

## Original Article

# Frequency of Cardiovascular Complications in Coronavirus-19 infected Patients during the second wave in a tertiary care Hospital of Lahore, Pakistan

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**Abstract:** Coronavirus 2019 (COVID-19) affects the cardiorespiratory systems by causing inflammation of the circulatory systems, hence, causing more cardiac complications in COVID-19 patients **Objective:** To observe the frequency of cardiac complications in COVID-19 patients during the second wave **Methods:** 235 COVID-19 patients presenting with cardiac complication to the Cardiology Department of Mayo Hospital, Lahore during 6 month periods of second wave of COVID-19 were included. Data regarding the medical history, age, gender was taken and the observed cardiac complication were noted **Results:** There were 76.6% male patients and 23.4% female patients. 56.2 % patients were already hypertensive, 37.9% were diabetic, 18.3% had familial history of cardiac diseases. The cardiovascular manifestations observed were, myocardial infarction (57.82%), 7.3% had angina, 21.3% had acute coronary syndrome and 12.3% had non ST elevation myocardial infarction. **Conclusions:** Our study suggests that there is a prevalence of cardiovascular diseases in COVID-patients which is a major concern as they are at increased risk for severe infection.

**Keywords:** Cardiovascular diseases, angina, COVID-19, coronary artery disease, cardiorespiratory system

## Introduction:

SARS corona virus 2, formally known as Corona Virus 19 or COVID-19 was declared a pandemic by World Health Organization March 2020 [1]. After its first emergence in China in late 2019, the virus quickly spread all around the world including Pakistan [2]. The novel corona virus showed deadly impacts on people with underlying comorbidities and cardio-vascular diseases (CVD) [3-7]. People with cardiac complications such as myocardial infarction, angina, hypertension, acute coronary syndrome, heart attack or who had undergone a bypass surgery all were prone to getting seriously ill after catching the disease. It was also observed that the COVID-19 patients who developed severe complications and died, they mostly had cardiovascular diseases upto 20-35% [5]. Pre-existing

cardiovascular conditions are a great risk factor for adverse outcomes related to COVID-19 infection severity [8]. Furthermore, cardiac diseases including myocarditis, heart failure, myocardial infarction, arrhythmia in patients without prior cardiac diseases are emerging, possibly, due to immunologic responses and cytokine syndrome [9]. As the viral infection propagates, many patients will need instant medical care for either COVID-19 or cardiac complications that have arisen or pre-exists but aggravated [10]. Many studies have reported many complications with COVID-19 with cardiac complications as dominant. Severely infected patients with COVID-19 manifests systemic inflammation, thrombosis and vascular abnormalities [11, 12].

COVID-19 infection leads to malfunctioning of multiple organs with emerging evidence suggesting endothelial injury as a prominent effect [13]. Almost 10% of the critically infected patients with COVID-19 die. A critical role of hyperactive immunological response, subsequently lead by endothelial damage and blood coagulation [14]. The risk of catching the disease lies equally amongst the population but the severity of the disease solely depends on an individual's personal health and immune response. People who are having heart problems are at a high risk of developing severe illness. Most of the population have mild to moderate symptoms of corona virus and require no hospitalization. The patients who recovered quite easily were noted to have no underlying comorbidities or heart conditions. The most vulnerable group amongst them are people who are above 60 years of age with underlying heart conditions. They are more likely to develop severe clinical complications after contracting COVID-19 infection.

According to the Center for Disease Control and Prevention, USA, people who have underlying heart conditions are 6 times more likely to be hospitalized after getting the virus. More data revealed that the same patients are 12 times more likely to die because of its complication [15]. The data from Pakistan's mortality analysis of confirmed COVID-19 patients, shows that 94% of patients who died because of the disease had underlying heart condition such as hypertension and ischemic heart disease [16].

Moreover, the complications of the disease in heart patients are quite fatal and manifest quite brutally. These patients require immediate attention and hospitalization. Apart from taking extra precautionary measures such as washing hands, maintaining social distance etc. these people are advised to continue their prescribed medications for their already existing heart condition.

### Methods:

It is a cross-sectional study conducted at Cardiology Department, Mayo Hospital, Lahore,

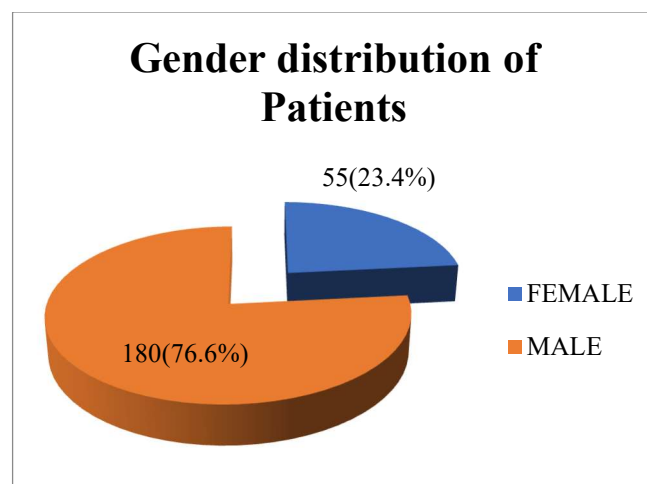
Pakistan for a period of 6 months i.e. September 2020–February 2021 during the second wave of COVID-19. 235 COVID-19 patients presented with cardiovascular manifestations to our department. All the medical history and demographic data was obtained and cardiac complications monitored. The study involved patients from various age groups. The youngest patient involved in the study was 27 years old and the oldest patient being 80 years of age. The average age was 53.14 with a standard deviation of 9.92. Data was analysis statistically by using SPSS version 23.0.

### Results:

The percentage of ejection fraction in these patients also varied in its results. The minimum percentage that was recorded was 30% and a maximum of 80%. The average percentage of ejection fraction was 47.73 with a standard deviation of 9.78 (Table 1).

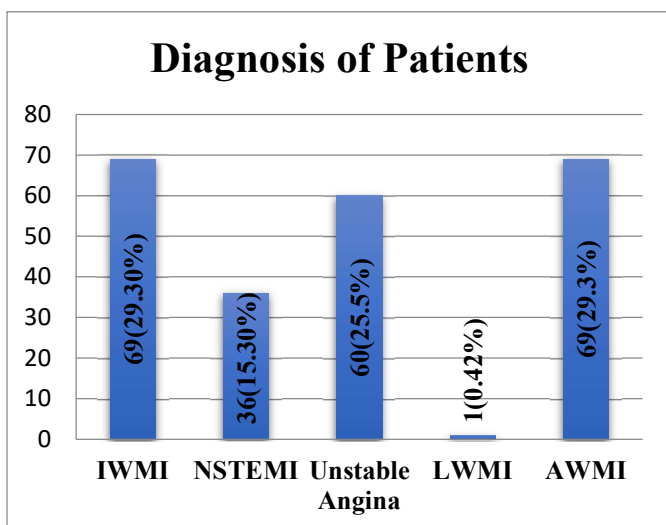
Variable	Minimum	Maximum	Mean $\pm$ SD
Age	27	80	53.14 $\pm$ 9.921
EF%	30.0	70.0	47.73 $\pm$ 9.78

**Table 1:** Descriptive measures



**Figure 1:** Gender of Patients

The data which was collected shows that out of 235 patients; 180 (76.6%) were males and 55 (23.4%) were females (Figure 1).



**Figure 2:** Diagnosis of Patients

The patients that were involved in the study were diagnosed with different cardiovascular diseases. 69 (29.4%) had been diagnosed with anterior wall myocardial infarction and 67 (28.42%) were diagnosed with inferior wall myocardial infarction. 7 (3%) out of 235 patients had angina and 10 (4.3%) had unstable angina. 50 (21.3%) patients were confirmed with acute coronary syndrome and 29 (12.3%) were confirmed with non ST elevation myocardial infarction. The rest of the diseases had less than 1% of patients involved. 1 (0.4%) patient had lateral wall myocardial infarction and 2 (0.9%) patients had IP myocardial infarction.

Comorbidities	Yes	No
Hypertension	132(56.2%)	103(43.8%)
Diabetes Mellitus	89(37.9%)	146(62.1%)
Smoker	104(44.3%)	131(55.7%)
Family History	43(18.3%)	192(81.7%)
IHD	42(17.9%)	193(82.1%)

**Table 2:** Comorbidities in patients

There were several comorbidities also noted in this group of patients. 132 out of 235 had hypertension. 89 patients had diabetes mellitus. 104 of these patients were chronic smokers. 43

of these patients came with a previous family history of cardiovascular diseases and 42 patients had ischemic heart disease as an underlying condition.

### Discussion:

COVID-19 virus primarily infect and impact respiratory system but its impact on cardiovascular system has also been highlighted. Moreover, pre-existing cardiovascular diseases pose an important risk factor for mortality and morbidity during COVID-19 infection. In our study, a survey was conducted to assess the clinical characteristics in patients with heart related complications affected by COVID-19. Based on our data, 235 COVID-patients showed various heart related morbidities, with around 30% exhibited inferior wall myocardial infarction. Al Saied *et al.* also reported arrhythmia, myocarditis and myocardial infarction as main cardiac manifestations of COVID-19 [17].

The mean age of patients was  $53.14 \pm 9.921$ , which suggests higher prevalence of CVD in adults as compared to younger patients. Similar to our results, Sabatino *et al.* also reported mean age of COVID-patients affected with CVD to be 36.6 years [18]. Younger patients suggest lower risk of mortality as well as severity of COVID-19 infection is mild. Co-morbidities such as hypertension and diabetes mellitus other than CVD in patients were also common in patients. Chen *et al.* in a meta-analysis study also reported higher proportion of high severity COVID patients had co-morbidities including coronary heart disease, diabetes and hypertension [19].

Infection of high severity may result in higher mortality rates, as increase in deaths due to ischemic heart disease and hypertension during initial phase of pandemic was reported in some parts of United States [20]. Moreover, a significant decrease in cardiovascular testing and diagnosis was observed due to economic challenges faced by the world during COVID-19 [21]. These challenges further add complications to the COVID-19 patients with co-morbidities. Therefore, precaution such as wearing a mask, maintaining a social distance, sanitization, self-

isolation and vaccination must be ensured by CVD patients.

### Conclusions:

Cardiovascular complications aggravated as the patients got infected with COVID-19. They also had more severe symptoms of COVID-19 as compared to other COVID-19 patients. These patients are more prone to getting contracted with COVID-19 and are high risk group. Precautionary measures should be taken for these patients. Knowledge of cardiovascular manifestations in COVID-19 patients on electrocardiographic presentations may assist the physicians in proper management of such patients.

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