Original Article

Prevalence and Impact of COVID-19 in Immuno-compromised Individuals: An Experience from a Private Outpatient Setting of South Punjab, Pakistan

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Abstract

Objective: To find out the prevalence and impact of COVID-19 on immunocompromised patients visiting outpatient department of a private healthcare facility of South Punjab, Pakistan.

Methods: This cross-sectional study was done at Outpatient Department of Aleena Hospital, Bahawalpur, Pakistan from 1st June 2020 to 30th December 2020. We included a total of 197 patients of both genders aged between 15 to 90 years visiting outpatient department of Aleena Hospital for various medical reasons. All patients underwent antibody testing for COVID-19 adopting immunochromatography for both IgG and IgM. A patient was labeled as immunocompromised if having diabetes mellitus or liver cirrhosis.

Results: In a total of 197 patients, 122 (61.9%) were male. Overall, mean age was 45.1±13.3 years ranging 15 to 90 years. A total of 50 (25.4%) cases were antibody positive for COVID-19. BMI ≥25 (p=0.045), and "been to close proximity with someone who travelled outside/inside the country" (p=0.014) were noted to have significant association with COVID-19 positive cases while all other variables had insignificant association (p>0.05). Presence of diabetes mellitus was noted to have significant association with COVID-19 antibody positivity (p=0.002). Overall, no significant association of immunocompromised status and COVID-19 antibodies positivity was observed (p=0.090).

Conclusion: Prevalence of positive COVID-19 antibodies was very high among patients visiting outpatient department of a private healthcare setting of South Punjab, Pakistan. Immunocompromised individuals were not found to have any significant association with COVID-19 infections.

Keywords: COVID-19, diabetes mellitus, immunocompromised, polymerase chain reaction.

Introduction

The Coronavirus Disease 2019 (COVID-19) pandemic has been the cause of significant morbidity as well as mortality affecting all parts of the world.[1] General presentation of COVID-19 might be ranging from asymptomatic to severe forms of illness while it usually presents as fever with symptoms exhibiting involvement of the lower respiratory tract. Many of the patients might develop "acute respiratory distress (ARDS), septic shock which in turn can further contribute to multi-organ dysfunction and mortality.[2] Age beyond

65 years has been identified to be the most important factor contributing to hospital admissions and severe forms of COVID-19 disease.[2,3]

There are two distinct phases of COVID-19 disease. In 1st phase, initial immunosuppression is caused that instigates viral replication and further results in hyper-inflammatory response progressing into worsening respiratory functional and shock.[4-6] As per the current understanding of the pathophysiological mechanisms involved following COVID-19, immune-compromised patients might be more prone to the COVID-19 infec-

tion.[7-9] A local study analyzing 79 COVID-19 positive cases revealed that 50.7% patients had comorbidities like diabetes (27.8%) or hypertension (26.6%).[10] The present study was planned to find out the prevalence and impact of COVID-19 on immunocompromised patients visiting outpatient department of a private healthcare facility of South Punjab, Pakistan.

Methods
This cross sectional study was conducted at Outpatient Department of Aleena Hospital, Bahawalpur, Pakistan from 1st June 2020 to 30th December 2020. Approval from the "Institutional Research Board" was acquired (Letter number: 1/2021). Informed and written consents were taken from all study participants. Considering 50.7%[10] COVID-19 cases to have comorbidities with 95% confidence level and 7% margin of error, a sample size of 196 was calculated.

We included a total of 197 patients of both genders aged between 15 to 90 years visiting outpatient department of Aleena Hospital for various medical reasons. Patients who refused to part of this study were excluded. At the time of enrollment, gender, age (years), body mass index (kg/m^2), marital status, smoking status and socio-economic status were noted in all patients. Patients were also enquired about the presence of co-morbidities like diabetes mellitus, liver cirrhosis, hypertension or chronic respiratory disease. Presenting symptoms were noted. All patients were asked about their recent traveling history and possible exposure/contact to a probable/confirmed COVID-19 case. Covid-19 antibody testing was done adopting immunochromatography for both IgG and IgM. Antibody positive cases for COVID-19 were noted. A patient was labeled as immune-compromised if having diabetes mellitus or liver cirrhosis. A special proforma was designed to record all study data. Data was analysis was performed using SPSS version 26.0. Qualitative data was represented frequency and percentages. Mean and standard deviation (SD) were calculated for quantitative variables. Comparisons between different sets of patients were made employing chi-square test considering p-value <0.05 as significant.

Results
In a total of 197 patients, 122 (61.9%) were male. Overall, mean age was 45.1±13.3 years ranging 15 to 90 years. Mean BMI was 26.7±6.7 kg/m^2. There were 117(59.4%) patients who belonged to low socio-economic status. There were 139 (70.6%) patients who were immunocompromised. Table-1 is showing comparison of characteristics in between immunocompromised and non immunocompromised patients. Female gender (p=0.009), age between 41 to 60 years (p<0.001), married (p<0.001), hypertension (p<0.001) and serum creatinine> 1 mg/dl (p<0.001) were found to have sig-

nificant association with withimmunocompromised status.

COVID-19 screening revealed that 50 (25.4%) cases were COVID-19 positive. BMI ≥25 (p=0.045), diabetes

Table 1: *Characteristics of Patients (n=197)*

Characteristics		Immuno-compromised (n=139)	Non Immuno-compromised (n=58)	P-Value
Gender	Male	78 (56.1%)	44 (75.9%)	0.009
	Female	61 (43.9%)	14 (24.1%)	
Age in Years	≤40	36 (25.9%)	39 (67.2%)	<0.001
	41-60	86 (61.9%)	18 (31.0%)	
	>60	17 (12.2%)	1 (1.7%)	
BMI in kg/m^2	<25	63 (45.3%)	32 (55.2%)	0.207
	≥25	76 (54.7%)	26 (44.8%)	
Married		75 (94.9%)	25 (62.2%)	<0.001
Household Size	≤6	44 (31.7%)	25(43.1%)	0.173
	>6	95 (68.3%)	35 (56.9%)	
Smoker		21 (15.1%)	10 (17.2%)	0.708
Socio-economic Status	Low	88 (63.3%)	29 (50.0%)	0.189
	Medium	38 (27.3%)	20 (34.5%)	
	High	13 (9.3%)	9 (15.5%)	
Cardiovascular Diseases		8 (5.8%)	0 (0%)	0.062
Chronic Respiratory Disease		6 (4.3%)	1 (1.7%)	0.370
Hypertension		48 (34.5%)	3 (5.2%)	<0.001
Serum Creatinine > 1 mg/dl		54 (38.8%)	43(74.1%)	<0.001
COVID-19 Positive		40 (28.8%)	10 (17.2%)	0.090

mellitus (p=0.002), and "been to close proximity with someone who travelled outside/inside the country" (p=0.014) were noted to have significant association with COVID-19 positive cases while all other variables had insignificant association (p>0.05). Table-2 is showing stratification of different study variables with respect to COVID-19 positivity.

In COVID-19 positive cases, most frequent presenting symptoms were flu like symptoms 35 (70.0%), fever 28 (56.0%), cough 28 (56.0%), headache 21 (42.0%) and dizziness 16 (32.0%). Table-3 is showing association of presenting symptoms among cases with and without COVID-19. It was revealed that flu like symptoms (p<0.001), fever (p<0.001), cough, (p<0.001), dyspnea (p=0.002), myalgia (p=0.034), sore throat (p=0.018) and headache (p=0.001) had significant association with COVID-19 positive cases.

Discussion
Emerging data has demonstrated that adults with immu-

Table 2: *Distribution of COVID-19 Antibody Positive Cases with respect to Study Variables (n=197)*

Study Variables		COVID-19 Antibodies		P-Value
		Positive (n=50)	Negative (n=147)	
Gender	Male	26 (52.0%)	96 (65.3%)	0.094
	Female	24 (48.0%)	51 (34.7%)	
Age in Years	≤40	17 (34.0%)	58 (39.5%)	0.192
	41-60	31 (62.0%)	73 (49.7%)	
	>60	2 (4.0%)	16 (10.9%)	
BMI in kg/m²	<25	18 (36.0%)	77 (52.4%)	0.045
	≥25	32 (64.0%)	70 (47.6%)	
Married		4 (12.5%)	17 (18.5%)	0.437
Household Size	≤6	17 (34.0%)	69 (46.9%)	0.111
	>6	33 (66.0%)	78 (53.1%)	
Smoker		5 (10.0%)	26 (17.7%)	0.197
Socio-economic Status	Low	23 (46.0%)	94 (63.9%)	0.059
	Medium	21 (42.0%)	37 (25.2%)	
	High	6 (4.0%)	16 (10.9%)	
Diabetes Mellitus		34 (68.0%)	62 (42.2%)	0.002
Liver Cirrhosis		13 (26.0%)	45 (30.6%)	0.537
Cardiovascular Diseases		2 (4.0%)	6 (4.1%)	0.980
Chronic Respiratory Disease		0 (0%)	7 (4.8%)	0.116
Hypertension		14 (28.0%)	37 (25.2%)	0.693
Unprotected Contact with a confirmed/ probable COVID-19 case		3 (6.0%)	2 (1.4%)	0.072
Traveled outside or inside the country in last 14 days		11 (22.0%)	18 (12.2%)	0.093
Been in close proximity with someone who traveled outside/inside the country		5 (10.0%)	3 (2.0%)	0.014

Table 3: *Frequency of Symptoms among Patients with and without COVID-19 Antibodies (n=197)*

Symptoms	COVID-19		P-Value
	Positive (n=50)	Negative (n=147)	
Flu Like Symptoms	35 (70.0%)	61 (41.5%)	<0.001
Fever	28 (56.0%)	34 (23.1%)	<0.001
Cough	28 (56.0%)	38 (25.9%)	<0.001
Dyspnea	13 (26.0%)	13 (8.8%)	0.002
Insomnia	2 (4.0%)	3 (2.0%)	0.447
Fatigue	2 (4.0%)	2 (1.4%)	0.253
Myalgia	10 (20.0%)	13 (8.8%)	0.034
Anorexia	3 (6.0%)	2 (1.4%)	0.072
Expectoration	3 (6.0%)	5 (3.4%)	0.421
Sore Throat	8 (16.0%)	8 (5.4%)	0.018
Confusion	3 (6.0%)	6 (4.1%)	0.575
Dizziness	16 (32.0%)	33 (22.4%)	0.177
Headache	21 (42.0%)	28 (19.0%)	0.001
Hemoptysis	2 (4.0%)	8 (5.4%)	0.688
Rhinorrhea	3 (6.0%)	8 (5.4%)	0.882
Chest Pain	4 (8.0%)	11 (7.5%)	0.905

seen which could have been the reasons why no significant association of immunocompromised status and COVID-19 positivity was found in the present study. Relatively small sample size in this study could have also influenced our findings that the significance did not reach at a significant level for association between immunocompromised status and COVID-19 positivity (p=0.090). A study from UK found only 8% of pediatric patients with laboratory confirmed SARS-CoV-2 to have severe immunocompromised status.[13] Other researchers have also found that mostly cases of mild severity among COVID-19 positive cases with immunocomprised set of morbidities.[14,15] Some authors have also shown similar rates in outcomes including mortality when immunocomprised individuals undergoing kidney or liver transplant were compared with general population.[16] We noted a significant association of diabetes mellitus and presence of COVID-19 infection in this study. Researchers have nominated diabetes to be risk factors for COVID-19 and our results were consistent with the past findings where patients of diabetes mellitus were labeled to have significantly increased chances of having COVID-19 infection.[17,18]

In this study, flu Like symptoms, fever, cough, dyspnea, myalgia, sore throat and headache were found to have significant association (p<0.05) with COVID-19 infection. All these symptoms are referring to mild nature of the COVID-19 disease while experts have labeled shortness of breath, dyspnea or abnormal chest imaging (highlighting pneumonia) pointing towards severity

nocompromized health status are at increased risk for severe COVID-19 disease.[11] Baek MS et al from Korea analyzing 871 immunocompromised patients observed that these patients were at significantly increased risk of in-hospital mortality and immunocompromised status was an independent predictor for higher risk of death in these patients.[12] In this study, we did not find any significant association between immunocompromised status and COVID-19 positivity when compared to non immunocompromised patients (28.8% vs. 17.2%, p=0.090). In the present study, our set of patients were screened at an outpatient clinic and comprised of cases who were relatively healthy with no major complications

of the disease.[19] Local data suggests fever (18.2%) and cough (13.8%) to be the most frequently noted symptoms accompanying COVID-19 disease. In this study, flu like symptoms followed by fever and cough were the most frequently noted symptoms among COVID-19 cases.[19]

Limitations of the Study: Being a single center study with a relatively small sample size, our findings should not be generalized. As this was a cross-sectional study conducted in an outpatient setting, we were unable to follow up patients for the potential disease progression, management and outcomes.

Conclusion

Prevalence of positive COVID-19 antibodies was very high among patients visiting outpatient department of a private healthcare setting of South Punjab, Pakistan. Immunocompromised individuals were not found to have any significant association with the presence of COVID-19 antibodies positivity. Flu like symptoms, fever, cough, dyspnea, myalgia, sore throat and headache were noted to have significant association with COVID-19 disease.

Acknowledgement

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