMITATIONS

Our study has some limitations. We studied early cases of the Indian subcontinent. Although a different disease but earlier experience of H₁N₁ pandemic helped us in infrastructural management and treatment. Various treatment guidelines and testing protocols were revised during the study duration.

CONCLUSION

This study showed variable range of presentation. Asymptomatic patients during the course of disease despite being Covid-19 positive pose a great epidemiological risk to the society as they can spread the infection unrestrictedly and shall be strictly isolated. Lymphopenia in hemogram and raised markers like pro-calcitonin, ferritin, FDP and D-Dimer do help in prognosis. Old age and comorbidity is associated with poor prognosis.

CONFLICT OF INTEREST

None of the authors have conflict of interest.

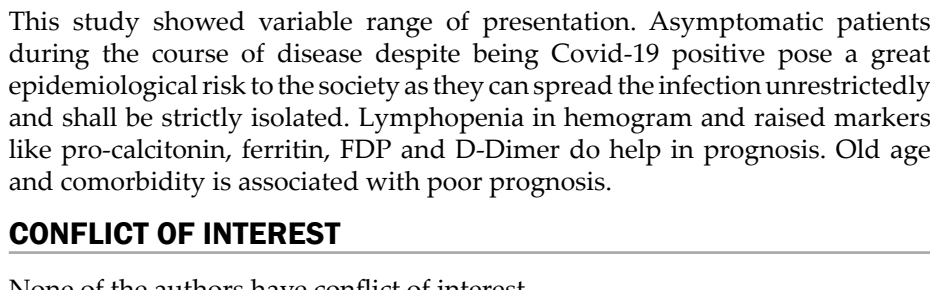


Figure 4: CT scan - Multifocal patchy peripheral and sub pleural area of air space ground glass opacities in both lung parenchyma, involving posterior segments of both upper lobes, lingular segment of left upper lobe, right middle lobe, superior and postero-basal segments of both lower lobes suggestive of viral pneumonitis.

Table 2: Comorbidities

Comorbidities	No. of Patients (n)
Diabetes	2 (9.5%)
Hypertension	3 (14.28%)
Cardiovascular Disease	1 (4.7%)
COPD	1 (4.7%)
Hypothyroidism	2 (9.5%)

Table 1: Patient's Comorbidities and Symptoms

Characteristics	All patients (n=21)	ICU Patients (n=4)	No ICU care (n=17)
Age	43.5(2.0-85.0)	61.0(37.0-85.0)	36.0(2.0-70.0)
Sex			
Men	14 (66.66%)	4 (100%)	10 (58.8%)
Women	7 (33.33%)	0	7 (41.1%)
Smoker	1 (4.76%)	1 (25%)	0
Signs and Symptoms			
Fever	11 (52.38%)	4 (100%)	7 (38.88%)
Cough	12 (57.1%)	4 (100%)	8 (47.0%)
Myalgia	9 (42.85%)	4 (100%)	5 (29.41%)
Sputum production	5 (23.80%)	2 (50%)	3 (14.28%)
Headache	4 (19.04%)	0	4 (19.04%)
Diarrhoea	8 (38.0%)	3 (75%)	5 (29.41%)
Dyspnea	4 (19.04%)	4 (100%)	0