

Disease Spectrum of COVID-19 in Cohort with Travel History from Iran

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ABSTRACT

Background: Coronavirus disease 2019 (Covid-19), declared as a pandemic in March 2020, is an acute respiratory tract illness caused by corona virus 2 (SARS-CoV2) with clinical manifestations ranging from mild upper respiratory tract symptoms to severe pneumonia.

Objective: To determine the disease spectrum of Covid-19 in cohort with travel history from Iran.

Materials & Methods: This cross-sectional study with a retrospective collection of data was conducted at Agha Khan University, Karachi from 15th March to 19th April 2020. One hundred and fifty-five laboratory-confirmed cases of Covid-19 were recruited from a government quarantine facility. Data was obtained from Punjab Emergency Services (Rescue 1122) database where a record of SARS-CoV-2 positive cases and quarantined persons is maintained. Study subjects with a travel history to Iran were contacted on telephone to obtain information about demographics, symptoms, and co-morbid conditions. SPSS version 24 was used to analyze the data. Frequencies and percentages were calculated.

Results: Among the returning travelers, 213 had laboratory-confirmed COVID-19, out of which 155 were included in this study. 56.1% were males with a mean age of 40 years. Among the study participants, 91.6% remained asymptomatic throughout the stay, while 8.4 % became symptomatic. 77.5% of the participants had received BCG vaccination in childhood. Among symptomatic cases 15.4% had asthma and 7.7% had hypertension. The most common clinical manifestation was cough which was present in 38.5% of the study participants. None died among the study participants.

Conclusion: A mild presentation of COVID-19 was seen in our study participants with 91.6% among them being asymptomatic, while 8.4% were symptomatic. There was a high positivity rate in males as compared to females.

Key Words: COVID-19, Travelers, Disease spectrum

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INTRODUCTION

Corona viruses are single-stranded RNA viruses belonging to the family Coronaviridae and subfamily Coronavirinae which is further classified into alpha, beta, gamma, and delta viruses.¹ Corona viruses were only known to cause a mild illness in humans till the early twenty-first century.² In 2002, an outbreak of severe acute respiratory illness originated in Guangdong, China. This acute respiratory illness

was caused by SARS-COV-2, a beta coronavirus traced in bats with civets as intermediate hosts.³ This outbreak lasted till 2003 with 8422 cases worldwide and a fatality rate of 11%.⁴ In 2012, there was another outbreak of acute respiratory illness in Saudi Arabia, caused by a coronavirus, the Middle East Respiratory Syndrome (MERS) with dromedary camels being the intermediate host.⁵ MERS affected 2494 people globally with a fatality rate of 34.4%.⁶

On 31 December 2019, the first case of Covid-19 caused by Sars-CoV-2 was reported in the city of Wuhan, China, where broncho-alveolar lavage samples from a cluster of cases with pneumonia were tested with real-time PCR and these turned out to be positive for beta coronavirus. This analysis showed a close relationship of this viral strain with bat coronavirus.⁷ Based on the data from China, the incidence of severe disease is 13.8% while 80% of the cases had mild to moderate disease.⁸ In Pakistan, the first case was reported on 26th February 2020 and since then 48,091 cases have been reported till 21st May 2020.

Among initial cases of COVID-19 in Pakistan, a significant cohort was the pilgrims returning from Iran. We conducted this study to determine the disease spectrum of Covid-19 in a cohort with a travel history from Iran.

The rationale of this study was primarily to observe the group and establish a ground for further conclusions regarding the associations of vaccinations, medications, age and sex with the positivity rate and severity of COVID-19.

MATERIALS AND METHODS

This cross-sectional study with retrospective collection of data was conducted at Agha Khan University, Karachi from 15th March to 19 April 2020 after IRB exemption (April 6, 2020). One hundred and fifty-five laboratory-confirmed cases of Covid-19 were recruited from a government quarantine facility. Data was obtained from the Punjab Emergency Services (Rescue 1122) database where a record of SARS-

CoV-2 positive cases and quarantined persons is maintained.

A total of 780 pilgrims were isolated at the quarantine center in Dera Ghazi Khan. Two hundred and thirteen patients had a positive reverse transcriptase PCR (RT-PCR) for SARS-CoV-2. Among these 213 patients, 58 were discharged after fourteen days of quarantine and only 155 patients were contactable and were included in the study. The patients were contacted over the phone and the study questionnaire was filled out on the phone after receiving verbal consent.

The study questionnaire included information about age, gender, travel history, including mode of travel and length of stay, smoking history, comorbid illnesses like hypertension, diabetes, asthma and ischemic heart disease, symptoms of COVID-19 like cough, fever, flu, sore throat, shortness of breath, myalgias, history of BCG vaccination and malaria treatment.

Statistical Analysis

The data was analyzed by SPSS version 24. Frequencies and percentages were calculated.

RESULTS

The participants had a mean age of 40±10.4 years. Among the study participants, 87 (56.1%) were males and 68 (43.9%) were females.

Among 155 participants 23.8% had comorbidities. In symptomatic participants, 14% had comorbidities. In asymptomatic participants, 14% had comorbidities and 9.8% of asymptomatic participants had comorbidities. Out of 155 participants, 106 (68.4%) went to Iran and 48 (31%) visited both Iran and Iraq. Among 13 symptomatic patients 11 (84.6%) visited Iran, while only 2 (15.4%) visited both places.

Out of the total study participants, 16 (10.3%) traveled by air and 130 (80.7%) traveled by road. Among symptomatic patients 1 (7.6%) traveled by air and 12 (92.3%) traveled by road.

Table 1: Baseline Characteristics and Clinical Features of the Pilgrims with COVID-19

Characteristics	Total n (%)	Patients without symptoms n (%)	Patients with symptoms n (%)
Total Patients	155(100%)	142(91.6%)	13 (8.4%)
Gender			
Males	87(56.1%)	76 (53.5%)	10 (77%)
Females	68(43.9%)	66 (46.5%)	3 (23%)
Co-morbid diseases	37 (23.8%)	15 (9.8%)	22 (14%)
Hypertension	19 (12.2%)	11 (7.09%)	8 (5.16%)
Diabetes	11 (7.09%)	7 (4.5%)	4 (2.58%)
Asthma	5 (3.22%)	1 (0.7%)	2 (1.29%)
IHD	2 (1.29%)	1 (0.7%)	8 (5.16%)
Travel history			
Iran	106 (68.4%)	95 (66.9%)	11 (84.6%)
Iran and Iraq	49 (31.6%)	47 (32.4%)	2 (15.4%)
Travel route			
By air	16 (10.3%)	15 (10.6%)	1 (7.6%)
By road	139 (89.7%)	127 (89.4%)	12 (92.3%)
Smoking History	22 (14.2%)	19 (13.4%)	3 (23.1%)
History of BCG vaccination	120 (77.4%)	110 (77.5%)	10 (76.9%)
History of taking anti-malarial	11 (7.1%)	9 (6.3%)	2 (15.4%)
Symptoms			
Cough			5 (38.5%)
Fever			1 (7.7%)
Flu			1 (7.7%)
Sore throat			3 (23.1%)
Shortness of breath			2 (15.4%)
Myalgias			1 (7.7%)

The participants who remained asymptomatic throughout the stay with an uneventful recovery were 142(91.6%), while 13(8.4%) became symptomatic with a history of cough in 5 (38.4%), fever in 1 (7.6%), sore throat in 3(23.07%), flu in 2 (7.6%), shortness of breath in 2 (15.38%) and myalgia in 1 (7.6%).

Two participants who developed shortness of breath were females aged 50 and 70 years. None of the two required supplemental oxygen therapy and recovered. The results of the study are illustrated in Table 1.

DISCUSSION

Corona viruses have been known to cause acute

respiratory illness in humans with a history of epidemics due to SARS in 2002 and MERS Corona virus in 2012. The latest one from this family of viruses is SARS- COV-2 with rapid human-to-human spread compared to the previous two.⁹ Information regarding the origin of this virus, transmission, pathogenesis, spectrum of illness and treatment is rapidly evolving. The clinical spectrum of this disease ranges from asymptomatic to critically ill patients with multi-organ failure requiring mechanical ventilation.¹⁰ While the earlier reports from China described associated mortality to be around 2%, as opposed to a higher mortality of around 35% due to MERS, the figures seem to have been

variable depending upon local and other factors and ranging from as high as 9.2% in Europe and 17% in USA. Between 26th February and 27th May 2020, Covid-19 has infected 57,705 people in Pakistan with a mortality rate of 2.1% (1,197) and mortality of 5.64 per 1,000,000 which is far less compared to trends within Europe (mortality of 544.04 per 1,000,000 in Italy) and the USA (299.79 per 1,000,000).

An obvious explanation offered is the difference between population pyramids of different countries. The population older than 65 years is 4.2%, 13% and 21.69% in Pakistan, USA, and Italy respectively.^{11,12,13} This difference in age subgroups, among other factors, may account for some of the difference in mortality - about 70% of deaths in US and more than 90% in Italy were in the 65 years and older age group. One of the earlier studies from China reported an overall case fatality of 2.3% in a study population of 72,314 out of which only 1.2% were asymptomatic with the majority having symptoms of fever, cough, and respiratory distress.¹⁴

This is in contrast to 91.6% of our study population being asymptomatic with no deaths observed. Various factors may have contributed to this, including a small sample size and factors related to pathogen, host, and environment. A somewhat similar observation was reported in an observational study of cruise ship passengers who had departed from Argentina. Of the 59% of passengers who tested positive, 81% had an asymptomatic disease course.¹⁵ In another study from China conducted in hospitalized patients infected with COVID-19, 32%, i.e.; 13 in a cohort of 41 patients had a comorbid illness with the most common one being diabetes and cardiovascular diseases (20% and 30% respectively).¹⁶ Smoking is also being evaluated as a possible risk factor for severe disease. A meta-analysis of 19 peer-reviewed papers associated smoking with severe COVID-19 described a more critical form of disease in 29.8%

of smokers as opposed to 17.6% of non-smokers.¹⁷ In our study population, none of the diabetic patients became symptomatic, 2 patients with asthma developed disease symptoms while smoking history was present in 23.1% (i.e., 3 out of 13 symptomatic cases).

While several host and pathogen factors with possible contribution in pathogenesis are currently being analyzed, one such is the purported role of BCG vaccine affording some protective effect against COVID-19 with a trial underway in Australia.¹⁸ Some data suggests that countries having abandoned universal BCG vaccination may have been more fiercely affected by COVID-19 with higher mortality rates.¹⁹ In our study population, a history of BCG vaccination was available for a similar proportion of persons amongst asymptomatic (77.5%, 110 out of 142) and Symptomatic (76.9%, 10 out of 13).

The limitations of our study was the small sample size and retrospective nature of the study with data collection over the phone and hence the possibility of errors.

CONCLUSION

A mild presentation of disease was seen in our study participants with 91.6% among them being asymptomatic. There was a high positivity rate in males as compared to females.

Conflict of interest:

The authors declare no conflict of interest.

Contributors:

AI&AN: drafted the initial version of the manuscript and performed data analysis

AS: designed the study and data analysis

YRG: Data acquisition

RQ: Contributed to the literature search

RN: proofreading

FS: critical revision of the manuscript

All authors approved the final version and signed the agreement to be accountable for all aspects of the work.

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