

A RETEROSPECTIVE CROSS-SECTIONAL STUDY FOR THE MORTALITY RATE AMONG COVID-19 PATIENTS IN A TERTIARY CARE HOSPITAL; A SINGLE CENTRAL STUDY

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ABSTRACT

Objective/Background: To calculate the survival and mortality rates among patients with COVID-19 pandemic.

Methodology: A single central retrospective cross-sectional study was conducted on 993 patients of COVID-19 from Aziz Bhatti Shaheed Teaching Hospital, Gujrat, Pakistan. Retrospective data was collected using patients reports of duration March, 2020 to January, 2022 from admitted patients of COVID-19 that were isolated in tertiary care hospital. All data was entered and analyzed in SPSS (Version 24.00). P-value ≤ 0.05 was considered as significant value.

Results: Total patients (993) of COVID-19 with average age 44.30 ± 20.24 years from which 547 (55.09%) were male. Out of 993 COVID-19 patients, 507 (51.10%), 243 (24.50%), 193 (19.40%), 30 (3.00%) and 20 (2.00%) were selected from 1st, 2nd, 3rd, 4th and 5th waves of pandemic COVID-19 from which mortalities were observed 394 (77.70%), 137 (56.30%), 38 (19.60%), 4 (13.30%) and 1 (5.00%) respectively, which were statistically significant with p-value < 0.001 . From all patients, 70% (693) were with any comorbidity and overall survival rate was observed 419 (42.20%). Association of survival rate with vaccination status and waves of disease was found statistically significant with P-value < 0.001 .

Conclusion: Survival rate was higher in the 3rd, 4th, 5th waves than 1st, 2nd due to vaccination, whereas morbidity rate was observed high in patients with any comorbidity and patient's age > 40 years.

Keywords: Retrospective study, case series study, COVID-19, survival rate, isolation

INTRODUCTION

The World Health Organization (WHO) has called the viral illness COVID-19, which is linked to the corona virus. COVID-19 begins as an epidemic of pneumonia in Wuhan, Hubei, China,

and is characterized by fever, a dry cough, exhaustion, and rare gastrointestinal symptoms (1) spread in December 2019 around world in 1st, 2nd, 3rd, 4th and 5th waves, the 1st and 2nd way were initially life threatening owing the lack of the COVID-19 vaccine. Various systems were involved such as respiratory (cough, sore- throat, shortness of breath and chest discomfort) gastrointestinal (diarrhea, vomiting and nausea) neurologic (headache or disorientation), and musculoskeletal. Fever, coughing and shortness of breath were more prevalent signs and symptoms. 7 days after the onset of illness, the symptoms were rather minor, but 9 days later, acute respiratory distress syndrome (ARDS), shortness of breath and mechanical ventilation were present. Tentatively, lungs were the major involved organs (1). In Pakistan, virus was verified to have spread on February 26, 2020, when two cases were note (a student in Karachi who had just returned from Iran and another person in Islamabad Capital Territory)(2). The coronavirus is positive single stranded RNA virus with a spherical form, lipid membranes, an encapsulated RNA, and a nucleocapsid proteins, with distinctive “crown-like” spikes on its surfaces, it is the member of the Orthocoronavirinae subfamily (3). The 2019-nCoV's precise origin, location and natural reservoir are still unknown. Theoretically, individuals might get the virus if they come into touch with or ingest an infected animal, person, or reservoir. The viral capacity increases initially and can still be identified 12 days after the onset of symptoms (4). As a result patients with COVID-19 may be contagious as long as two weeks. There was no COVID-19 certified therapy in 1st and 2nd waves. At that time, the primary approaches were symptomatic and supportive treatment, such as, maintaining blood pressure and vital signs while treating consequences including organ failure or secondary infections. Many COVID-19 vaccines have been formulated; however, the two that have had the most success in preventing COVID-19 infection were created by BioNTech/Pfizer, 31 December 2020 and Moderna, 30 April 2021, that is about 95% effective and they were the first mRNA vaccines to receive ‘emergency use authorization’ (by FDA) and ‘conditional approval’ by EMA. Other vaccines were, SII/COVISHIELD and AstraZeneca/AZD vaccines, 16 February 2021, Janssen/Ad26.COV 2.S vaccine developed by Johnson & Johnson, 12 March 2021, Sinopharm COVID-19 vaccine, 7 May 2021, Sinovac-CoronaVac vaccine, 1 June 2021, Bharat Biotech vaccine, 3 November 2021, Covovax vaccine, 17 December 2021, Nuvaxovid vaccine, 20 December 2021. Several additional publications have offered thorough analysis of Moderna mRNA-1273, the BioNTech/Pfizer and CureVac/CVnCoV vaccines, highlighting the differences

and similarities in mRNA structure and LNP design (5, 6). In Pakistan, patients were vaccinated with Sinopharm, later on; Moderna and Pfizer were also used to get vaccination as a booster shot. Viruses often possess the capacity to change regularly and give rise to variations. While some variations change throughout the time, others stay the same. The four coronavirus genera are alpha, beta, gamma and delta. The alpha and beta genera contain viruses that are recognized to be a cause of human illness. These viruses were zoonotic, meaning they could spread from animal to human. Variants are genomes that have different genetic sequences from one another. When a phenotypic difference between, the variations is confirmed, they are referred to be strains (7). The Omicron variant also known as B.1.1.7 was first reported by WHO on 24 November, 2021. It is 40-80% more contagious (8) . The Delta variant, also known as B.1.617 was reported by WHO on 11 May, 2021 and this variant was so dominant that it spread globally. In contrast to other viral strains, delta spreads more rapidly and is the cause of more cases and fatalities worldwide. India is where delta variant was originally discovered. This variety is known as 'double mutant variant' because it occurs in the same virus with two mutations. The COVAXIN vaccine from Bharat Biotech has been shown to successfully neutralize the infection and it is 78% effective against the double mutant variant (9, 10). The attitude towards vaccinations in general, worries about safety due to the rapid development process, opinions that vaccination were unnecessary given, general mistrust, uncertainty about the provenance of vaccines, and a lack of confidence in vaccine efficacy were the most frequent reasons given for refusing the COVID-19 vaccine (11, 12). Although COVID-19 vaccinations were beneficial, none of them were completely successful in preventing COVID-19 ailment. A small proportion of people who have received all recommended vaccinations will nevertheless get COVID-19 illness, and instances are referred to as vaccine breakthrough cases.(10)The Global Advisory Committee on Vaccine Safety (GACVS) of WHO keeps a keen eye on the safety of vaccines following immunization and monitor any side effects that may occur (10).This article describes the survival rate among COVID-19 pandemic patients in a tertiary care hospital which is not discussed earlier in previous published articles. The survival report demonstrated the survival rate of COVID-19 patients before and after the vaccination, survival rate among patients with comorbidities like Chronic Obstructive Pulmonary Disease (COPD), Cardiovascular Disease (CVD), Chronic Kidney Disease (CKD) and Asthma. In this article we describe the parameters i.e., gender effected (number of males and females effected), vaccination status (non-vaccinated,

partial vaccinated, full vaccinated), life status (expire rate, survival rate), number of comorbidities (CVD, CKD, COPD, Asthma). Also describe the vaccination status associated with survival rate, non-vaccination status with mortality rate. This article will help all clinicians and health care providers to better understand the severity of comorbidities and how to increase the survival rate of COVID-19 patients by improving the patient's life by managing the comorbidities because patients with comorbidities were at great risk of death. Objective of the study was to calculate the survival and mortality rates among patients with COVID-19 pandemic.

METHODS

Design, setting and duration of study: A single central retrospective cross-sectional study was conducted in Aziz Bhatti Shaheed Teaching hospital, district Gujrat, Punjab, Pakistan during March to Jan, 2022

Sample size and sampling technique: Total 993 participants were selected with non-probability convenient sampling technique and sample size was calculated using 95% confidence level, 0.05 precision and margin of error is 5%.

Inclusion and exclusion criteria: COVID-19 positive patients were included in the study whereas children of age 1-10 years, pregnant ladies because there were a very minor number of these patients victims of COVID-19 were excluded from the study.

Data collection tool and data Collection procedure: Performa and reports of patients were used as a data collection tool. Data were collected from hospital record and record of Aziz Bhatti Shaheed Teaching Hospital, district Gujrat. Data about COVID-19 patients was collected from five waves of COVID from 26th February, 2020 to 31st January, 2021 using HIS. Patient data was also segregated gender and age group wise, vaccination status, survival and mortality rate. Patient suffered from COVID with prior comorbidities like Chronic Obstructive Pulmonary Disease (COPD), cardiovascular disease (CVD), Chronic Kidney Disease (CKD) and Asthma was also included.

Statistical analysis: Data were entered and analyzed in IBM SPSS version 21.00. A frequency distribution was formulated for descriptive analysis. To assess the association and strength of

association, Chi- Square test and Spearman Correlation Coefficient was applied. P-value ≤ 0.05 was considered as significant value and all results were calculated at 95% confidence interval.

RESULTS

Table 1: Demographic characteristics of patients with COVID-19

Variables	Responses	n(%)
Waves of COVID-19	1st	507(51.10)
	2nd	243(24.50)
	3rd	193(19.40)
	4th	30(3.00)
	5th	20(2.00)
Age group in years	<15	56(5.60)
	15-30	233(23.50)
	31-45	261(26.30)
	46-60	189(19.00)
	>60	254(25.60)
Gender	Male	547(55.10)
	Female	446(44.90)
Facility status	OPD	456(45.9)
	ICU	407(41.00)
	Isolated	130(13.1)
Life status	Expire	574(57.8)
	Survive	419(42.2)
Vaccination status	Non-vaccinated	774(77.9)
	Partial Vaccinated	28(2.80)
	Fully Vaccinated	191(19.20)
Comorbidity	Yes	730(73.50)
	NO	263(26.50)
No. of comorbidity	NO	263(26.50)
	1	364(36.70)
	2	321(32.30)
	>2	45(4.50)
CVD	Yes	355(35.80)
	NO	638(64.20)
CKD	Yes	171(17.20)
	NO	822(82.80)
COPD	Yes	297(29.90)
	NO	696(70.10)
Asthma	Yes	319(32.10)
	NO	674(67.90)
Total		993(100)

By analysis, it showed that total sample was 993(100) of COVID-19 pandemic patients in which, in 1st wave there were 507 (51.10%), in second wave there were total patients 247 (24.50%), in 3rd wave total patient were 193(19.40%), in 4th and 5th waves total number of patients were 30(3.00%) and 20(2.00%) respectively. Age of patients <15 years were 56(5.60%) , age of patients from 15-30 years were 233(23.50%), age of patients from age 31-45 years were 261(26.30%) patients, from 46-60 years were 189(19.00%) and age of patients above 60 years were 254(25.60%). In all-over 5 waves the total number of male and female was 547(55.10%), 446(44.90%) respectively. Total numbers of expired patients were 574(57.80%) and survival rate was 419(42.20%). Vaccination status for COVID-19 include non-vaccinated, partial vaccinated and fully vaccinated as 774(77.90%), 28(2.80%), 191(19.20%) respectively. Patients with comorbidity were 730(73.50). Total number of patients without comorbidity were 263(26.50), with only 1 comorbidity were 364(36.70), with 2 comorbidities were 321(32.30) and <2 comorbidities were 45(4.50) and presence of 1 comorbidity was significantly associated with mortality. Number of patients suffering from CVD, CKD, COPD and asthma were 355(35.80), 171(17.20), 297(29.90) and 319(32.10) respectively.

Analysis showed the demographic characteristics of COVID-19 with total sample 993(100) of COVID-19 pandemic patients in 1st, 2nd, 3rd, 4th and 5th with patients 507(100), 243(100), 193(100), 30(100) and 20(100). Age of patients in 1st wave <15 years, 15-30, 31-45, 46-60 and >60 were 23(4.50%), 142(28.00), 128(25.20), 87(17.20) and 127(25.00) respectively. Age of patients in 2nd wave <15 years, 15-30, 31-45, 46-60 and >60 were 27(11.10), 37(15.20), 70(28.80), 42(17.30) and 67(27.60) respectively. Age of patients in 3rd wave <15 years, 15-30, 31-45, 46-60 and >60 were 4(2.10), 41(21.20), 46(23.80), 45(23.30) and 57(29.50) respectively. Age of patients in 4th wave <15 years, 15-30, 31-45, 46-60 and >60 were 1(3.30), 10(33.30), 9(30.00), 8(26.70) and 2(6.70) respectively. Age of patients in 5th wave <15 years, 15-30, 31-45, 46-60 and >60 were 1(5.00), 3(15.00), 8(40.00), 7(35.00) and 1(5.00) respectively. Total numbers of expired patients in 1st, 2nd, 3rd, 4th and 5th wave were 394(77.70), 137(56.40), 38(19.70), 4(13.30), 1(5) and survival rate was 113 (22.30), 106(43.60), 155(80.30), 26(86.70), 19(95) respectively.

Vaccination status for COVID-19 include non-vaccinated, partial vaccinated and fully vaccinated patients in 1st, 2nd, 3rd, 4th and 5th wave as 507(100), 243(100), 20(10.40), 2(6.70),

2(10.00) respectively and 0.00(100), 0.00(100), 18(9.30), 7(23.30), 3(15.00) and 0.00(100), 0.00(100), 155(80.30), 21(70.00), 15(75.00) .

Table 2: Demographic analysis in different waves (1-5) of COVID-19 pandemic.

Waves of COVID-19	Responses	1st	2nd	3rd	4th	5th
		n(%)	n(%)	n(%)	n(%)	n(%)
Age Group (Years)	<15	23(4.50)	27(11.10)	4(2.10)	1(3.30)	1(5.00)
	15-30	142(28.00)	37(15.20)	41(21.20)	10(33.30)	3(15.00)
	31-45	128(25.20)	70(28.80)	46(23.80)	9(30.00)	8(40.00)
	46-60	87(17.20)	42(17.30)	45(23.30)	8(26.70)	7(35.00)
	>60	127(25.00)	67(27.60)	57(29.50)	2(6.70)	1(5.00)
Life Status	Expire	394(77.70)	137(56.40)	38(19.70)	4(13.30)	1(5)
	Survive	113 (22.30)	106(43.60)	155(80.30)	26(86.70)	19(95)
Vaccination Status	Non-vaccinated	507(100)	243(100)	20(10.40)	2(6.70)	2(10.00)
	Partial Vaccinated	0.00(0.00)	0.00(0.00)	18(9.30)	7(23.30)	3(15.00)
	Fully Vaccinated	0.00(0.00)	0.00(0.00)	155(80.30)	21(70.00)	15(75.00)
Comorbidity	Yes	369(72.80)	187(77.00)	148(76.70)	15(50.00)	12(60.00)
	NO	138(27.20)	56(23.00)	45(23.30)	15(50.00)	8(40.00)
No. of Comorbidity	NO	138(27.40)	56(23.00)	45(23.30)	15(50.00)	8(40.00)
	1	181(35.70)	89(36.70)	75(38.90)	13(43.30)	7(35.00)
	2	162(32.00)	85(35.00)	67(34.70)	2(6.70)	5(25.00)
	>2	26(5.10)	13(5.30)	6(3.10)	0.00(0.00)	0.00(0.00)
Asthma	Yes	176(34.70)	74(30.50)	61(31.60)	2(6.70)	6(30.00)
	NO	331(65.30)	169(69.50)	132(68.40)	28(93.30)	14(70.00)
CVD	Yes	167(32.90)	96(39.50)	82(42.50)	6(20.00)	4(20.00)
	NO	340(67.10)	147(60.50)	111(57.50)	24(80.00)	16(80.00)
CKD	Yes	60(11.80)	62(25.50)	49(20.20)	6(20.00)	4(20.00)
	NO	447(88.20)	181(74.50)	154(79.80)	24(80.00)	16(80.00)
COPD	Yes	181(35.70)	65(26.70)	45(23.30)	3(10.00)	3(15.00)
	NO	326(64.30)	178(73.30)	148(76.70)	27(90.00)	17(85.00)
Total		507(100)	243(100)	193(100)	30(100)	20(100)

CVD: Cardiovascular Disease, CKD: Chronic Kidney Disease, COPD: Chronic Obstructive Pulmonary Disease

Patients with comorbidity in 1st, 2nd, 3rd, 4th and 5th wave were 369(72.80), 187(77.00), 148(76.70), 15(50.00) and 12(60.00) and with no comorbidity were 138(27.20), 56(23.00), 45(23.30), 15(50.00) and 8(40.00) respectively.

Table 3: Association of life status in patient with COVID-19 pandemic

Life status	Responses	Expiry	Survival	Spearman Correlation	Chi Square	P-value
Waves	1st	394	113	0.48	244.73	<0.001*
	2nd	137	106			
	3rd	38	155			
	4th	4	26			
	5th	1	19			
Age Group (Years)	<15	32	24	0.48	244.73	0.093
	15-30	143	90			
	31-45	135	126			
	46-60	105	84			
	>60	159	95			
Gender	Male	313	234	-0.013	0.17	0.68
	Female	261	185			
Vaccination Status	Non-vaccinated	550	224	0.754	887.8	<0.001*
	Partial Vaccinated	19	9			
	Fully Vaccinated	5	186			
Comorbidity	Yes	417	313	-0.023	0.525	0.469
	No	158	105			
No. of Comorbidity	No	158	105	0.013	0.835	0.712
	1	205	158			
	2	184	138			
	>2	27	18			
Asthma	Yes	180	139	-0.019	0.366	0.546
	No	394	280			
CVD	Yes	204	153	-0.015	0.237	0.627
	No	373	266			
CKD	Yes	91	80	-0.042	1.783	0.182
	No	483	339			
COPD	Yes	184	113	0.055	2.989	0.084
	No	390	306			

Number of comorbidities include the patients with 1, 2, >2, and without comorbidity in 1st, 2nd, 3rd, 4th and 5th wave were 181(35.70), 89(36.70), 75(38.90), 13(43.30), 7(35.00), and 162(32.00),

85(35.00), 67(34.70), 2(6.70), 5(25.00) and 26(5.10), 13(5.30), 6(3.10), 0.00(100), 0.00(100) and 138(27.40), 56(23.00), 45(23.30), respectively.

The number of patients suffering from asthma comorbidity in 1st, 2nd, 3rd, 4th and 5th wave were 176(34.70), 74(30.50), 61(31.60), 2(6.70), 6(30.00) and patients those were not suffering from asthma were 331(65.30), 169(69.50), 132(68.40), 28(93.30), 14(70.00) respectively. The number of patients suffering from CVD in 1st, 2nd, 3rd, 4th and 5th wave were 167(32.90), 96(39.50), 82(42.50), 6(20.00), 4(20.00) and patients those were not suffering from CVD were 340(67.10), 147(60.50), 111(57.50), 24(80.00), 16(80.00) respectively. The number of patients suffering from CKD in 1st, 2nd, 3rd, 4th and 5th wave were 60(11.80), 62(25.50), 49(20.20), 6(20.00), 4(20.00) and patients those were not suffering from CKD were 447(88.20), 181(74.50), 154(79.80), 24(80.00), 16(80.00) respectively. The number of patients suffering from COPD in 1st, 2nd, 3rd, 4th and 5th wave were 181(35.70), 65(26.70), 45(23.30), 3(10.00), 3(15.00) and patients those were not suffering from COPD were 326(64.30), 178(73.30), 148(76.70), 27(90.00), 17(85.00) respectively.

Studies showed the association of life status in patients with COVID-19 pandemic in 1st, 2nd, 3rd, 4th and 5th wave with expiry and survival rate 394, 137, 38, 4, 1 and 113, 106, 155, 26, 19 with values of spearman correlation, Chi-square and P-value as 0.48, 244.73 and 0.00 respectively. Age groups of patients in 1st, 2nd, 3rd, 4th and 5th wave were <15 years, 15-30, 31-45, 46-60 and >60 with expiry and survival rate as 32, 143, 135, 105, 159 and 24, 90, 126, 84, 95 with values of spearman correlation, Chi-square and P-value as 0.48, 244.73 and 0.093 respectively. Number of male, female death and survival rate were 313, 261 and 234, 185 with values of spearman correlation, Chi-square and P-value as -0.013, 0.17 and 0.68 respectively. Vaccination status for COVID-19 include non-vaccinated, partial vaccinated and fully vaccinated with expired and survival rate as 550, 19, 5 and 224, 9, 186 with values of spearman correlation, Chi-square and P-value as 0.754, 887.8 and 0.00 respectively. The patient with comorbidities with expired and survival rate were 417, 313 and patient without comorbidities with death and survival were 158, 105 with values of spearman correlation, Chi-square and P-value -0.023, 0.525, 0.469. The patient with no comorbidity, with 1, 2, <2 comorbidities with expiry rate 158, 205, 184, 27 were and patient survival rate 105, 158, 138, 18 with values of spearman correlation, Chi-square and P-value 0.013, 0.835, 0.712. The patient with asthma with expired and survival rate were 180, 139 and patient without asthma with death and survival were 394, 280 with values of spearman

correlation, Chi-square and P-value -0.019, 0.366, 0.546. The patient with CVD with expired and survival rate were 204, 153 and patient without CVD with death and survival were 373, 266 with values of spearman correlation, Chi-square and P-value as -0.015, 0.237 and 0.627. The patient with CKD with expired and survival rate were 91, 80 and patient without CKD with death and survival were 483, 339 with values of spearman correlation, Chi-square and P-value as -0.042, 1.78 and 0.182 respectively. The patient with COPD with expired and survival rate were 184, 113 and patient without COPD with death and survival were 390,306 with values of spearman correlation, Chi-square and P-value as 0.055, 2.989 and 0.084 respectively.

Table 4: Association of vaccination status in different waves of COVID-19 pandemic.

			Wave					Total
			1st	2nd	3rd	4th	5th	
Vaccination Status	Non-vaccinated	Count	507	243	20	2	2	774
		% within Vaccination Status	65.5%	31.4%	2.6%	.3%	.3%	100.0%
		% within Wave	100.0%	100.0%	10.4%	6.7%	10.0%	77.9%
	Partial Vaccinated	Count	0	0	18	7	3	28
		% within Vaccination Status	0.0%	0.0%	64.3%	25.0%	10.7%	100.0%
		% within Wave	0.0%	0.0%	9.3%	23.3%	15.0%	2.8%
	Fully Vaccinated	Count	0	0	155	21	15	191
		% within Vaccination Status	0.0%	0.0%	81.2%	11.0%	7.9%	100.0%
		% within Wave	0.0%	0.0%	80.3%	70.0%	75.0%	19.2%
	Total		Count	507	243	193	30	20
% within Vaccination Status			51.1%	24.5%	19.4%	3.0%	2.0%	100.0%

Analysis showed that the non-vaccination status in 1st and 2nd wave were 100%, and 100%, 10.4%, 6.7%, 10.0%, 77.9% as 3rd, 4th and 5th wave respectively. The partial vaccination status among different waves of COVID-19 pandemic were 0.0%, 0.0%, 9.30%, 23.3%, 15.0%, 2.80%.

The fully vaccination status among different waves of COVID-19 pandemic were 0.0%, 0.0%, 80.3%, 70.0%, 75.0%, 19.2%.

DISCUSSION

Patients were more in 1st wave, COVID-19 patients were decreasing as waves were increases (1st – 5th waves). Patients were more in higher age groups suffered from COVID-19, with the series of cases of COVID-19, along with the previous studies (13, 14) patients above the age of 65 years were more likely to have severe form of COVID-19. Males were more affected as compared to women. One study showed that 56% of the 425 COVID-19 patients in one research were men (15). Another study reported that out of total 140 COVID-19 patients, 50.7% were males (16) because males exposed to environment more than females. Patients were more in OPD than ICU and few were isolated in hospital. Out of total more patients 574(57.80) were expired and survival rate was low. Other studies showed that the total number of deaths is regrettably large in 2nd wave of COVID-19 due to drastically high number of infections (17). Non-vaccinated were more as compared to partial and fully vaccinated due to no vaccine during 1st and 2nd waves of COVID-19 at that time, but in 3rd, 4th and 5th waves of COVID-19, vaccination status was high due to availability of vaccines. Compared to other nations and areas, where vaccination acceptability for the H1N1 virus ranged from 17-67%, Chinese vaccination acceptance for COVID-19 virus was greater (18-21). In accordance with this study patients were more with CVD. Other study also concluded that the patient with the chronic medical disorders, notably cardiovascular disease, have been observed to respond to COVID-19 with significantly worse outcomes (22-24). The clinical feature of patients hospitalized for COVID-19 infection were studied in a recent research in China (14), and preliminary results revealed that 31% of patients had concomitant hypertension and up to 15% had cardiovascular diseases. In relation to COVID-19 comorbidities, other studies showed that cardio-cerebrovascular disease and hypertension both were present in 1572 of COVID-19 patients in six published Chinese studies at rates of 16.4% and 17.1% respectively (25). This study also showed that there was more person with CVD which were more prone towards coronavirus. CVD was the first most common comorbidity associated with increased COVID-19 patients. CKD also associated towards COVID-19 as other studies reported that SARS-CoV-2 infection symptoms in individuals have included various degrees of renal dysfunction (26). According to a recent study, SARS-CoV-2

specifically targets the human kidney because it expresses ACE2 on the surface of its cell (27). In this study, CKD was the second most common comorbidity associated with higher rate of COVID-19 patients. Respiratory viruses triggers asthma exacerbation, which can worsen the severity of infectious illness (28). Asthma has been identified as a risk factor for the COVID-19 morbidity, just as other viruses do (29). Coronavirus has previously been linked to the cause of asthma flare-ups (30, 31). In this study, patients those were suffering from asthma, were also more prone towards COVID-19. Patients with COPD have inadequate lung function reserves, making it easy for superimposed COVID-19 pneumonia, acute respiratory distress syndrome (ARDS), or pulmonary vascular thrombo-embolic events observed in COVID-19 (32, 33) leads to the respiratory failure. COPD patients were at higher risk of mortality from other respiratory infections such as influenza (34). In this study CVD, CKD, Asthma and COPD were the comorbidities. The variations among percentages or numbers are due to the different analytical tools that were used for analyzing the data. Study has limited knowledge about children those from the 1-10 age group. Study has limited knowledge about pregnant ladies.

CONCLUSION

In conclusion, this study identified several factors that showed an association with COVID-19-related mortality. These include comorbidities like COPD, CVD, CKD and Asthma. Among these patients with asthma and CVD were at the great risk of death. Also tell about the gender in which males were more affected with COVID-19 as compared to women. 31-45 age groups were more affected with COVID-19. Vaccination status was better during 3rd, 4th and 5th wave due to availability of vaccine. The death rate was higher than survival rate among COVID-19 patients.

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