Department of Health & Family Welfare

Government of Kerala

COVID 19
Clinical Management Report

INDEX

Message

In this fight against COVID, the Department of Health and Family Welfare is taking a multiprong approach of prevention and cure, effectively supported by all the line Departments. The Department has put up specific structures to provide care and support to the COVID patients in the form of COVID Care Centres, Covid First Line Treatment Centres and COVID Hospitals. These structures were put up on the concept of primary, secondary and tertiary level of COVID care.

It is heartening to note that the State Medical Board has developed a sound treatment protocol. The teams working in COVID Hospitals have put in tremendous efforts, followed up with the treatment protocols and ensured that the maximum number of patients are cured.

In this report the analysis of 500 patients has been done. I appreciate the works done by the State Medical Board, Institutional Medical Boards and the team of doctors and other staff taking care of the COVID Patients.

I feel this Clinical Management Report will be of use to all to understand various analytical aspects related to COVID in context of Kerala.

Best wishes,

K K Shailaja Teacher
Minister Health & Family Welfare
Social Justice
Woman and Child Development
Government of Kerala
Thiruvananthapuram

Foreword

Kerala state landed in the COVID pandemic quite early by the end of January 2020, as the first case in India was detected in Thrissur district of Kerala on 29th January 2020. Since then all the activities right from planning, developing standard operation practices, doing capacity building, procurement, trouble shooting, etc are being done concurrently.

The Department has resolved to take up activities based on scientific knowledge available without compromising at any level. As a result of which, the newer concepts of 'home isolation', Covid Care Centres, Covid First Line Treatment Centres and development of various protocols was done by various expert committees. All these things were done through specific management units in a coordinated way so as to ensure seamless qualitative work in the field.

The Department has developed a software of collating clinical data. At the State level a committee was constituted involving State Medical Board, Institutional Medical Board and teams of the Clinicians of the respective COVID Hospitals. The Committee discussed various issues related to the 500 cases that got cured and after a series of discussions, prepared an analytical report.

It is our endeavor to build capacities of all to do the analysis, draw sound inferences and take actions based on the evidence. As we go forward, the Committee will publish the second volume of report with more analytics. We welcome suggestions from the expert to improve the analysis further.

INTRODUCTION

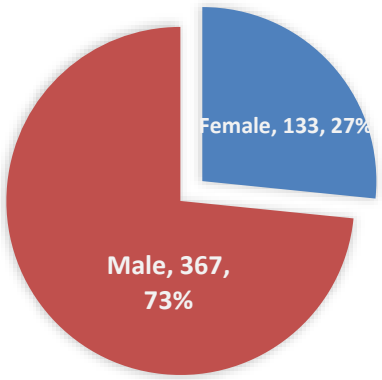
The clinical profile of the first 500 confirmed COVID-19 cases in Kerala has been described in this document. The clinical and epidemiological data from all the cases were captured in a retrospective fashion using an electronic data entry system from designated COVID Hospitals where these patients have been treated. Incidentally the first case of COVID-19 in India was diagnosed in Kerala in Jan 30, 2020, a medical student who had returned from Wuhan. Clinical details of the 500 confirmed patients; with the complete data entry has been captured in this document.

CLINICAL PROFILE

Gender

Of the confirmed COVID 19 cases, 73.4% were males and 26.6% were females**.**

Figure 1 : Gender distribution of COVID positive patients



AGE DISTRIBUTION

Mean age of the patients (n=500) studied was 36.42 years and Standard deviation 15.45 years. Median age is 34 years. Of the total 500 patients, 4.4% were less than 10 yrs of age, 5.8% were between 11 to 20 yrs of age, 28.4% were between 21 to 30 yrs, 27.2% between 31 to 40 yrs of age, 16.8% between 41 to 50 yrs , 10% between 51 to 60 yrs, 4.4% between 61 to 70 yrs, 2% between 71 to 80 yrs and 1 % more than 80 yrs of age.

When age group is considered as a broad division,71.2% of patients were between age 11 to 45 yrs, 17% between 46 to 60 yrs, 7.4% above 60 yrs of age and 4.4% less than 10 yrs of age.

Figure 2: Age distribution of COVID positive patients

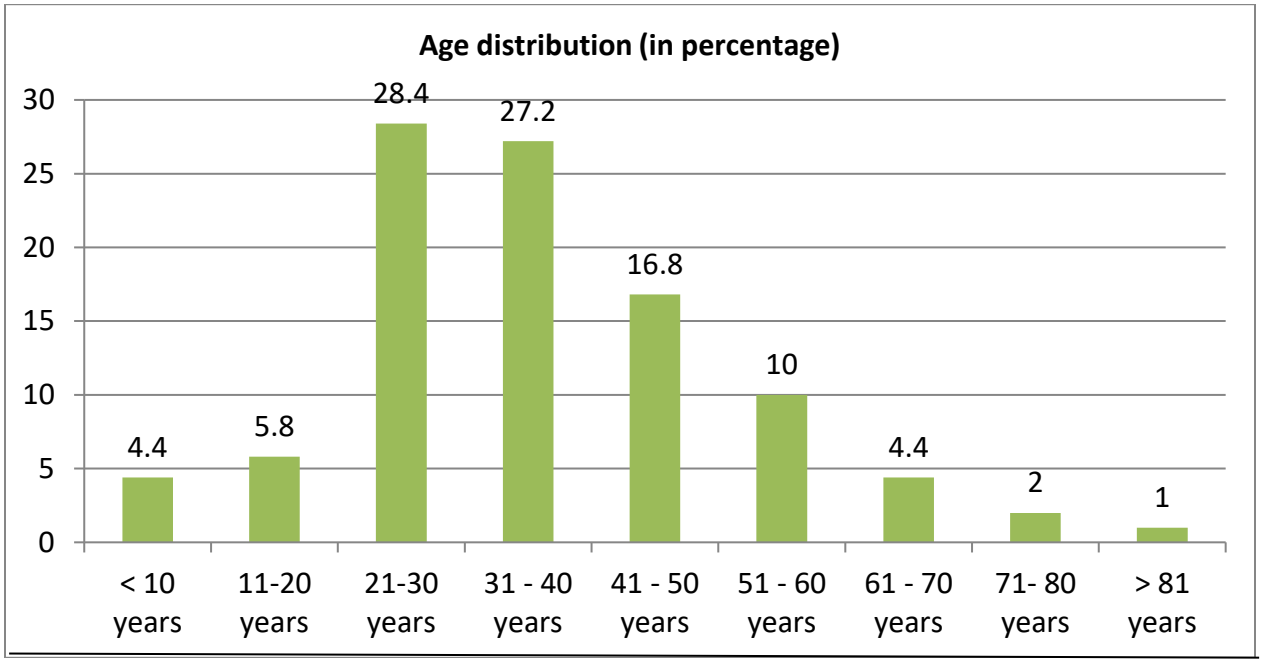


Figure 3: Age distribution of COVID positive patients in broad categories

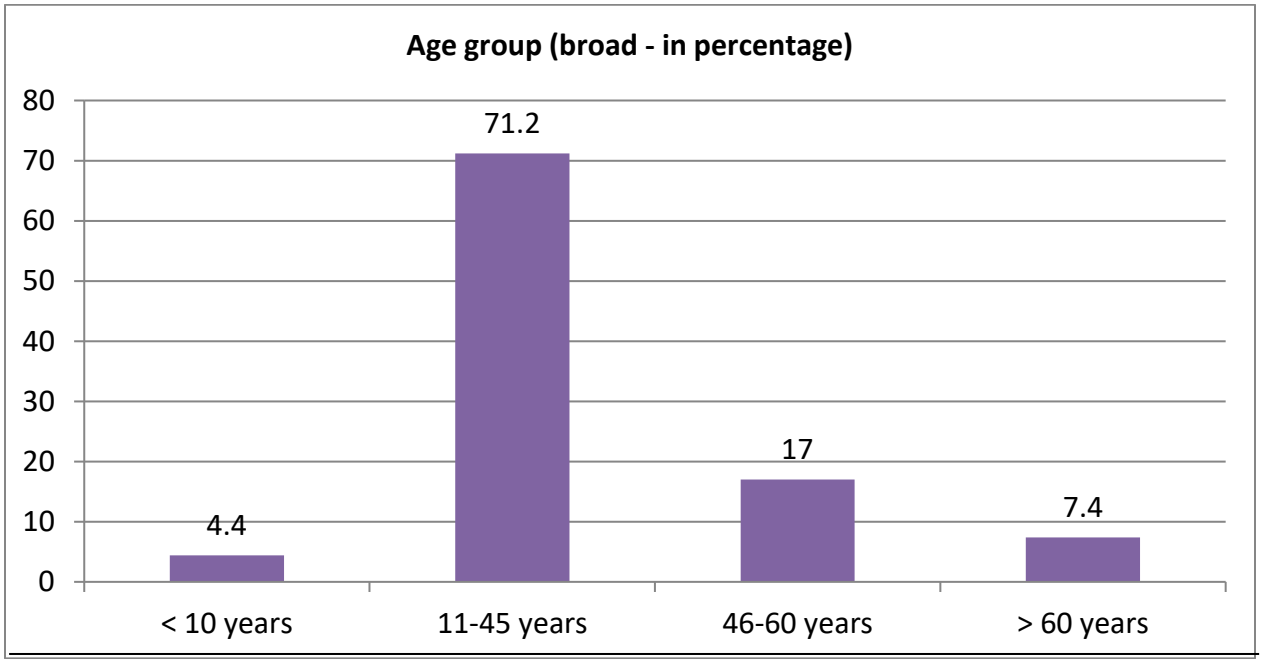


Figure 4: Graph showing Age wise gender distribution of Patients

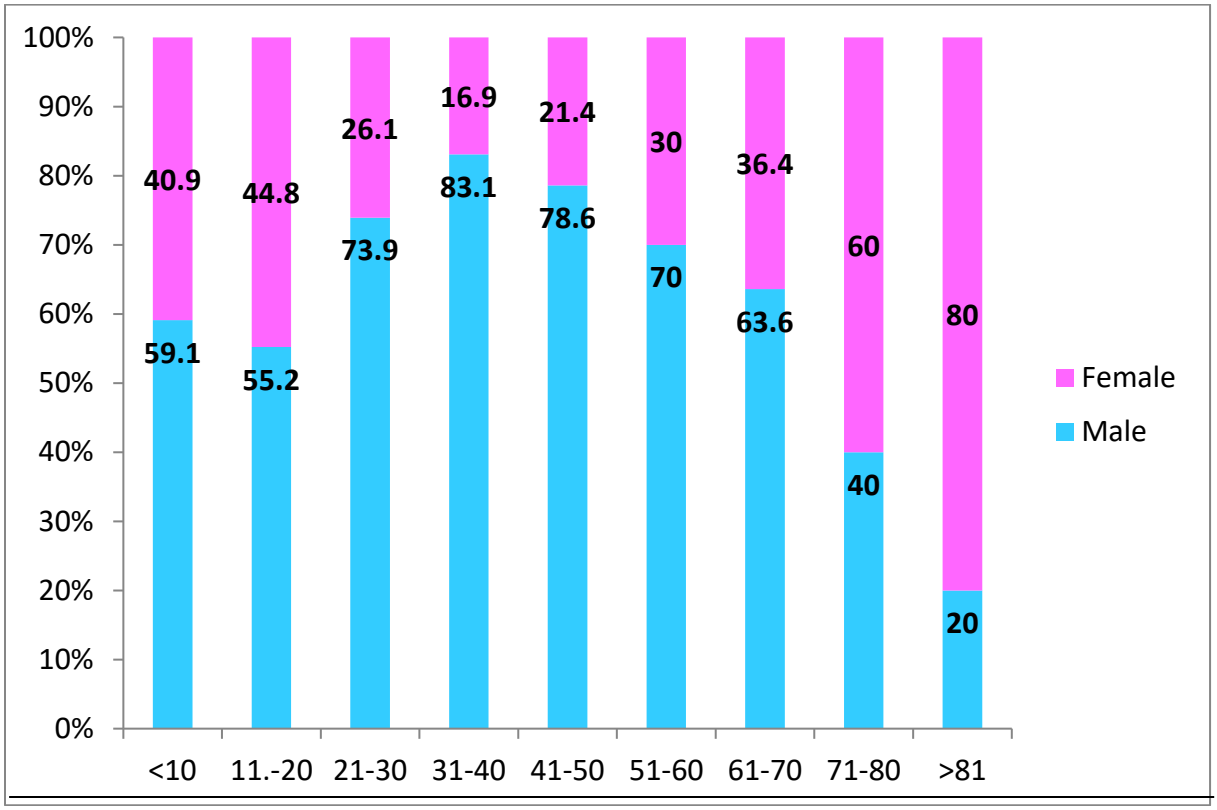


Figure 5: BOX-PLOT DEPICTING TIME METRICS WITH REGARD TO TESTING, DURATION OF HOSPITALISATION AND RTPCR POSITIVITY IN RELATION TO SYMPTOM ONSET

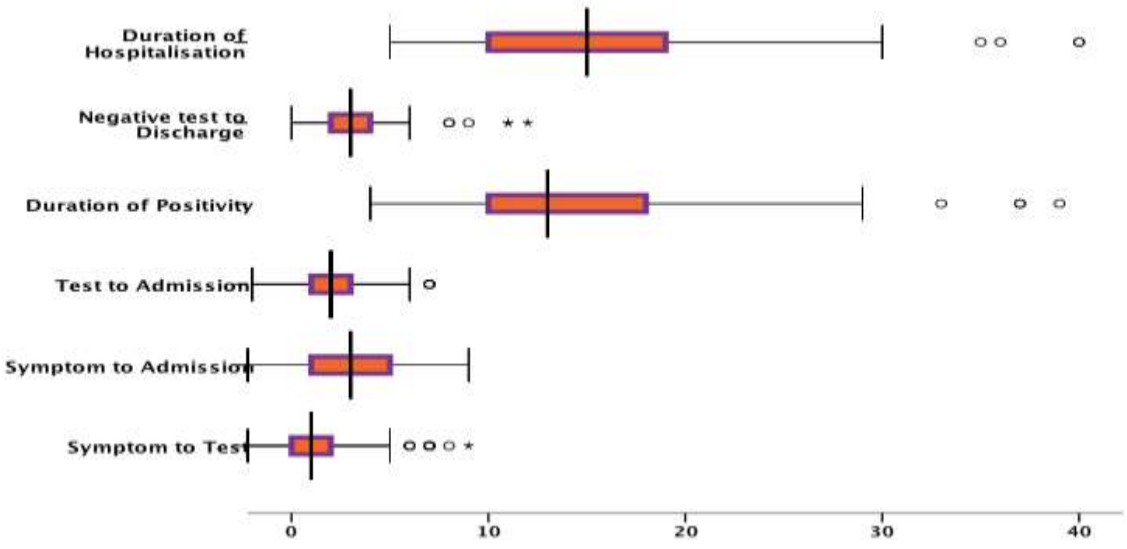


Table 1: Statistics of time taken for patients to get tested, admitted, attain negative status and duration of hospitalization

	Mean	Standard deviation	Median	Max	Min
Time taken from First Symptom to test (in days)	1.8	2.4	1.0		
Time taken from first symptom to admission (in days)	3.05	2.51	3		
Time taken from test to admission (in days)	1.97	1.621	2		
Duration of RTPCR positivity (in days)	13.52	6.57	12	40	2
Time taken from Negative test to discharge (in days)	2.72	1.68	3.0	12	0
Duration of hospitalization (in days)	14.28	6.63	13.0	42	4

Figure 6: Pie diagram showing Proportion of COVID 19 Patients having at least one Symptom

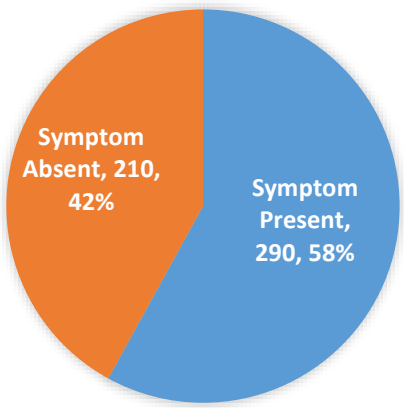
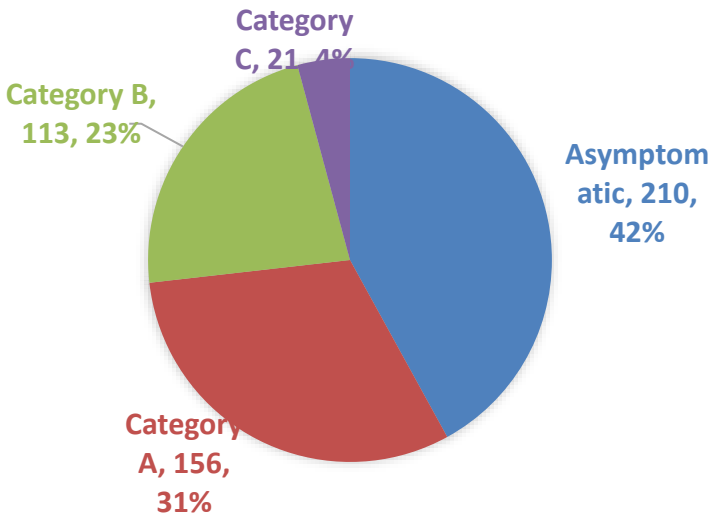


Figure 7: PIE DIAGRAM SHOWING CLINICAL CATEGORIZATION OF PATIENTS



Out of 500 patients, 42% were asymptomatic, 31.2 % were in CAT A, 22.6 % in CAT B and 4.2% in CAT C..

Figure 8: Boxplot showing Age distribution of different Clinical category

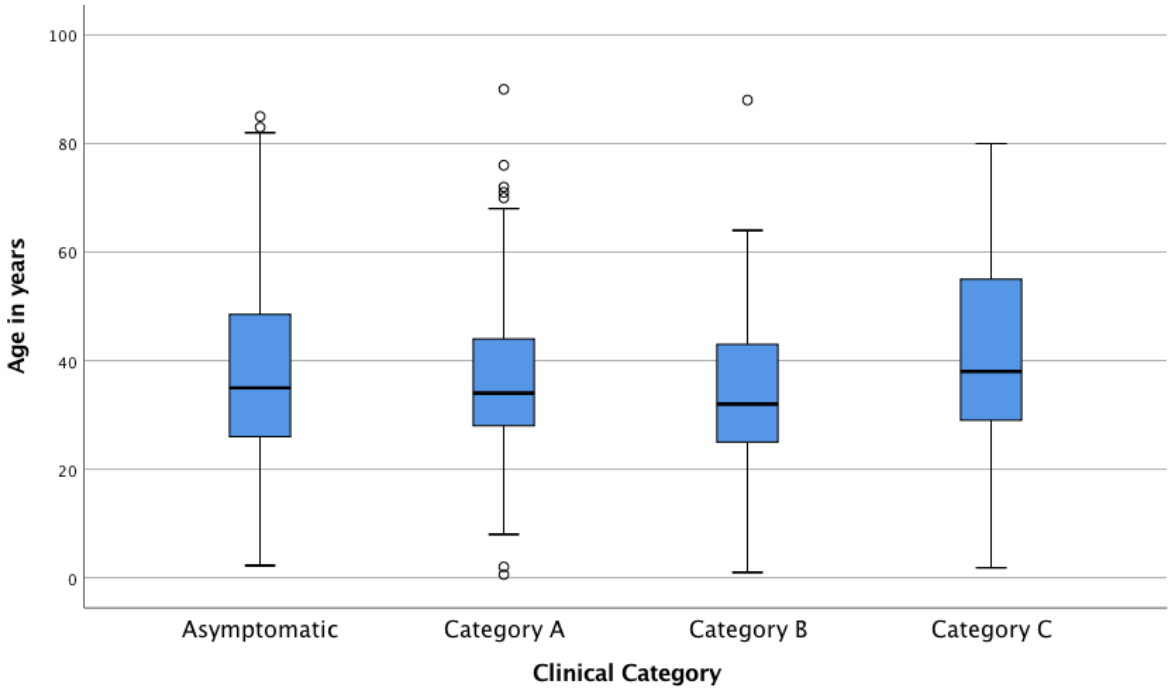


Table 2: Table showing Age distribution of different Clinical category

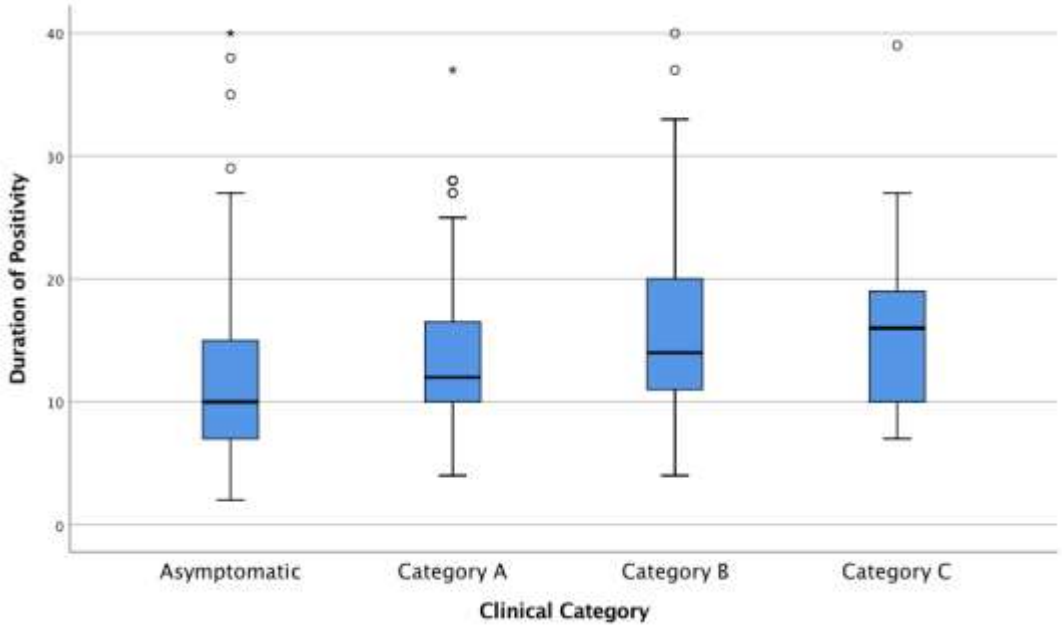
Asymptomatic	**Median**	35
	Mean	36.85
	Std. Deviation	16.711
Category A	**Median**	34.5
	Mean	37.06
	Std. Deviation	14.302
Category B	**Median**	32
	Mean	33.86
	Std. Deviation	13.619
Category C	**Median**	38
	Mean	41.28
	Std. Deviation	18.523

Though not statistically significant, Patients of Category C belonged to higher age group

Table 3: Table showing Distribution of duration of Positivity, Negative test to discharge and Duration of hospital stay

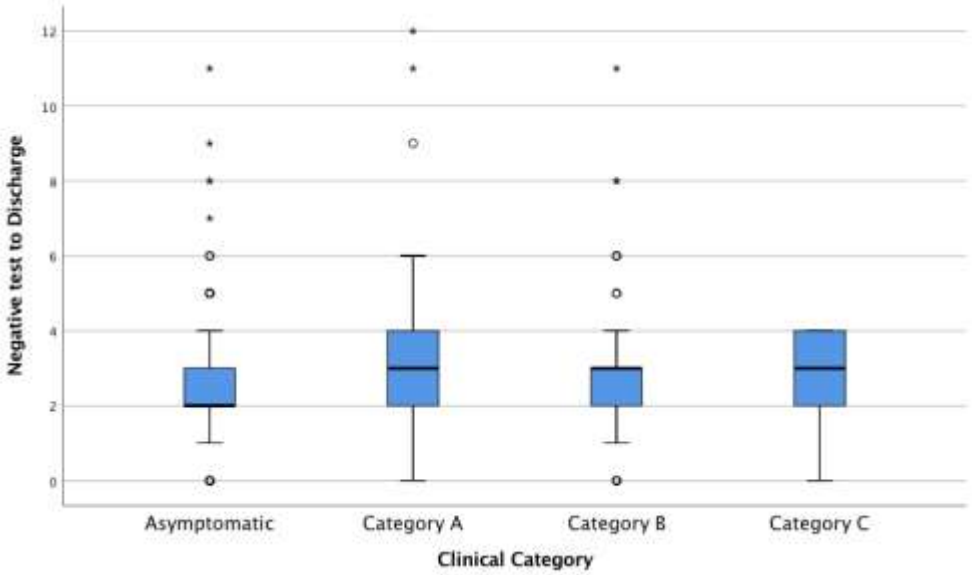
t	Asymptomatic (210)		
	Duration of Positivity	**Negative test to Discharge**	**Duration of Hospitalisation**
Median	10	2	11
Mean	11.89	2.49	12.48
Std. Deviation	6.172	1.636	6.24
Minimum	2	0	4
Maximum	40	11	42
	Category A (156)		
Median	12	3	13.5
Mean	13.72	3.04	14.56
Std. Deviation	6.037	1.713	5.967
Minimum	4	0	5
Maximum	37	12	36
	Category B (113)		
Median	14	3	16
Mean	15.76	2.73	16.72
Std. Deviation	6.896	1.727	6.885
Minimum	4	0	5
Maximum	40	11	40
	Category C (21)		
Median	16	3	17
Mean	16.24	2.62	17.1
Std. Deviation	8.173	1.284	8.619
Minimum	7	0	5
Maximum	39	4	40
Kruskal Wallis Test	p <0.001	p <0.001	p <0.001

Figure 9: Boxplot showing Distribution of Duration of positivity across different Clinical Categories



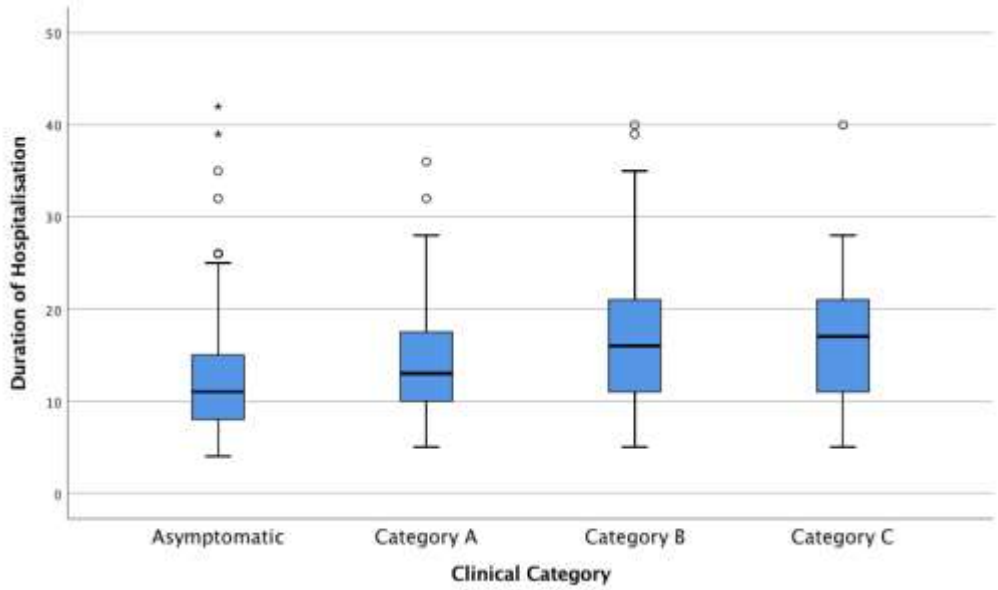
There is a statistically significant increasing trend between duration of positivity and severity of clinical category.

Figure 10: Boxplot showing Distribution of "Time interval between negative test and Discharge from Hospital" across different Clinical Categories



There is statistically significant difference of "1 day " between asymptomatic and symptomatic patients.

Figure 11: Boxplot showing Distribution of Duration Hospitalisation across different Clinical Categories



There is a statistically significant increasing trend between duration of hospitalisation and severity of clinical category.

Table 4: Table showing Duration Hospitalisation across different Clinical Categories

	<= 7 days	8-10 days	11-14 days	15-20 days	21-30 days	> = 31 days
Asymptomatic	37 (17.6%)	66 (31.4%)	50 (23.8%)	35 (16.7%)	18 (8.6%)	4 (1.9%)
Category A	10 (6.4%)	38 (24.4%)	36 (23.1%)	48 (30.8%)	22 (14.1%)	2 (1.3%)
Category B	2 (1.8%)	22 (19.5%)	26 (23%)	33 (29.2%)	27 (23.9%)	3 (2.7%)
Category C	3 (14.3%)	2 (9.5%)	4 (19%)	6 (28.6%)	5 (23.8%)	1 (4.8%)

Figure 12: Clustered column graph showing Duration Hospitalisation across different Clinical Categories

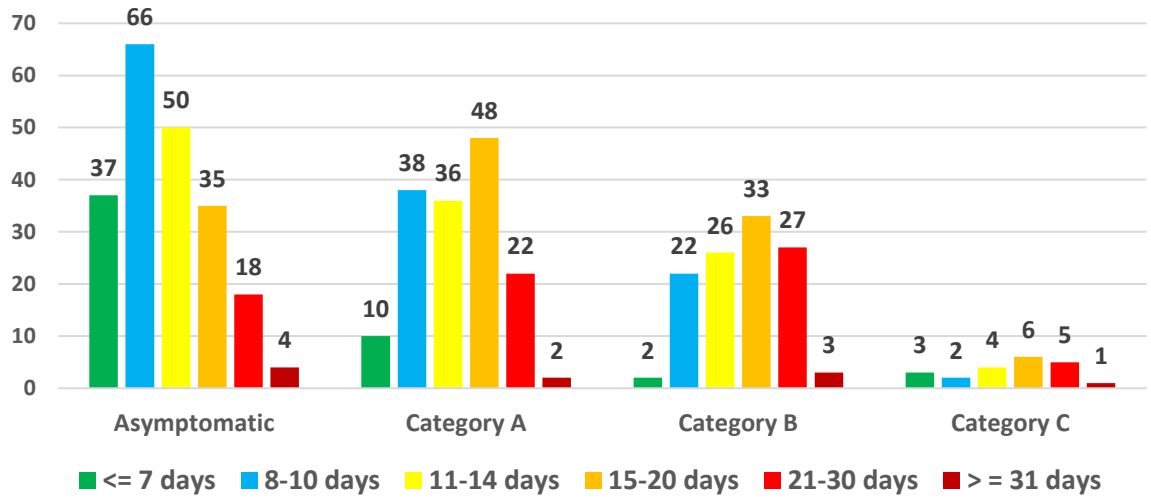


Figure 13: Pie diagram showing RISK CATEGORIZATION OF PATIENT

Out of 500 patients, 95.8% were mild, 3.6% were moderate and 0.6% were severe.

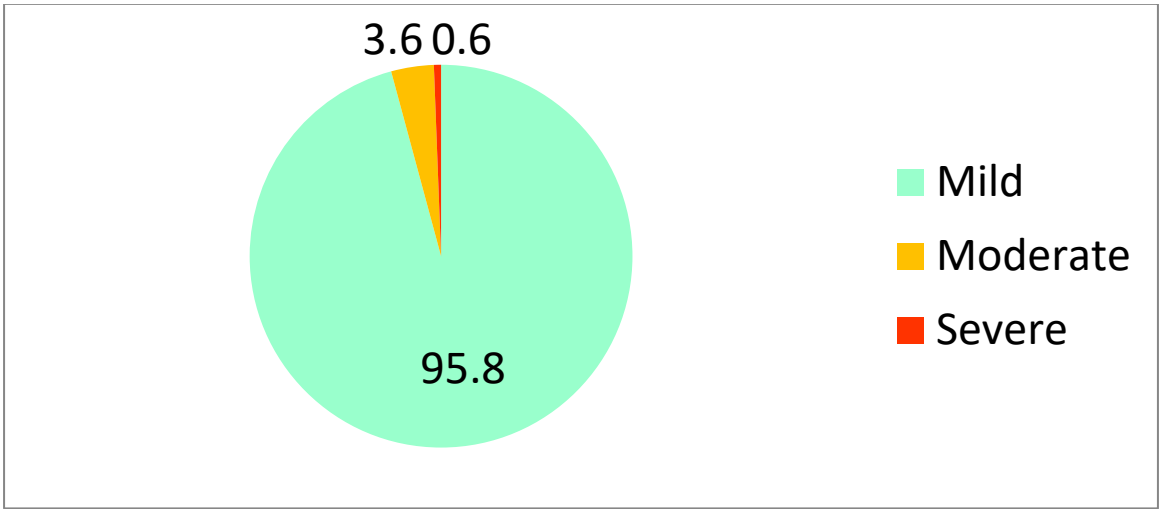
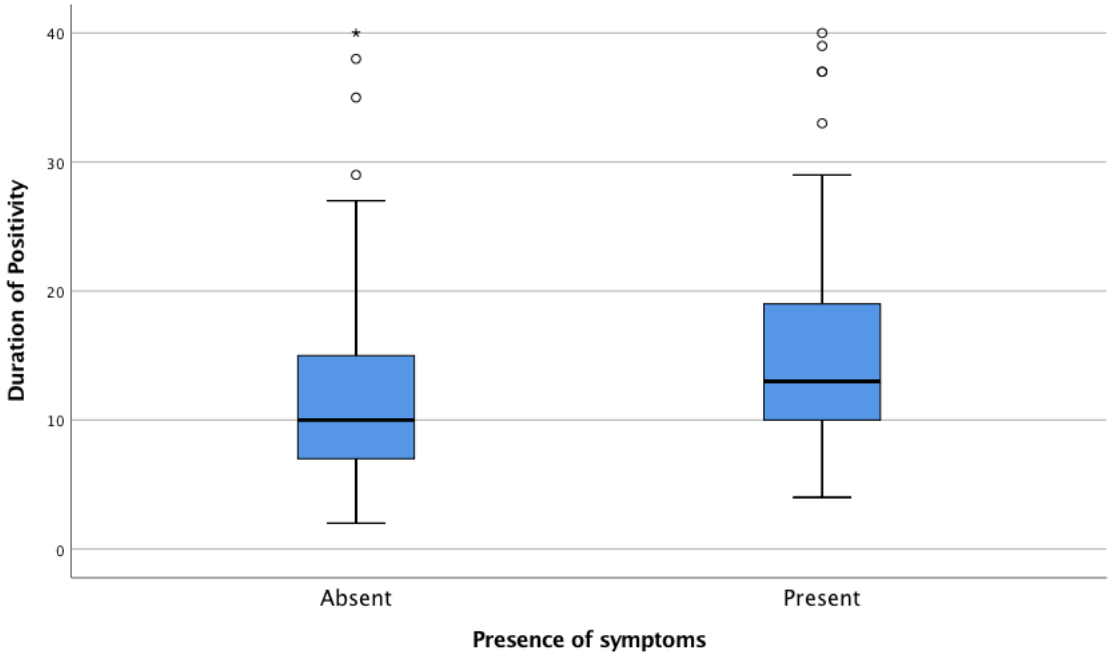
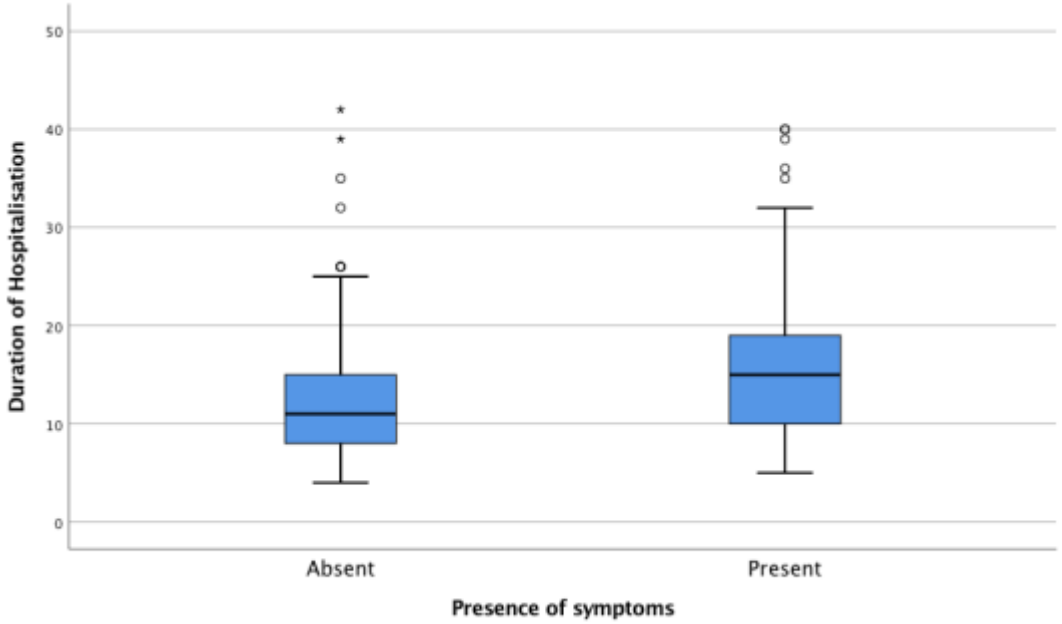


Figure 14: Box plot showing Duration of disease positivity among COVID 19 Patients with and without symptoms



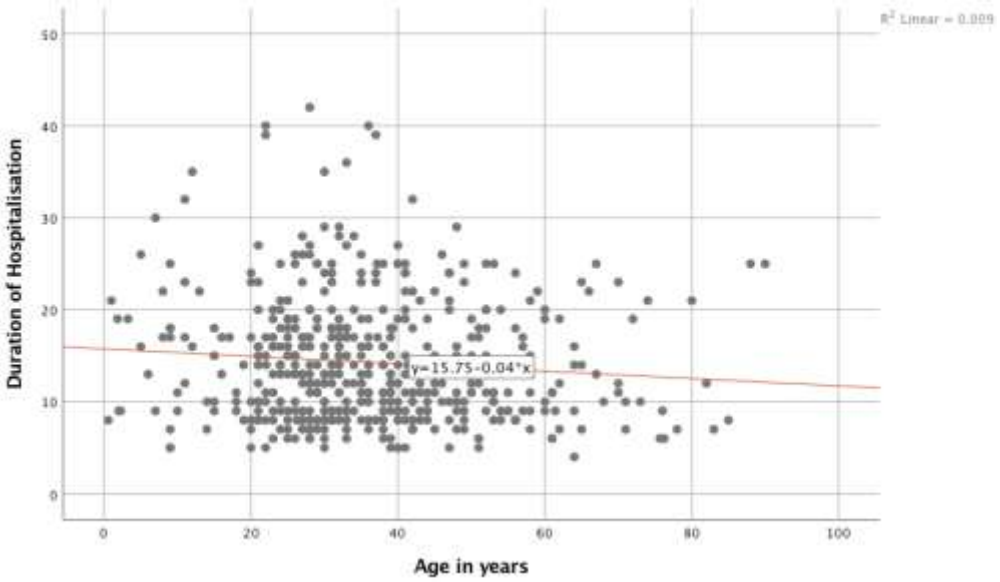
There is statistically significant difference in duration of RTPCR positivity among patients with symptoms (Mean 14.69 days SD 6.61 and Median 13 days) and without symptoms(Mean 11.89 days SD 6.17 and Median 10 days) ($t = 4.789$, $p = <0.001$)

Figure 15: Box plot showing Duration of Hospitalisation among COVID 19 Patients with and without symptoms



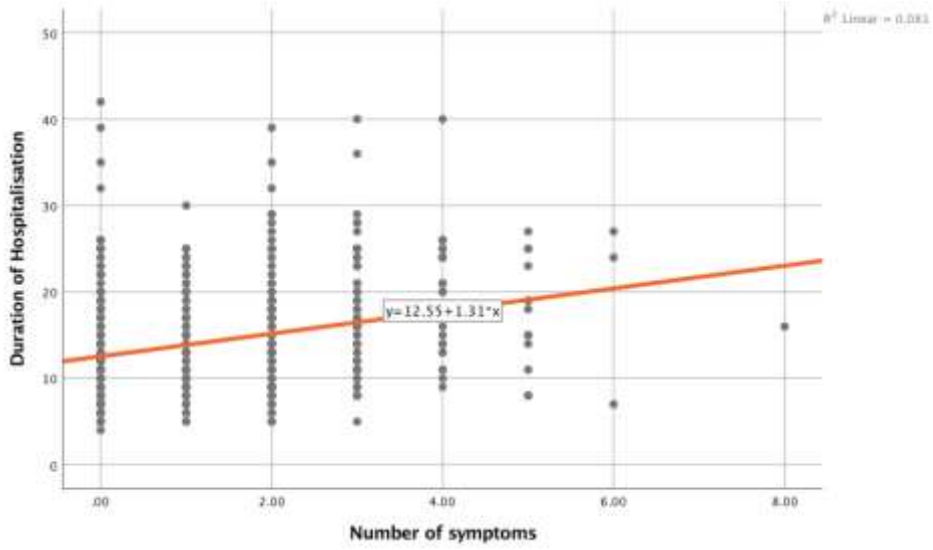
There is statistically significant difference in duration of hospital stay among patients with symptoms (Mean 15.58 days SD 6.62 and Median 15 days) and without symptoms(Mean 12.48 days SD 6.24 and Median 11 days) (t = 5.296, p = <0.001)

Figure 16: Scatter plot showing Age in years and duration of hospitalisation



There is a small negative correlation between age of the patient and duration of hospital stay and it is not statistically significant (Spearman's correlation -0.087, p = 0.053).This correlation is to be verified by studying a larger sample size.

Figure 17: Scatter plot showing number of symptoms the patients are having and duration of hospitalisation



Though not statistically significant, there is a positive correlation between number of symptoms and duration of hospital stay.More the number of symptoms, longer is the hospital stay.

Figure 18: Pie diagram showing Comorbidity Profile of COVID 19 Patients

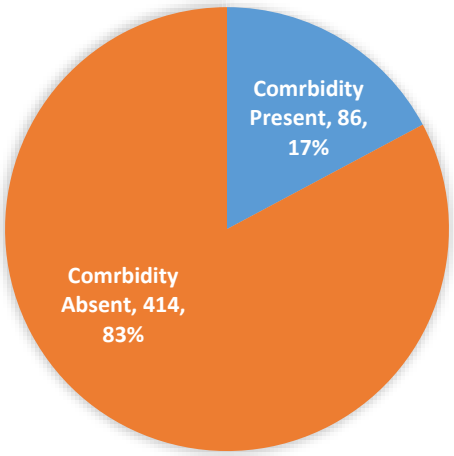
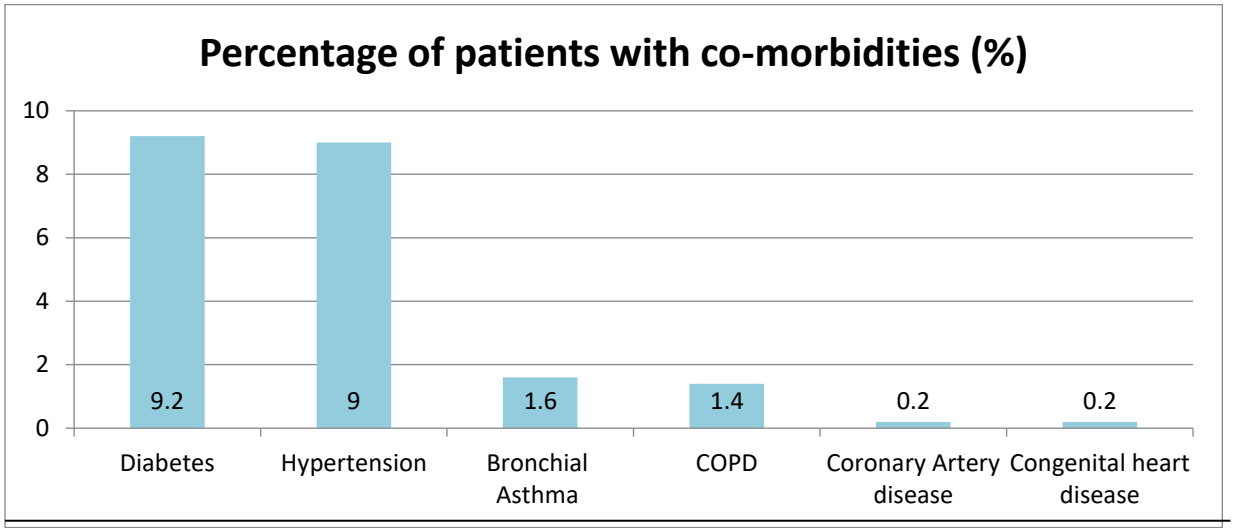
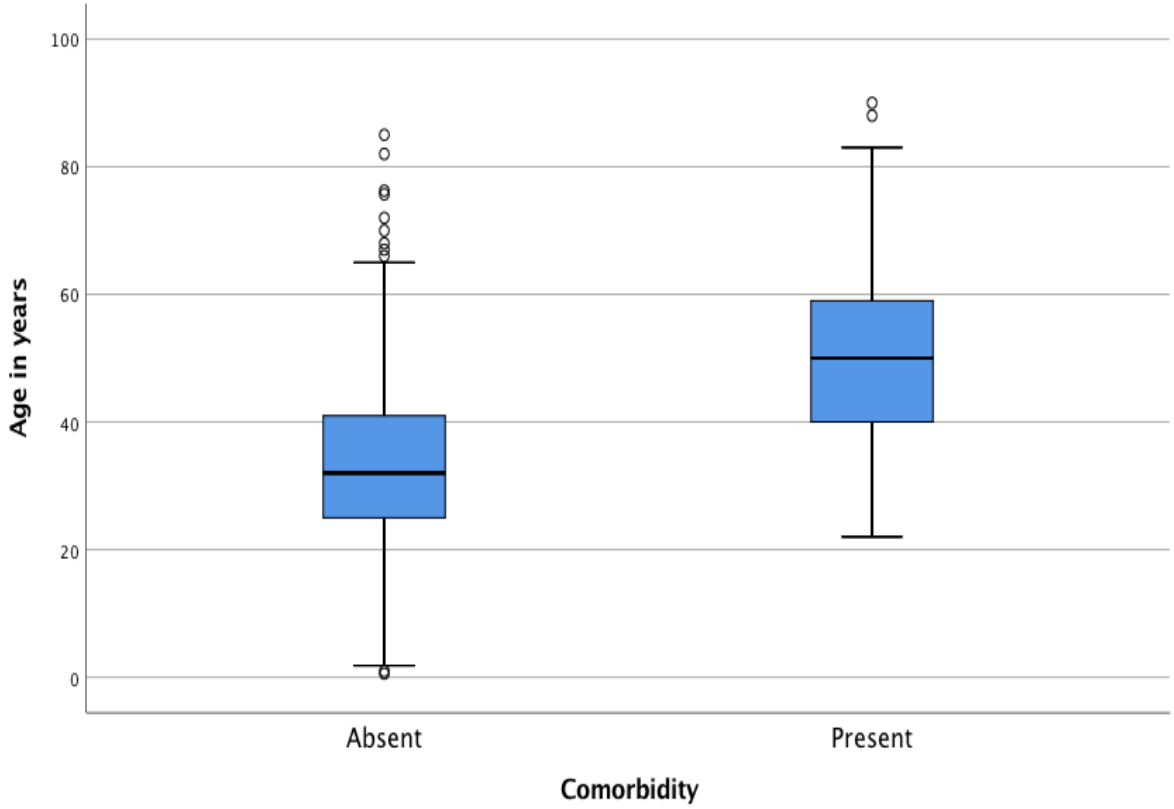


Figure 19: Bar diagram showing percentage of patients with comorbities



Out of 500 patients, 17% had co-morbidities. Out of which 9.2% had diabetes mellitus, 9% had hypertension, 1.6% had bronchial asthma, 1.4% had COPD,0.2% had coronary artery disease and 0.2% had congenital heart disease.

Figure 20: **Box plot showing distribution of Age in years of COVID 19 Patients with and without at least one Comorbidity**

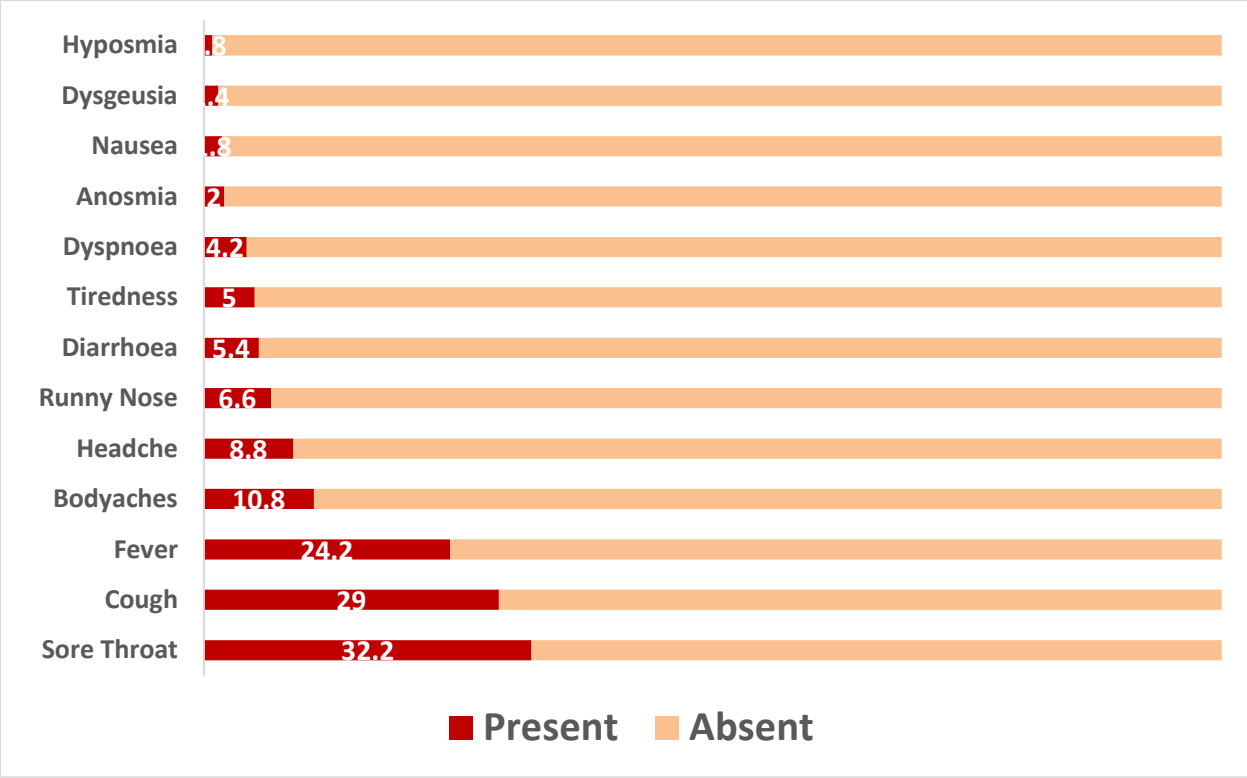


There is statistically significant difference in distribution of age in years among patients with at least one Comorbidity (Mean 50.62 yearss SD 15.69 and Median 50 years) and without symptoms (Mean 33.48 yearss SD 13.8 and Median 32 years) (t = 10.31, p = <0.001)

There is no statistically significant difference in duration of positivity or duration of hospital stay among patients with or without any comorbidity.

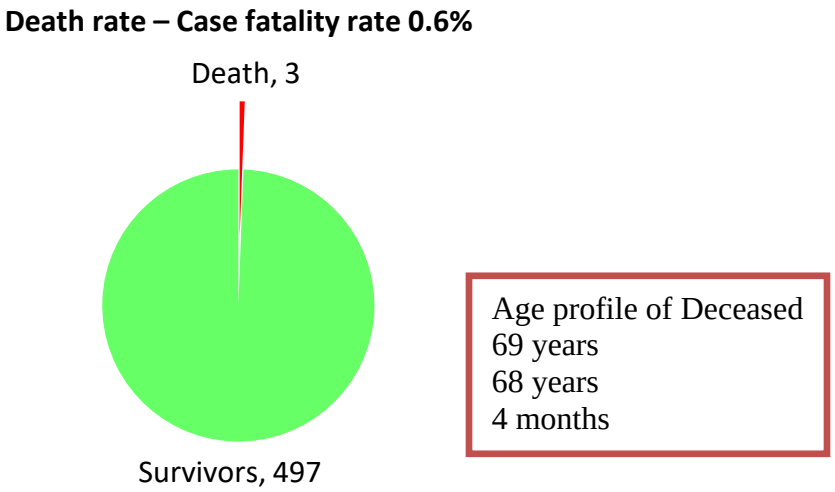
SYMPTOMATOLOGY

Figure 21: Percentage stacked Bar diagram showing profile of symptoms among COVID positive patients



Out of 500 patients, fever was present in 24.2%, cough in 29%, sore throat in 32.2%,myalgia in 10.8%,rhinitis in 8%, headache in 8.8%, diarrhoea in 5.4%,, fatiguability in 5%, dyspnoea in 4.2%, hyposmia in 2.8%,dysgeusia in 1.4% and nausea in 1.8%.
Out of 500 patients, 42% of patients were asymptomatic, 31.2% were in CAT A, 22.6 % were in CAT B and 4.2% were in CAT C.This means that moderate to severe symptoms were present only in 4.2% of the patients.95.8% of patients had only mild symptoms.

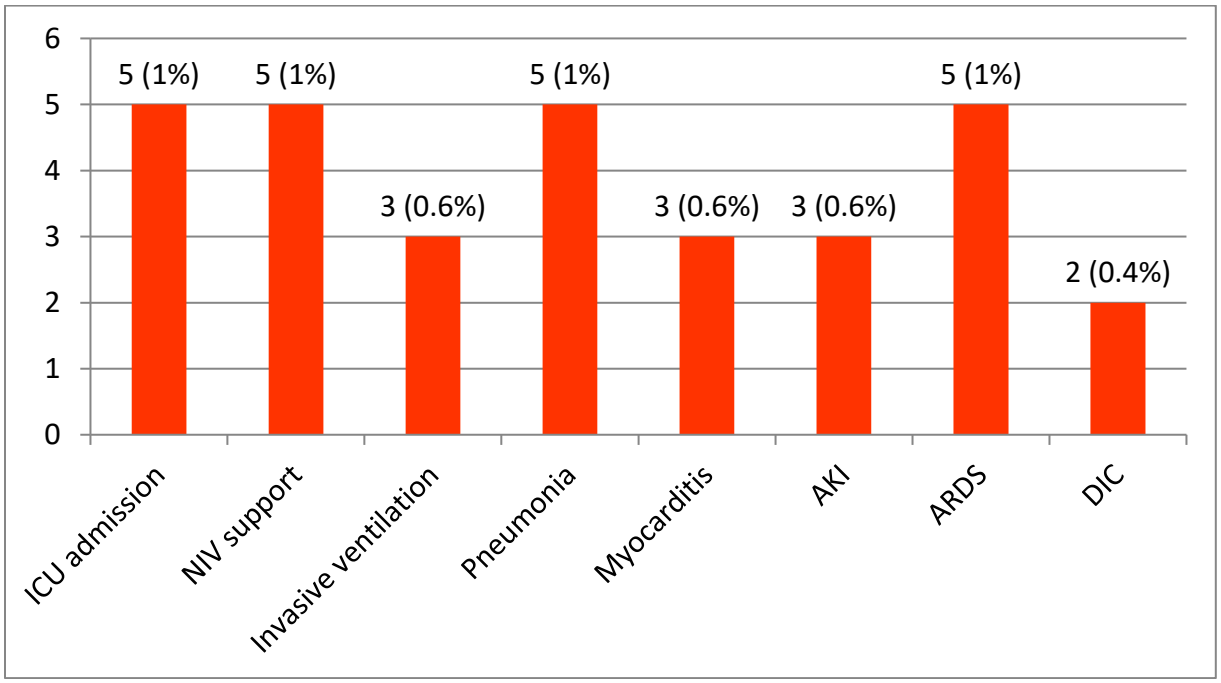
Figure 22: Pie chart showing Case Fatality Rate and age profile of deceased



Out of 500 patients, three patients died [CFR 0.6%].Age profile of the deceased were 68 yrs, 69 yrs and 4 months. All the deceased patients had comorbidities.

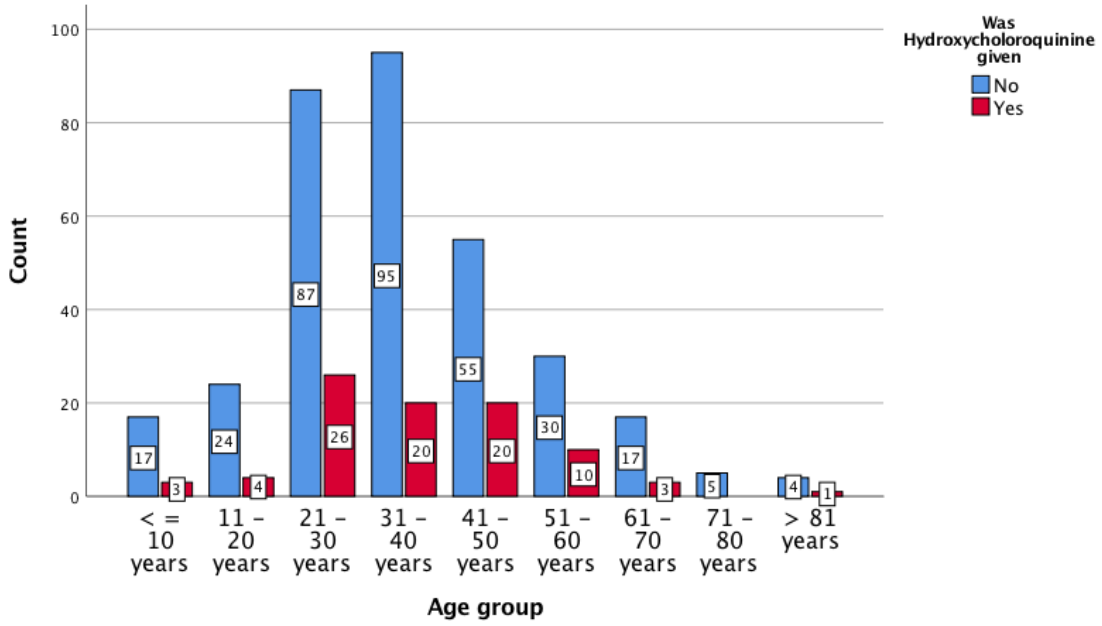
1. Coronary artery disease, Hypertension, Dyslipidemia, post CABG
2. Hypertension.
3. Congenital heart disease, Global developmental delay.

Figure 23: Profile of critically ill patients who required ICU care



Of the 500 patients, 1% were critically ill and required ICU admission.1% required NIV,0.6% required invasive mechanical ventilation, 1% had pneumonia, 0.6% had myocarditis, 0.6% had acute kidney injury , 1% had ARDS and 0.4% had Disseminated intravascular coagulation.

Figure 24: Barchart showing HCQs use among various age groups



(After excluding centres where HCQS+ Azithromycin combination was not used as per state protocol)

Figure 25: Histogram showing HCQs use with duration of hospitalization

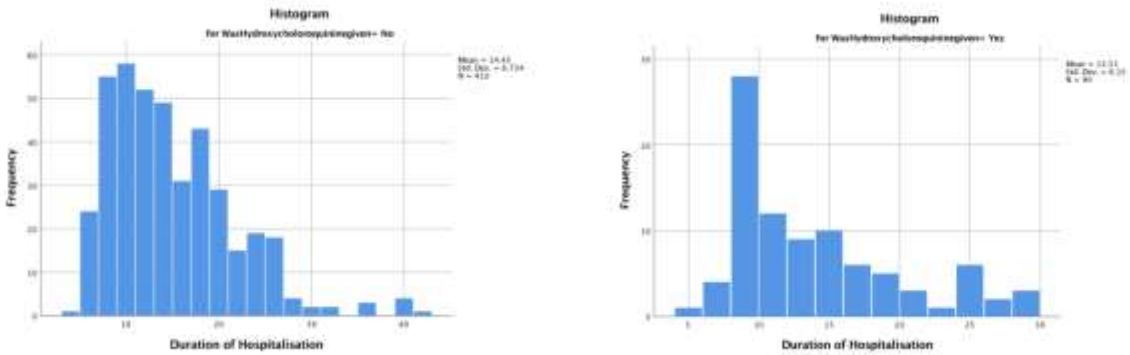


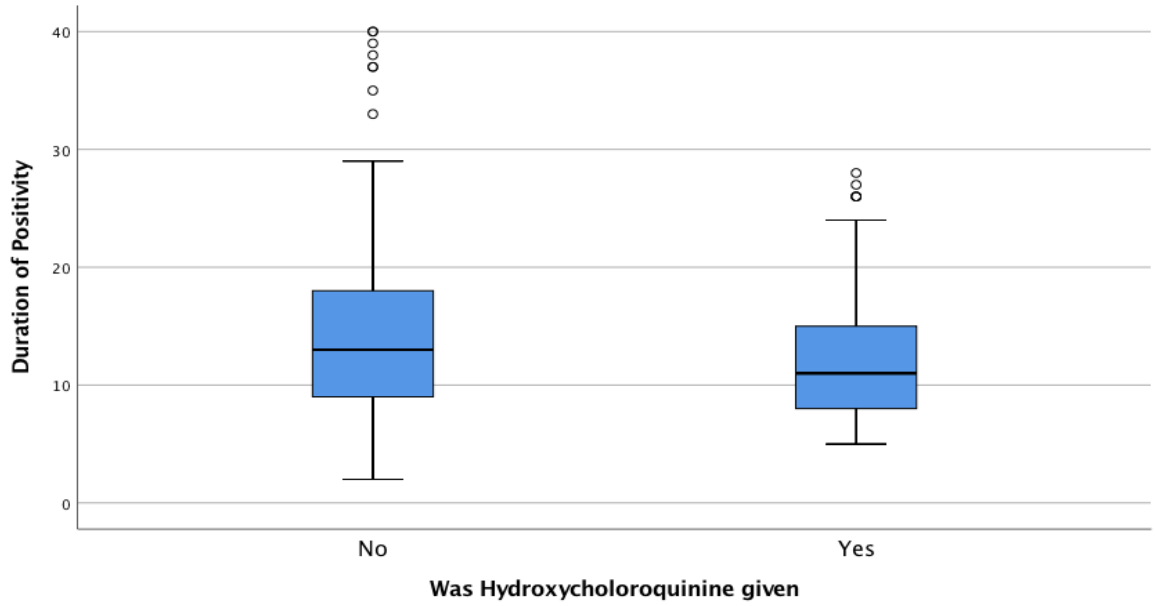
Table 5: Table depicting use of association of HCQs with duration of hospitalization and duration of positivity

		Duration of Positivity	Duration of Hospitalisation
Hydroxycholoroquinine not given	Median	12	13
	Mean	13.68	14.45
	Std. Deviation	6.669	6.734
Hydroxycholoroquinine given	Median	11	11.5
	Mean	12.76	13.51
	Std. Deviation	6.088	6.15

Mean duration of hospital stay inpatients who received HCQS+ azithromycin was 13.51 days and the mean duration in those who did not receive HCQS+azithromycin was 14.45 days.Eventhough duration of hospital stay was less in the HCQS+azithromycin arm, the difference was not statistically significant.

After excluding centres where HCQS+ Azithromycin combination was not used as per state protocol, it is observed that there is a statistically significant reduction in the duration of RTPCR positivity and Hospitalization among patients who received HCQs + Azithromycin to those patients who did not receive the combination.

Figure 26: Boxplot showing Association of Treatment with HCQ Vs Duration of positivity



Mean duration of RTPCR positivity among HCQS+ Azithromycin combination was 12.47 days [SD 5.87, SE 0.63] and the same among patients who had not received HCQS+ Azithromycin combination was 14.33 days[SD 6.85 and SE 0.38] .This observation was statistically significant [t = -2.35 p = 0.021 (Median 11 days Vs. 14 days)].

Figure 27: Boxplot showing Association of Treatment with HCQ Vs Duration of hospitalization

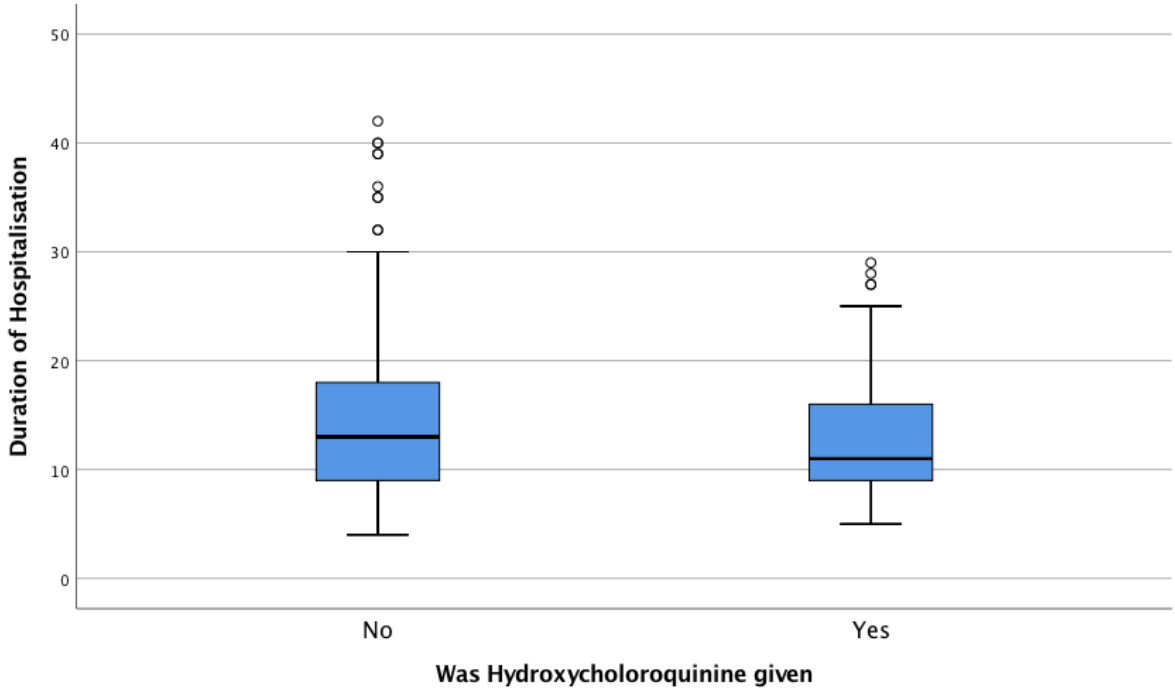
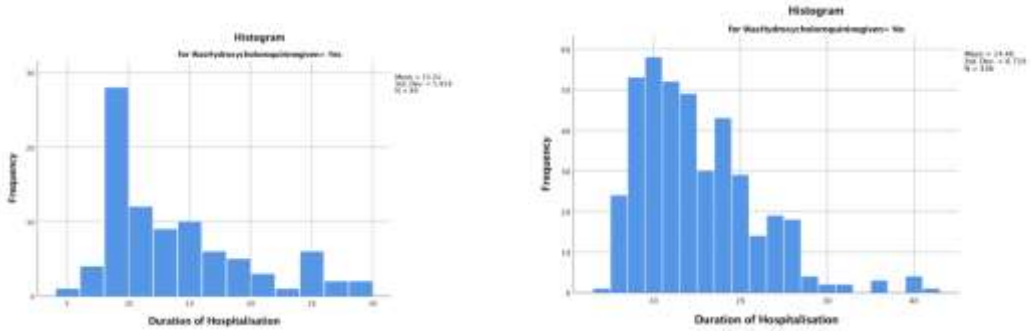


Figure 28: Histogram showing distribution of Treatment with HCQ Vs Duration of hospitalization



Mean duration of hospital stay among HCQS+ Azithromycin combination was 13.2 days [SD 5.89 SE 0.63] and the same among patientwho had not received HCQS+ Azithromycin combination was 14.94 days.[SD 6.97 and SE 0.38] . This observation was statistically significant t = -2.14 p = 0.033 (Median 11 days Vs. 13 days)

Table 6: Table showing summary

1	Number of confirmed cases of COVID 19	500
2	Numer of deaths	3
3	Case fatality rate	0.6
4	Mean day of admission from symptom onset	3.05 days
5	% of asymptomatic	42%
6	% of CAT A patients	31.2%
7	% of CAT B patients	22.6 %
8	% of CAT C patients	4.2 %
9	% of patients with mild severity	95.8%
10	% of patients with moderate severity	3.6%
11	% of patients who were severe	0.6%
12	% of patients who received HCQS	18 %
13	% of patients who received supportive treatment only	82 %
14	Mean duration to RTPCR negativity [2 nd consecutive Neg]	13.52 days
15	Mean duration of hospitalization	14.28 days
16	% of patients with co-morbidities	17%

Observations

- Of the confirmed COVID 19 cases, 73.4% were males and 26.6% were females**.**
- Of the total 500 patients, 4.4% were less than 10 yrs of age, 5.8% were between 11 to 20 yrs of age, 28.4% were between 21 to 30 yrs, 27.2% between 31 to 40 yrs of age, 16.8% between 41 to 50 yrs , 10% between 51 to 60 yrs, 4.4% between 61 to 70 yrs, 2% between 71 to 80 yrs and 1 % more than 80 yrs of age.
- When age group is considered as a broad division,71.2% of patients were between age 11 to 45 yrs, 17% between 46 to 60 yrs, 7.4% above 60 yrs of age and 4.4% less than 10 yrs of age.
- Out of 500 patients, 42% were asymptomatic and 58% were symptomatic. Of the symptomatics,31.2% were in CAT A, 22.6 % in CAT B and 4.2% in CAT C.
- Out of 500 patients, 95.8% were mild, 3.6% were moderate and 0.6% were severe.
- There is statistically significant difference in duration of RTPCR positivity among patients with symptoms (Mean 14.69 days SD 6.61 and Median 13 days) and without symptoms(Mean 11.89 days SD 6.17 and Median 10 days) ($t = 4.789$, $p = <0.001$)
- There is statistically significant difference in duration of hospital stay among patients with symptoms (Mean 15.58 days SD 6.62 and Median 15 days) and without symptoms(Mean 12.48 days SD 6.24 and Median 11 days) ($t = 5.296$, $p = <0.001$)
- There is a small negative correlation between age of the patient and duration of hospital stay and it is not statistically significant (Spearman's correlation -0.087, $p = 0.053$).This correlation is to be verified by studying a larger sample size.
- Though not statistically significant, there is a positive correlation between number of symptoms and duration of hospital stay.More the number of symptoms, longer is the hospital stay.
- Out of 500 patients, 17% had co-morbidities. Out of which 9.2% had diabetes mellitus, 9% had hypertension, 1.6% had bronchial asthma, 1.4% had COPD,0.2% had coronary artery disease and 0.2% had congenital heart disease.
- There is statistically significant difference in distribution of age in years among patients with at least one Comorbidity (Mean 50.62 yearss SD 15.69 and Median 50 years) and without symptoms (Mean 33.48 yearss SD 13.8 and Median 32 years) ($t = 10.31$, $p = <0.001$)
- There is no statistically significant difference in duration of positivity or duration of hospital stay among patients with or without any comorbidity.
- Out of 500 patients, fever was present in 24.2%, cough in 29%, sore throat in 32.2%,myalgia in 10.8%,rhinitis in 8%, headache in 8.8%, diarrhoea in 5.4%,, fatiguability in 5%, dyspnoea in 4.2%, hyposmia in 2.8%,dysgeusia in 1.4% and nausea in 1.8%.
- Out of 500 patients, 42% of patients were asymptomatic, 29.6% were in CAT A, 24.2% were in CAT B and 4.2% were in CAT C.This means that moderate to severe symptoms were present only in 4.2% of the patients.95.8% of patients had only mild symptoms.

- Out of 500 patients, three patients died [CFR 0.6%].Age profile of the deceased were 68 yrs, 69 yrs and 4 months. All the deceased patients had comorbidities.

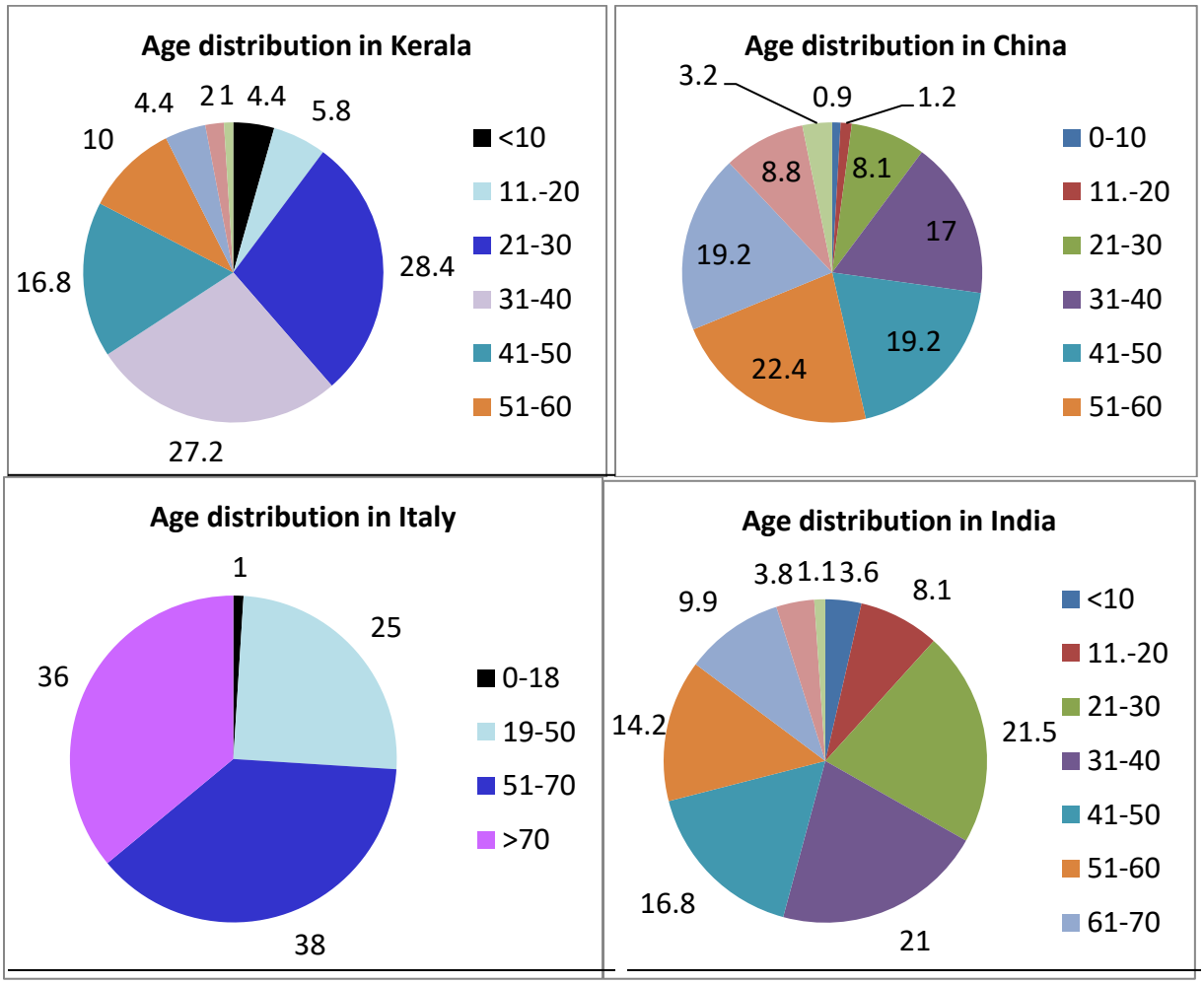
1. Coronary artery disease, Hypertension, Dyslipidemia, post CABG
2. Hypertension.
3. Congenital heart disease, Global developmental delay.

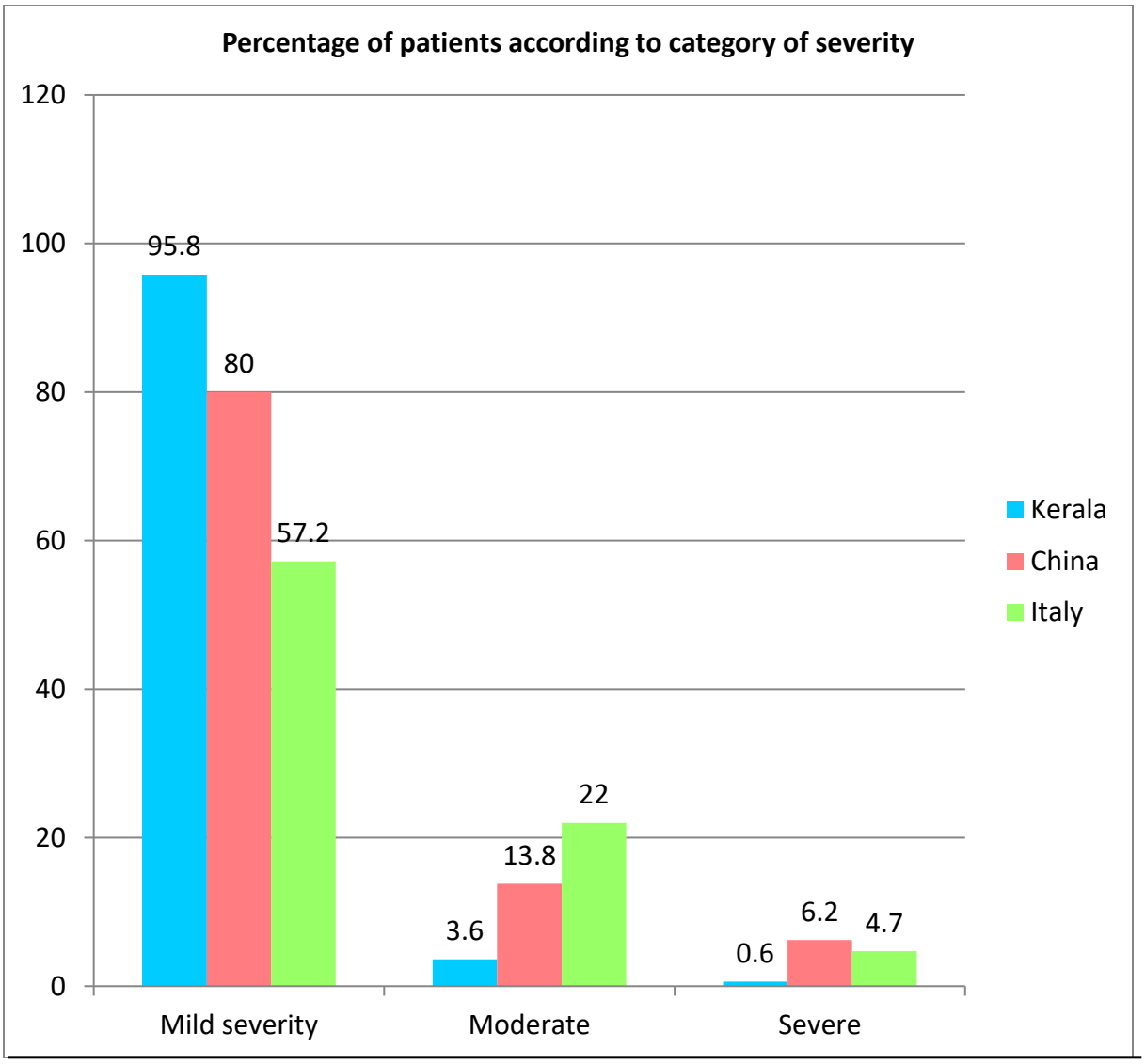
- Of the 500 patients, 1% were critically ill and required ICU admission.1% required NIV,0.6% required invasive mechanical ventilation, 1% had pneumonia, 0.6% had myocarditis, 0.6% had acute kidney injury , 1% had ARDS and 0.4% had Disseminated intravascular coagulation.
- Mean duration of hospital stay inpatients who received HCQS+ azithromycin was 13.51 days and the mean duration in those who did not receive HCQS+azithromycin was 14.45 days.Eventhough duration of hospital stay was less in the HCQS+azithromycin arm, the difference was not statistically significant.
- After excluding centres where HCQS+ Azithromycin combination was not used as per state protocol, it is observed that there is a statistically significant reduction in the duration of RTPCR positivity and Hospitalization among patients who received HCQs + Azithromycin to those patients who did not receive the combination.

DISCUSSION

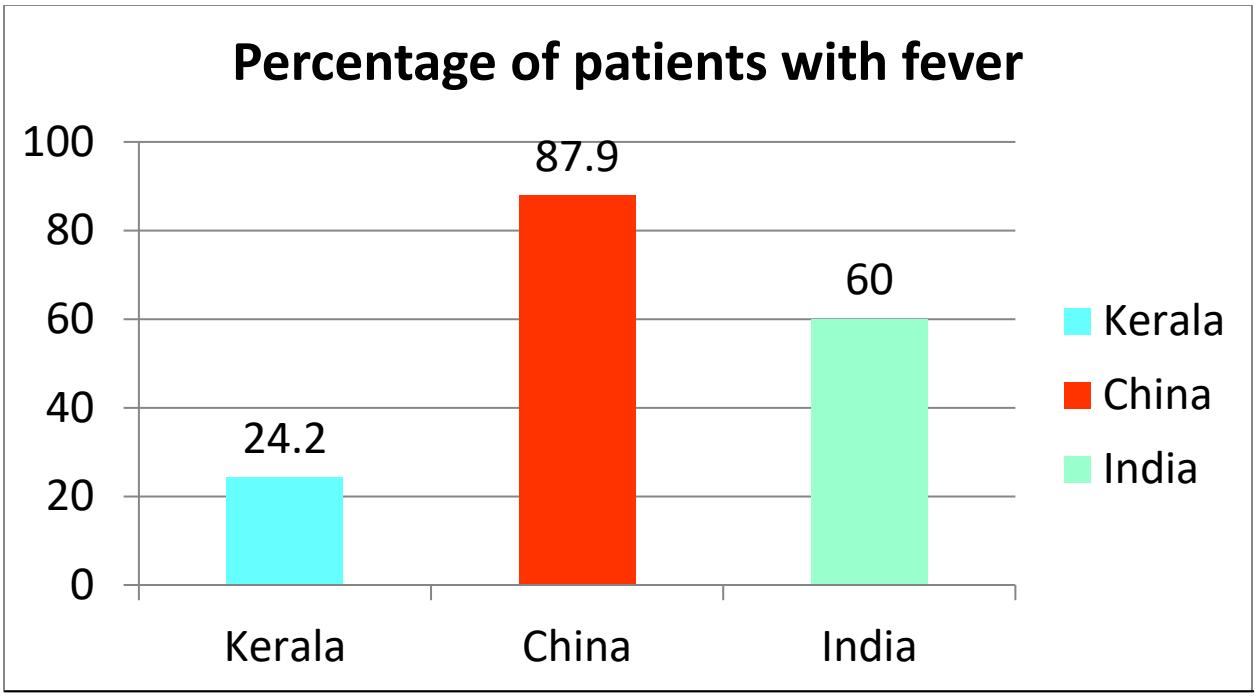
Comparison of available data from Kerala, China, Italy and India with regard to clinical profile of confirmed cases of SARS-CoV-2 infection

	Kerala	China	Italy	India
Age - median	34.00		63	37
0-10	4.4	0.9		3.6
11-20	5.8	1.2		8.1
21-30	28.4	8.1		21.5
31-40	27.2	17.0		21.0
41-50	16.8	19.2		16.8
51-60	10	22.4		14.2
61-70	4.4	19.2		9.9
71-80	2	8.8		3.8
>81	1	3.2		1.1
Male	73.4	51.4	58.3	64.5
Female	26.6	48.6	41.7	35.5
Hypertension	9	12.8		
Diabetes	9.2	5.3		
Copd/asthma	3	2.4		
Cardiac disease	0.4	4.2		
Mild severity	95.8	80	57.2	
Moderate	3.6	13.8	22	
Severe	0.6	6.2	4.7	
Asymptomatic	42		16.1	
Fever	24.2	87.9		60
Cough	29	67.7		64.5
Myalgia	10.8	14.8		12.5
Headache	8.8	13.6		
Diarrhoea	5.4	3.7		3.1
Rhinitis	8			4.8
Sorethroat	32.2	13.9		
Hyposmia	2.8			
Dysgeusia	1.4			
Breathlessness	4.2	18.6		31.9
Fatiguability	5	38.1		
Nausea	1.8			2.5
CFR	0.6	3.8		


Age distribution in Kerala
4.4
21
4.4
5.8
10
28.4
16.8
27.2
<10
11.-20
21-30
31-40
41-50
51-60
Age distribution in China
3.2
0.9
1.2
8.8
8.1
17
19.2
19.2
22.4
0-10
11.-20
21-30
31-40
41-50
51-60
Age distribution in Italy
1
25
36
38
0-18
19-50
51-70
>70
Age distribution in India
3.8
1.1
3.6
8.1
9.9
14.2
21.5
16.8
21
<10
11.-20
21-30
31-40
41-50
51-60
61-70

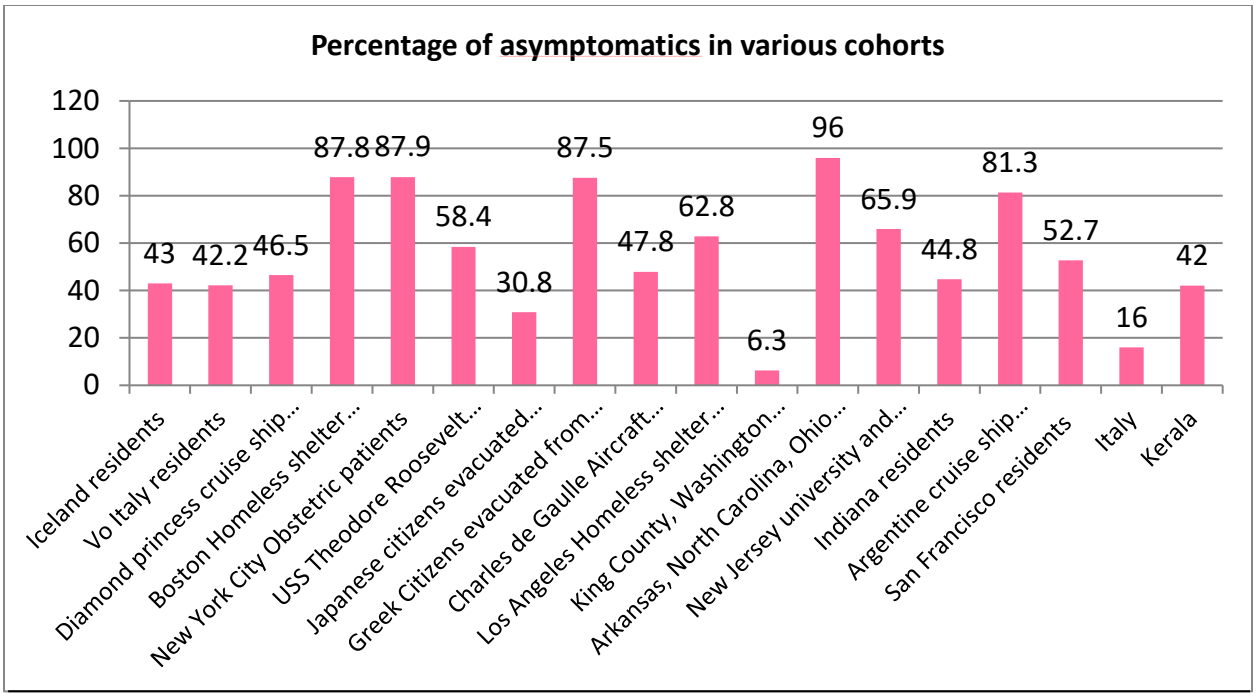


When compared to data from China and Italy, the percentage of patients with moderate to severe disease is lower in Kerala.This partly explains the lower case fatality rate in Kerala when compared to that in China and Italy.Even among high risk groups in Kerala, COVID-19 is not progressing to severe-critical disease when compared to China and Italy.This is probably due to very early admission of confirmed cases of COVID-19 in Kerala. The mean of number of days from symptom onset to nasopharyngeal swab collection and hospitalisation in Kerala is only 1.7 days and 3 days repectively..The early administration of HCQS+Azithromycin to this high risk groups may be a factor preventing progression from mild to moderate-severe disease in critically ill.This hypothesis however has to be validated by analysis data from a larger number of patients.



COMPARISON OF PERCENTAGE OF ASYMPTOMATIC SARS-COV-2 INFECTION IN KERALA TO OTHER COHORTS

Cohort	**Asymptomatic[%]**
Iceland residents	43
Vo Italy residents	42.2
Diamond princess cruise ship passengers and crew	46.5
Boston Homeless shelter occupants	87.8
New York City Obstetric patients	87.9
USS Theodore Roosevelt aircraft carrier Crew	58.4
Japanese citizens evacuated from Wuhan, China	30.8
Greek Citizens evacuated from the United Kingdom, Spain and Turkey	87.5
Charles de Gaulle Aircraft Carrier Crew	47.8
Los Angeles Homeless shelter occupants	62.8
King County, Washington Nursing facility residents	6.3
Arkansas, North Carolina, Ohio and Virginia inmates	96
New Jersey university and hospital employees	65.9
Indiana residents	44.8
Argentine cruise ship passengers and crew	81.3
San Francisco residents	52.7
Italy	16
Kerala	42



Reference

1. Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19)-16-24 February 2020.
2. Integrated surveillance of COVID 19 in Italy as of March 22, 2020
3. Laboratory surveillance for SARS-CoV-2 in India: Performance of testing and descriptive epidemiology of detected COVID-19 January 22-April 30,2020, ICMR COVID Study Group
4. The epidemiological characteristics of an outbreak of 2019 Novel corona virus disease [COVID-19] –China, 2020-The Novel Corona Virus Pneumonia Emergency Response Epidemiology TeamCCDC Weekly / Vol. 2 / No. 8
5. Oran, Daniel P., Topol, Eric. J Prevalence of Asymptomatic SARS-CoV-2 Infection. A Narrative Review. Annals of Internal Medicine; Jun 2020

COVID 19 (nCorona) Virus Outbreak Control and Prevention State Cell
Health & Family Welfare Department
Government of Kerala

COVID-19 INTERIM TREATMENT GUIDELINES FOR KERALA STATE

No./31/2020/Health – 24th March 2020

WHO has declared the COVID-19 epidemic affecting more than 195 countries as a Pandemic. Due to the inflow of persons from affected countries, Kerala state has strengthened the surveillance and control measures against the disease.
This document was developed as a clinical guideline to streamline the treatment efforts against SARS-CoV -2 virus. It is a 'living' document and will be updated from time to time depending on newer discovery and current research.

1. Laboratory investigation for proven COVID 19 patients

At Admission	CBC, RFT, LFT, CRP, RBS, ECG
If clinically Indicated	Portable CXR, HIV, HBsAg, HCV, D-Dimer, Ferritin, LDH, CPK, procalcitonin, Blood culture
To repeat Every 3 days if clinically deteriorating.	CBC, Creatinine, AST/ALT, CRP, LDH, CPK, Ferritin, HRCT
For Immunocompromised patients eg Transplant recipients, HIV	Tests to rule out opportunistic infections like Mycobacterium tuberculosis, pneumocystis jiroveci etc

2. Categories

A	Mild sore throat / cough / rhinitis /diarrhea
B	Fever and/or severe sore throat / cough /diarrhea OR Category-A plus two or more of the following • Lung/ heart / liver/ kidney / neurological disease/ Hypertension / haematological disorders/ uncontrolled diabetes/ cancer /HIV-AIDS • On long term steroids /immunosuppressive drugs. • Pregnant lady • Age –more than 60 years. OR Category A Plus cardiovascular disease
C	• Breathlessness, chest pain, drowsiness, fall in blood pressure, haemoptysis, cyanosis [red flag signs] • Children with ILI (influenza like illness) with ***red flag signs*** (Somnolence, high/persistent fever, inability to feed well, convulsions, dyspnoea /respiratory distress, etc). • Worsening of underlying chronic conditions.

*Categorization should be reassessed every 24-48 hours for Category A & B

3. Identification of high risk patients

Co morbidities	Clinical assessment	Laboratory values
Uncontrolled diabetes	Hypoxia – SpO2 ≤ 93% on room air	CRP > 100 mg /L
Hypertension	Tachycardia PR > 125/min	CPK > twice upper limit of normal
Cardiovascular disease	Respiratory distress RR > 30/min	
Lung disease	Hypotension BP < 90systolic, 60mm Hg Diastolic	Ferritin > 300mcg/L
CKD	Altered sensorium	TROP T elevation
CLD		LDH > 245 U /L
On immunosuppressives		D Dimer > 1000ng/ml
HIV / congenital immunodeficiency disorders		Multi organ dysfunction
Age > 60yrs		ALC < 0.8

4. Treatment

1. Categorize A, B , C
2. Treatment

Supportive care

1. AVOID using NSAIDs other than paracetamol unless absolutely necessary.
2. AVOID using nebulized drugs to avoid aerosolization of virus, use MDI instead.
3. Oseltamivir 75mg 1-0-1 in all symptomatic patients with influenza like illness until PCR report with dose adjustment for paediatric and renal insufficiency
4. Antibiotic selection in case of secondary bacterial pneumonia should be as per institutional antibiogram.
5. AVOID using systemic steroids. Steroids may be considered only in case of refractory shock, macrophage activation syndrome or in Cytokine release syndrome (CRS) Grade 3 or 4 with no response to Tocilizumab.
6. Non-invasive ventilation [NIV] is to be avoided in patients with COVID-19, as there is high risk of aerosol generation as the seal they generate is inferior to that cheived with a correctly placed and inflated cuffed tracheal tube.
7. Consider discontinuation of inhaled steroids as they may reduce local immunity and promote viral replication. But if discontinuation of inhaled steroids is likely to worsen the preexisting lung disease, decision on the same has to be taken by the treating doctor.

Treatment strategies according to clinical situation

Category	Treatment	Precautions
A	Symptomatic treatment	Categorization should be reassessed every 28-48 hours for Category A.
B	1. Tab HCQs 400mg 1-0-1 x 1 day, then 200 1-0-1 x 4 days (Children : 6.5mg/kg/ dose PO BD day 1 followed by 3.25mg/kg/dose PO BD X 4 days) OR Tab Chloroquine base 600 mg (10mg/kg) at diagnosis and	Contraindications to chloroquine /HCQS • QTc > 500msec • Porphyria • Myasthenia gravis • Retinal pathology • Epilepsy Pregnancy is NOT a contraindication

	300mg (5 mg/kg) 12 h later, followed by 300 mg (5 mg/kg) BD up to Day 5 Plus 2. Tab Azithromycin 500mg 1-0-0 x 1 day and 250mg 1-0-0 x 4 days Children: 10 mg/kg (max 500mg) day 1, Followed by 5mg/kg/day on days 2 to 5. 3. Tab Oseltamivir 75mg 1-0-1 in all symptomatic patients with influenza like illness until PCR report. Children : 3mg/kg/dose BD Dose adjustment for those with renal insufficiency	If Baseline QT is prolonged – frequent ECG monitoring is required
C	1. Tab HCQs 400mg 1-0-1 x 1 day, then 200mg 1-0-1 x 4 days Children : 6.5mg/kg/ dose PO BD day 1 followed by 3.25mg/kg/dose PO BD X 4 days OR Tab Chloroquine base 600 mg (10mg/kg) at diagnosis and 300mg (5 mg/kg) 12 h later, followed by 300 mg (5 mg/kg) BID up to Day 5. [Usually 1tablet of chloroquine has 150 mg base] PLUS Inj Azithromycin 500mg IV stat and 250mg IV OD for 5 days Children: 10mg/kg (max 500mg) day 1, Followed by 5mg/kg/day on days 2 to 5.	For chloroquine and derivatives as discussed above For Protease inhibitors Assess for drug-drug interactions (including with calcineurin inhibitors) before starting. Gastrointestinal intolerance may be seen Monitor liver function tests while on therapy. Discontinue these agents upon discharge regardless of duration, unless previously used as maintenance medications for another indication.

	2. Tab Lopinavir / Ritonavir (400/100) 1-0-1 for 14 days or for 7 days after becoming asymptomatic. Children 14 days to 6 months : 16mg/kg (based on lopinavir component) PO BD < 15kg : 12 mg/kg PO (based on lopinavir component BD) 15-25 kg: 200 mg-50 mg PO BD 26-35 kg: 300 mg-75 mg PO BD >35 kg: 400 mg-100 mg PO BD Lopinavir/ritonavir is to be used only if HCQS/chloroquine is contraindicated. Lopinavir/ritonavir should be used only on a compassionate ground after informed consent. It has to be started within 10 days of symptom onset. 3. Tab Oseltamivir 75mg 1-0-1 in all symptomatic patients with influenza like illness until PCR report with dose adjustment for children and those with renal insufficiency	
If CAT C patient progresses to ARDS/ MODS while on HCQS/chloroquine plus azithromycin, addition of Lopinavir/ritonavir may be considered in case of progressive worsening as Remedesivir is not available in India. In that case azithromycin is to be stopped. QTc is to be monitored very frequently. This combination is to be used on a compassionate ground after taking informed consent explaining the possibility of life threatening QTc prolongation and cardiac arrhythmias.		

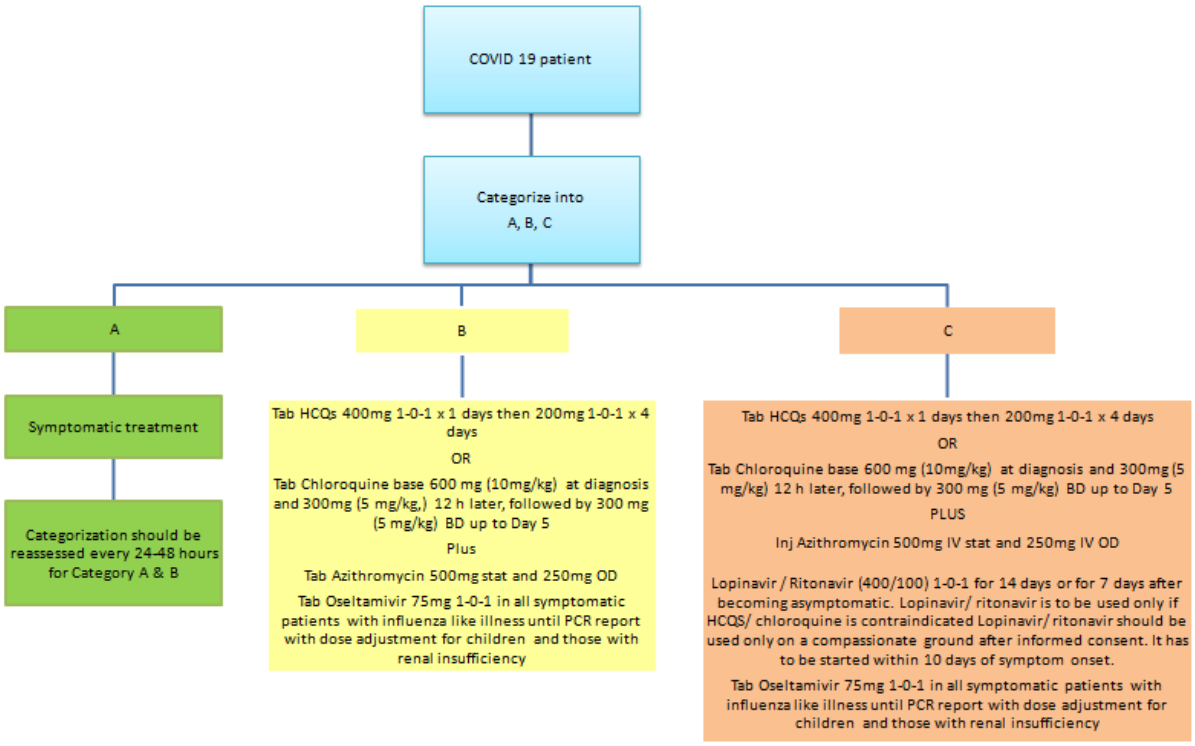
For those with evidence of cytokine release syndrome [CRS]

Grade	Clinical Assessment	Treatment
Grade 1	Mild reaction: low grade fever, No oxygen requirement or need for IVF	No treatment
Grade 2	Moderate reaction : -High grade fever (> 103F), need for IVF (not hypotension), mild oxygen requirement (<6L/min) -Grade 2 AKI -Grade 3 LFT (Raised liver enzymes and S. Bilirubin ≥ 2.5gm/dl)	Send for serum IL-6, If not available , use CRP as a surrogate marker
Grade 3	Severe reaction : -Rapidly worsening respiratory status with radiographic infiltrates and spo2 ≤ 93% in room air or on supplemental oxygen (> 6L/min, high flow, BiPAP, CPAP) - Grade 4 Liver function test (raised liver enzymes, S Bilirubin > 2.5gm/dl and INR > 1.5, encephalopathy) -Grade 3 AKI, -IVF for resuscitation , - coagulopathy requiring correction with FFP or cryoprecipitate -low dose vasopressor (Noradrenaline < 0.5mcg/kg/min or Adrenaline < 0.3mcg/kg/min)	Send for serum IL-6 or CRP, Ferritin Consider tocilizumab >18 years : 8mg/kg IV (max 400mg) < 18 years < 30kg : 12mg/kg IV over 60 minutes >30kg : 8mg/kg (max 800mg) IV over 60minutes if no effect can repeat x 2 more doses Q8H apart; if no response, consider low dose corticosteroids especially in case of concomitant septic shock
Grade 4	Life threatening multi organ dysfunction, hypoxia requiring mechanical ventilation, hypotension requiring high dose vasopressors	Send for serum IL-6 or CRP; consider tocilizumab as in Grade 3; consider corticosteroids

(Adapted and modified from the Penn CRS criteria and MGH)

For Grade 3/ 4 CRS when there is no response to Tocilizumab / availability/tolerance issue

Glucocorticoids may be used for a short period of time – 3-5 days. It is recommended that dose should not exceed the equivalent of methylprednisolone 1-2mg/kg/day. A larger dose of glucocorticoid will delay the removal of corona virus due to immunosuppressive effects.



A	Mild sore throat / cough / rhinitis /diarrhea
B	Fever and/or severe sore throat / cough OR Category-A plus two or more of the following Lung/ heart / liver/ kidney / neurological disease/ Hypertension/haematological disorders/ uncontrolled diabetes/ cancer /HIV- AIDS On long term steroids Pregnant lady Age –more than 60 years. OR Cardiovascular disease
C	Breathlessness, chest pain, drowsiness, fall in blood pressure, haemoptysis, cyanosis [red flag signs] Children with ILI (influenza like illness) with ***red flag signs*** (Somnolence, high/persistent fever, inability to feed well, convulsions, dyspnoea /respiratory distress, etc). Worsening of underlying chronic conditions.

Contraindications to chloroquine /HCQS

- QTc > 500msec
- Porphyria
- Myasthenia gravis
- Retinal pathology
- Epilepsy

Pregnancy is NOT a contraindication
If Baseline QT prolongation – Monitor ECG

For Protease inhibitors
Assess for drug-drug interactions (including with calcineurin inhibitors) before starting.
Gastrointestinal intolerance may be seen
Monitor liver function tests while on therapy.
Discontinue these agents upon discharge regardless of duration, unless previously used as maintenance medications for another indication

If CAT C progresses to ARDS/MODS on HCQ/Chloroquine plus Azithromycin, addition of lopinavir / ritonavir may be considered

In Children: HCQs 6.5mg/kg/ dose BD, day 1 followed by 3.25mg/kg/dose PO BD X 4 days
Azithromycin: 10mg/kg (max 500mg) day 1, Followed by 5mg/kg/day on days 2 to 5.
Lopinavir/Ritonavir (based on lopinavir component): 14 days to 6months : 16mg/kg PO BD, < 15kg : 12 mg/kg PO, 15-25 kg: 200 mg-50 mg PO BD, 26-35 kg: 300 mg-75 mg PO BD, >35 kg: 400 mg-100 mg PO BD

The National Task force for COVID-19 constituted by ICMR recommends the use of hydroxy-chloroquine for prophylaxis of SARS-CoV -2 infection for high risk population.

1. Asymptomatic healthcare workers involved in the care of suspected or confirmed cases of COVID-19.
2. Asymptomatic household contacts of laboratory confirmed cases
3.

DOSE

1. Asymptomatic healthcare workers involved in the care of suspected or confirmed cases of COVID-19: 400 mg twice a day on Day 1, followed by 400 mg once weekly for next 7 weeks : to be taken with meals.
2. Asymptomatic household contacts of laboratory confirmed cases: 400 mg twice day on Day 1, followed by 400 mg once weekly for next 3 weeks, to be taken with meals.
3.

Exclusion/contraindication

1. Drug is not recommended for prophylaxis in children under 15 years of age.
2. Drug is contraindicated in persons with retinopathy, hypersensitivity to HCQS or 4-aminoquinoline compounds

References

1. Massachusetts General Hospital COVID-19 Treatment Guidance
2. Interim Clinical Guidance For Patients Suspected Of/Confirmed with COVID – 19 in Belgium 19 March 2020
3. COVID 19 Management protocol, All India Institute of medical sciences, New Delhi
4. Novel Corona Virus Pneumonia diagnosis and treatment scheme for severe and critical cases – COVID 19 Medical care team Central Directive Group of China 13 March 2020
5. Diagnosis and treatment protocol for Novel Corona Virus Pneumonia trial version 7, National health commission China March 3, 2020

Available evidence on the use of Tocilizumab in COVID-19

Tocilizumab

Tocilizumab is a recombinant humanized monoclonal antibody against IL-6 receptor

Rationale for use of Tocilizumab in COVID-19

Pro-inflammatory cytokine levels are elevated in COVID-19 infection. Predictors of mortality from a retrospective, multicentre study of 150 confirmed COVID-19 cases in Wuhan, China included elevated ferritin and IL-6. This suggests that virus induced hyper inflammation is contributing to the mortality[1, 2].

Tocilizumab has been found useful in severe or life threatening cases of cytokine release syndrome (CRS) due to chimeric antigen receptor-T cell therapy. However there are no randomized control trials that compared Tocilizumab versus steroids fir CRS [3].

Dose recommended for CRS:

>18 years: 8mg/kg IV (400mg),
< 18 years
< 30kg: 12mg/kg IV over 60 minutes
>30kg: 8mg/kg (max 800mg) IV over 60minutes
The total tocilizumab dose should not exceed 800 mg[4].
If no effect can repeat x 2 more doses Q8H apart;
If no response, consider low dose corticosteroids especially in case of concomitant septic shock
Can be given as an intravenous infusion in normal saline over 1 hour.
Up to 3 additional doses can be administered with at least 8 hour interval between consecutive doses.

Evidence for Tocilizumab in COVID-19

Xu et al reported their experience with Tocilizumab in patients with severe or critical COVID-19 infection[5]. The diagnosis of severity was defined if any of the following conditions was met: (1) respiratory rate ≥ 30 breaths/min; (2) SpO2 ≤ 93% while breathing room air; (3) PaO2/FiO2 ≤ 300 mmHg. A critical case was diagnosed if any of: (1) respiratory failure which requiring mechanical ventilation; (2) shock; (3) combined with other organ failure, need to be admitted to ICU. The study included 21 patients who received standard therapy including lopinavir, methylprednisolone, other symptom relievers and oxygen therapy along with tocilizumab. The dose of Tocilizumab used was 400mg single intravenous infusion. 19 patients were discharged from hospital, while two were improving in hospital at the time of reporting. The authors also reported that symptoms, hypoxygenemia, and CT opacity changes were improved immediately after the treatment with tocilizumab in most of the patients.

Ongoing clinical trials:

Tocilizumab in COVID-19 Pneumonia (TOCIVID-19) (TOCIVID-19)

This is a multicenter, single-arm, open-label, phase 2 study in severe COVID-19 infection. All the patients enrolled are treated with tocilizumab. One-month mortality rate is the primary end point. Participants will receive two doses of Tocilizumab 8 mg/kg (up to a maximum of 800mg per dose), with an interval of 12 hours. Primary outcome measurement: 1 month mortality.

Guidelines and recommendations:

1) Recommendations for COVID-19 clinical management, National Institute for the Infectious Diseases, Italy:

Tocilizumab: 8 mg/kg (maximum 800 mg/dose), single dose intravenously (1-hour infusion); in absence or with poor clinical improvement a second dose should be administered after 8-12 hours. Tocilizumab administration should be guided by the presence of 1 or more of following selection criteria: a) PaO2/Fi02 ratio < 300, b)rapid worsening of respiratory gas exchange with or without availability of non-invasive or invasive ventilation c)IL-6 levels >40 pg/ml (if not available, see D-dimer levels >1000 ng/ml.)

Therapeutic schedule: 2 administrations (each 8 mg/kg, maximum 800 mg). Second administration to be started at 8-12 hours from the first one. Repeat PCR and D-dimer (+/-IL-6) after 24 hours from each administration.

2) Massachusetts General Hospital COVID-19 Treatment Guidance:

To be given after establishment of clinical status

Grade 1 – mild reaction
Grade 2 – moderate reaction, fever, need for IVF (not hypotension), mild oxygen requirement
Grade 3 – severe, liver test dysfunction, kidney injury, IVF for resuscitation, low dose vasopressor, supplemental oxygen (high flow, BiPAP, CPAP)
Grade 4 – life threatening, mechanical ventilation, high dose vasopressors

Treatment interventions based on grades:

Grade 1 – no treatment
Grade 2 – send for serum IL-6
Grade 3 – send for serum IL-6; consider Tocilizumab, if no effect can repeat x 2 more doses Q8H apart; if no response, consider low dose corticosteroids
Grade 4 – send for serum IL-6; consider Tocilizumab as Grade 3; consider corticosteroids

References:

1. COVID-19: consider cytokine storm syndromes and immunosuppression - The Lancet [Internet]. [cited 2020 Mar 21]. Available from: https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)30628-0/fulltext

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3. Cytokine release syndrome with novel therapeutics for acute lymphoblastic leukemia. - PubMed - NCBI [Internet]. [cited 2020 Mar 21]. Available from: https://www.ncbi.nlm.nih.gov/pubmed?term=27913530

4. ACTEMRA (tocilizumab) injection. Drug monograph

5. Xu et al Effective Treatment of Severe COVID-19 Patients with Tocilizumab. China Xiv:202003.00026v1

GUIDELINES FOR COMPASSIONATE USE OF LOPINAVIR/RITONAVIR IN SYMPTOMATIC 2019 –COVID -19 PATIENTS

The treatment guidelines are to be implemented for clinical management of Severe Acute Respiratory Infection due to novel Corona virus. Treatment with lopinavir-ritonavir should be restricted to those patients with proven 2019-COVID-19 who present with clinical syndromes of mild pneumonia, severe pneumonia, acute respiratory distress syndrome, sepsis or septic shock (WHO Interim guidance on clinical management of severe acute respiratory infection due to novel corona virus, 28 Jan 2020).

Patient Eligibility criteria:

- ➡ Adult over 18yrs of age
- ➡ Laboratory confirmation of 2019-COVID-19 infection by RT-PCR from throat swab, sputum or BAL specimen.
- ➡ Patients with mild Pneumonia, severe pneumonia, ARDS, Sepsis or septic shock, hospitalized due to symptoms related to nCoV.#
- ➡ Informed consent from patient
- ➡ Clearance from Medical board constituted for novel corona virus care in the treating Institution or from the Medical College Attached.
- ➡ For patients below 18 years of age, clearance from the State Medical Board is required.

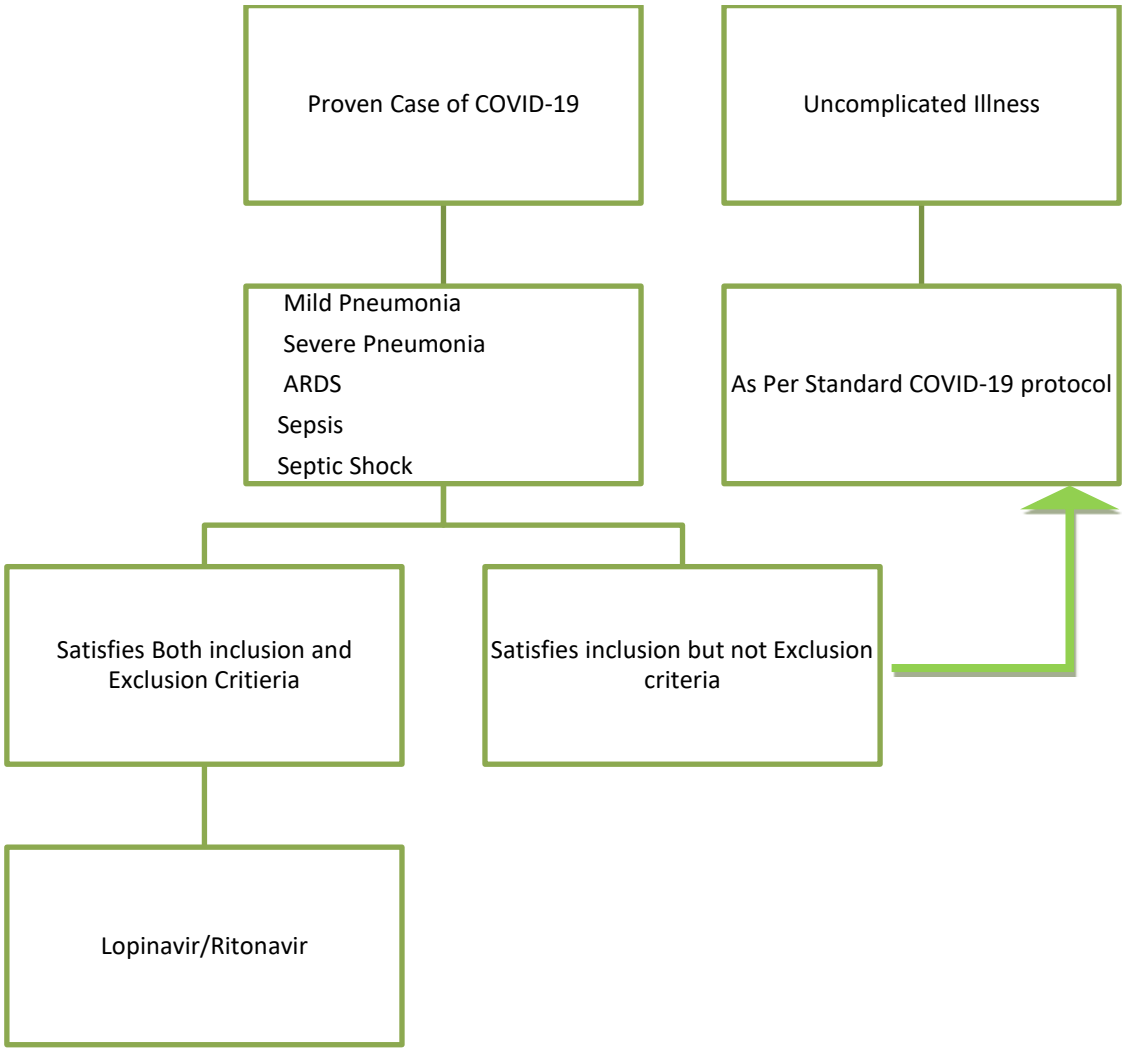
Exclusion Criteria:

- Asymptomatic individuals with COVID-19 infection.
- Known allergy or hypersensitivity reaction to Lopinavir / Ritonavir.
- A patient with Hepatic Impairment (ALT over more than five times the normal).
- Use of medications that are contraindicated with Lopinavir / Ritonavir and that cannot be replaced or stopped, It is contraindicated with astemizole, terfenadine, cisapride, ergot

derivatives, sildenafil, midazolam , triazolam; lovastatin, simvastatin, pimozide and fluticasone propionate.

- Known HIV infected individual receiving other protease inhibitors containing regimen
- Documented chronic liver disease.

ALGORITHM FOR CASE MANAGEMENT



DOSAGE OF LOPINAVIR / RITONAVIR

ADULTS:

Lopinavir / Ritonavir 200mg/50mg - 2 tablets every 12 hours for 14 days or for 7 days after becoming asymptomatic whichever is earlier

For patients unable to take medicines orally, 400mg Lopinavir / 100 mg Ritonavir 5ml suspension every 12 hours for 14 days or for 7 days after becoming asymptomatic whichever is earlier, via a nasogastric tube.

Administer with caution among persons receiving Rifampicin, Ketoconazole, ethylene estradiol .

LABORATORY INVESTIGATIONS:

- Haemogram
- Liver function test
- Renal function test
- HbA1C and blood sugar, if required
- RT PCR for COVID-19 (respiratory samples, nasopharyngeal samples, oropharyngeal swab, sputum, BAL if available)
- Investigations appropriate for any documented chronic morbidity

LABORATORY SAMPLE COLLECTION-(other than investigations for routine clinical monitoring)

- Blood sample every 48 hours — for PT/INR, LFT, RFT and serum amylase (to monitor drug-induced adverse events)

FREQUENCY AND DURATION OF MONITORING:

Patients should be monitored daily until discharge from the hospital by the Institutional Medical Board.

Patient should be discharged based on the State protocol in concurrence with the opinion of Institutional Medical Board.

Adverse events of Lopinavir –ritonavir

The observed adverse effects with lopinavir/ritonavir are

1. Acute pancreatitis (defined as having)
    a. abdominal pain consistent with acute Pancreatitis
    b. serum amylase at least three times greater than the upper limit of normal)
2. Elevation of ALT to more than five-fold upper limit of normal.
3. Anaphylaxis
4. Bleeding diathesis (INR > 3 without anticoagulant therapy)
5. Diarrhoea.

ROLES AND RESPONSIBILITIES OF TREATING INSTITUTIONS

1. The treating hospital will be responsible for patient management.
2. Prior to initiating treatment with Lopinavir / Ritonavir, the Institutional Medical Board will be responsible for obtaining written Informed Consent in the structured format from the patient or his/her guardian.
3. Patients not consenting to receive Lopinavir / Ritonavir will continue to be monitored and treated as per protocol, with provision of standard of care.
4. The case report forms will have to be filled up by the treating physician and submitted to Institutional Medical board.

ROLES AND RESPONSIBILITIES OF INSTITUTIONAL MEDICAL BOARD

1.Institutional Medical board will decide whether the patient with confirmed novel corona virus infection satisfies the criteria to be initiated on lopinavir-ritonavir.
2.Institutional Medical board will have to assess the patients who have been initiated on lopinavir-ritonavir daily.
3.Institutional medical board will have to ensure that the case report form is filled properly.
4.If patients with high risk contact of confirmed case of nCoV, presents with ARDS or sepsis, the need for initiation of lopinavir-ritonavir should be assessed by Institutional Medical board and should be referred to State Medical Board.

ROLES AND RESPONSIBILITIES OF STATE MEDICAL BOARD

1. If patients with high risk contact of confirmed case of nCoV, presents with ARDS or sepsis, the need for initiation of lopinavir-ritonavir should be assessed by State Medical Board and directive should be given to concerned Institutional Medical Board.

2. Any clarification with regard to compassionate use of lopinavir-ritonavir will be addressed by State Medical Board.

3. Treatment decision regarding use of lopinavir-ritonavir in confirmed nCoV cases in patients less than 18 yrs of age will be addressed by state Medical Board.

#CASE DEFINITIONS OF CLINICAL SYNDROMES

Mild pneumonia	Patient with pneumonia and no signs of severe pneumonia. Child with non-severe pneumonia has cough or difficulty breathing + fast breathing: fast breathing (in breaths/min): <2 months, ≥60; 2–11 months, ≥50; 1–5 years, ≥40 and no signs of severe pneumonia.
Severe pneumonia	Adolescent or adult: fever or suspected respiratory infection, plus one of respiratory rate >30 breaths/min, severe respiratory distress, or SpO2 <90% on room air

	Child with cough or difficulty in breathing, plus at least one of the following: central cyanosis or SpO2 <90%; severe respiratory distress (e.g. grunting, very severe chest indrawing); signs of pneumonia with a general danger sign: inability to breastfeed or drink, lethargy or unconsciousness, or convulsions. Other signs of pneumonia may be present: chest indrawing, fast breathing (in breaths/min): <2 months, ≥60; 2–11 months, ≥50; 1–5 years, ≥40. The diagnosis is clinical; chest imaging can exclude complications.
Acute Respiratory Distress Syndrome	Onset: new or worsening respiratory symptoms within one week of known clinical insult. Chest imaging (radiograph, CT scan, or lung ultrasound): bilateral opacities, not fully explained by effusions, lobar or lung collapse, or nodules. Origin of oedema: respiratory failure not fully explained by cardiac failure or fluid overload. Need objective assessment (e.g. echocardiography) to exclude hydrostatic cause of oedema if no risk factor present. Oxygenation (adults): • Mild ARDS: 200 mmHg < PaO2/FiO2 ≤ 300 mmHg (with PEEP or CPAP ≥5 cmH2O, 7 or non-ventilated8) • Moderate ARDS: 100 mmHg < PaO2/FiO2 ≤200 mmHg with PEEP ≥5 cmH2O, 7 or non-ventilated8) • Severe ARDS: PaO2/FiO2 ≤ 100 mmHg with PEEP ≥5 cmH2O, 7 or non-ventilated8) • When PaO2 is not available, SpO2/FiO2 ≤315 suggests ARDS (including in non-ventilated patients) Oxygenation (children; OI = Oxygenation Index and OSI = Oxygenation Index using SpO2): • Bilevel NIV or CPAP ≥5 cmH2O via full face mask: PaO2/FiO2 ≤ 300 mmHg or SpO2/FiO2 ≤264 • Mild ARDS (invasively ventilated): 4 ≤ OI < 8 or 5 ≤ OSI < 7.5 • Moderate ARDS (invasively ventilated): 8 ≤ OI < 16 or 7.5 ≤ OSI < 12.3 • Severe ARDS (invasively ventilated): OI ≥ 16 or OSI ≥ 12.3
Sepsis	Adults: life-threatening organ dysfunction caused by a dysregulated host response to suspected or proven infection, with organ dysfunction. Signs of organ dysfunction include: altered mental status, difficult or fast breathing, low oxygen saturation, reduced urine output, fast heart rate, weak pulse, cold extremities or low blood pressure, skin mottling, or laboratory

	evidence of coagulopathy, thrombocytopenia, acidosis, high lactate or hyperbilirubinemia. Children: suspected or proven infection and ≥2 SIRS criteria, of which one must be abnormal temperature or white blood cell count.
Septic shock	Adults: persisting hypotension despite volume resuscitation, requiring vasopressors to maintain MAP ≥65 mmHg and serum lactate level >2 mmol/L. Children : any hypotension (SBP 2 SD below normal for age) or 2-3 of the following: altered mental state; tachycardia or bradycardia (HR 160 bpm in infants and HR 150 bpm in children); prolonged capillary refill (>2 sec) or warm vasodilation with bounding pulses; tachypnea; mottled skin or petechial or purpuric rash; increased lactate; oliguria; hyperthermia or hypothermia.

References

1. Clinical management of severe acute respiratory infection when Novel coronavirus (2019-nCoV) infection is suspected: Interim Guidance by WHO Jan 28, 2020.

INFORMED CONSENT FORM FOR COMPASSIONATE USE OF LOPINAVIR-RITONAVIR FOR COVID-19 VIRUS

Institutional Medical board has informed me that I /my relative have been diagnosed with SARS-CoV -2 infection. They have clearly explained to me that there is no effective and approved medication against COVID-19 infection. They have explained to me in detail that there is some scientific evidence regarding the effectiveness of using lopinavir-ritonavir for corona virus infections like SARS in the past. They also explained to me that at present a clinical trial is going on in China to ascertain the efficacy of lopinavir-ritonavir in people affected by COVID-19. They have explained to me that lopinavir-ritonavir has been used in treatment of HIV even in children for more than ten years in India with an acceptable adverse effect profile.

The team of doctors informed me that as I have developed pneumonia due to COVID-19, I might benefit by the restricted Compassionate use of lopinavir-ritonavir. They have clearly explained to me that lopinavir-ritonavir has not been approved for the definitive treatment of COVID-19.They have explained to me in detail that as there are no approved antiviral drugs for COVID-19, and as there is a risk of progression to acute respiratory distress syndrome, lopinavir-ritonavir may be used. They have explained to me about the probable side effects of lopinavir-ritonavir like diarrhea, hypersensitivity, pancreatitis, gastritis and hepatitis. They have made it clear that the standard treatment for COVID-19 infection will be continued irrespective of my decision regarding the compassionate use of lopinavir-ritonavir. Knowing that lopinavir-ritonavir is not an approved medication for the treatment of novel corona virus infection, I fully agree to the restricted public health emergency use of this drug for the treatment of my novel corona virus infection.

Name

Relation

Signature

Institutional Medical Board Members

Name

Signature

The advisory may be followed up by the treating team and the Hospital Medical Board.

If there is any doubt, teams may consult the State Medical Board.

Principal Secretary

Annexure

COVID 19 (nCorona) Virus Outbreak Control and Prevention State Cell
Health & Family Welfare Department
Government of Kerala

COVID-19 – Constitution of the Committee to study clinical management of 500 patients – Reg
No.31/F2/2020/Health – 18th June 2020

WHO has declared the COVID-19 epidemic affecting more than 216 countries as a Pandemic. Due to the inflow of persons from affected countries, Kerala state has strengthened the surveillance and control measures against the disease. The Department of Health and Family Welfare has designated COVID Hospitals in districts and the State Medical Board was the first to develop Treatment Protocol.

It is decided to study the 500 positive patient's clinical management and publish a report that should be made available to all to understand various aspects of COVID19.
The Committee is constituted as follows to study the clinical management as follows -

1. State Medical Board Chairman and members
2. Institutional Clinical management teams
3. Dr Libu as a coordinator

The State Medical Board Chairman may conduct meetings with all COVID Hospitals Clinical Management Teams as and when required.

After conducting the first volume of 500 patients. Subsequent patients study reports to be submitted by the respective COVID Medical Boards every month. They may seek guidance from State Medical Board. The second volume to be done in such collaborative way.

The Report may be submitted within 7 days.

Principal Secretary

Annexure

State Medical Board

Sl No	Name	Designation
1	Dr Santhosh Kumar	Prof Peadiatrics, Chairman State Medical Board, Superintendent SAT Hospital Thiruvananthapuram
2	Dr Kala Kesavan P	Prof Pharmacology Govt Medical College Alappuzha
3	Dr Anil Sathyadas	Prof Critical Care Govt Medical College Thiruvananthapuram
4	Dr Sheela Mathew	Prof Infectious Diseases Govt Medical College Kozhikode
5	Dr Chandini	HoD and Prof Emergency Medicine Govt Medical College Kozhikode
6	Dr Aravind	Asst Prof and HoD Infectious Disease Thiruvananthapuram
7	Dr Bindu	HoD Pharmacology Govt Medical College Thiruvananthapuram
8	Dr Unnikrishnan Kartha	HoD and Prof Govt Medical College Alappuzha

1.GOVT.MEDICAL COLLEGE MANJERI

Medical Board Member	**Designation**	**Clinical Team**	**Designation**	**Name of Paramedical Staff**	**Designation**
Dr.M P Sasi	Principal	Dr.Mridul Kumar	Associate Professor ,Medicine	Moosakutty	Store Superintendent
Dr.Nandakumar	Superintendent	Dr.Musthafa	Asst Prf Of Respiratory Medicine	Ayisha	Nursing Superintendent
Dr.Shinas Babu	Nodal Officer Covid-19	Dr.Krishnadas	Consultant ,Medicine	Sujatha	Head Nurse, HIC
Dr.Sheena Lal	Deputy Superintendent	Dr.Arif	Asst Prof Anaesthesiology		
Dr.Afsal	Deputy Superintendent	Dr.Nisar	Asst Prof Medicine		
Dr.Anitha	Hod Medicine	Dr.Abdul Rasak	Consultant ,Respiratory Medicine		
Dr.Vijayakumar	Hod Peadiatrics				
Dr.Santhosh	Hod Respiratory Medicine				
Dr.Asuma	Hod Community Medicine				
Dr.Jacob	Hod Gyneacology				

Dr.Vinod	Hod Surgery				
Dr.Anitha	Hod Microbiology				
Dr.Suma	Hod ENT				
Dr.Bindu	Hod Anasthesia				

2. GOVT. MEDICAL COLLEGE KASARAGOD

Medical Board Member	**Designation**	**Clinical Team**	**Designation**	**Name of Paramedical Staff**	**Designation**
Dr.Raman Swathy Vaman	Superintendent				
Dr.Adarsh MB	Assistant professor General medicine	Dr.Adarsh MB	Assistant professor General medicine	Manu U K	Pharmacist cum storekeeper
Dr Anitha Abraham	Assistant professor Community medicine	Dr Anitha Abraham	Assistant professor Community medicine	Siji Sebastian	Head Nurse
Dr Kavitha P	Assistant professor Anaesthesia	Dr Kavitha P	Assistant professor Anaesthesia	Alphonse T L	Head Nurse
Dr Arun	Assistant professor Anaesthesia	Dr Arun	Assistant professor Anaesthesia	Jaya S	Head Nurse
Dr Ameer Bavae L B	Assistant professor ENT	Dr Ameer Bavae L B	Assistant professor ENT		
Dr Sadik	Assistant professor Paediatrics	Dr Sadik	Assistant professor Paediatrics		
Dr Nubila	Assistant professor Microbiology	Dr Nubila	Assistant professor Microbiology		
Dr Lakshmi Priya U	Assistant professor Pathology	Dr Lakshmi Priya U	Assistant professor Pathology		
Dr Jyothis P	Assistant professor Transfusion medicine	Dr Jyothis P	Assistant professor Transfusion medicine		
		Dr. Meera M Nandakumar	Senior Resident ENT		
		Dr. Muhammed Faseed CH	Senior Resident Respiratory medicine		
		Dr..Anil Kumar	Junior Resident		

		Dr.Abdul Khader Babu VK	Junior Resident		

3. DISTRICT HOSPITAL PALAKKAD

Medical Board Member	Designation	Clinical Team	Designation	Name of Paramedical Staff	Designation
Dr.Remadevi.K	Superintendent	Dr.Sujith.J S	Consultant Medicine	Smt.Anitha	Nursing Superintendent
Dr.Shyja.J S	RMO	Dr.Lemna	Jr.Consultant Medicine	Smt.Radhika	Head Nurse
Dr.Abhijith.V	Consultant Psychiatrist	Dr.Divya Damodaran	Jr.Consultant Pulmonology	Smt.Nimmy	Lab technician
Dr.Sona.N	Consultant Medicine	Dr.Kiran	Associate Professor in Medicine		
Dr.Krishnadas	Consultant Nephrology	Dr.Abi mon	Assistant Professor in Medicine		
Dr.sreeram .B	Assistant Professor in Medicine	Dr.Aswathi	Assistant Professor in Medicine		
Dr.Sreeram Shankar	Jr.Consultant Medicine	Dr.Deepthi	Assistant Professor in Medicine		
		Dr.Haseena	Assistant Professor in Medicine		
		Dr.Nishil	Assistant Surgeon		
		Dr.Aswin	Assistant Surgeon		
		Dr.Sreejith	Assistant Professor in Medicine		
		Dr.Anwar	Assistant Professor in pulmonology		
		Dr.Naveen	Assistant Surgeon		
		Dr.Hemalatha	Professor in ENT		

4. DISTRICT HOSPITAL KANHANGAD

Medical Board Member	Designation	Clinical Team	Designation	Name Of Paramedical Staff	Designation
Dr. Prakash K V	Superintendent	Dr Rajesh Ramachandran	JC Medicine	Sudhakaran	Store Superintendent I/C
Dr Rijith Krishnan	RMO	Dr Praveen KC	JC Resp Medicine	Valsamma	Nursing Superintendent
Dr. Vinod Kumar	Senior Consultant Surgeon	Dr Abilash	JC Pediatrics	Achamma	Head Nurse, Hic
Dr Rajesh Ramachandran	Nodal Officer, JC Medicine	Dr Mini Unni	JC Pediatrcs		
Dr. Praveen KC	JC Resp Medicine	Dr Jyothi	Consulant Gynecologist		
Dr Ramya RK	Junior Consultant, Anesthesia				
Dr CKP Kunhabdulla	Senior Consultant, Pediatrics				
Dr Jyothi	Consultant Gynecologist				
Dr Nithyananda Babu	Consultant ENT Surgeon				
Dr Shakeel Anwar	JC, Orthopedics				

5. DISTRICT HOSPITAL KOLLAM

Medical Board Member	Designation	Clinical Team	Designation	Name Of Paramedical Staff	Designation
Dr.Vasanthadas	Superintendent				
Dr.Anirup Sankar	RMO, Covid Nodal Officer	Dr.Annu Anand	JC Medicine	Ajoy	Store Superintendent
Dr.Filson	JC Medicine	Dr.Santhosh	Consultant Surgeon	Geetha.N	Nursing Officer
Dr.Bijoy	JC Anesthesia	Dr.Mini	Consultant Ent Surgeon	Geethakumari C	Head Nurse HIC
Dr.Gireeshan	Consultant ENT	Dr.Ulsah Harry	JC Psychiatry		
Dr.Sahil	Consultant Orthopedics	Dr.Roogus Jose	JC Orthopedics		

Dr.Nithin Mathew Sam	Consultant Forensic Surgeon	Dr.Riyas Basheer	JC Resp Medicine		
Dr.Riyas Basheer	JC Resp Medicine	Dr.Soumya	Assistant Surgeon		
Dr.Joseph Gomaz	Consulant Surgeon	Dr.Vivek	Assistant Surgeon		
Dr.Gireesh	Consulant Physician-Cardiologist	Dr.Sumesh	Assistant Surgeon		
Dr.Kiran	Consultant Psychiatry	Dr.Harilal	Assistant Surgeon		
Dr.Lalu Sundar	JC Tranfusion Medicine				

6. DISTRICT HOSPITAL KANNUR

Medical Board Member	Designation	Clinical Team	Designation	Name Of Paramedical Staff	Designation
Dr. RAJEEVAN V K	SUPERINTENDENT	TREATMENT TEAM			
Dr. ABHILASH N	Medical Consultant	Dr. Greeshma S	Jr. Medical Consultant	Sasindran Mavilodan	Store Superintendent
Dr. Latha P	Jr. Medical Consultant	Dr. Sushamakumari K	Consultant ENT	Ajitha M	Nursing Officer
Dr. Mridula M P	Consultant - Peadiatrics	Dr. Rajeev Raghavan	Consultant Ortho	Marykutty MC	Head Nurse - (HIC i/c)
Dr. Ismail C V T	R M O	Dr. Soya Sudhakaran	Consultant OB& G		
		Dr. Sharmila A P	Assistant Surgeon		

7. DISTRICT HOSPITAL KOZHENCHERY

Medical Board Member	Designation	Clinical Team	Designation	Name Of Paramedical Staff	Designation
Dr. Prathibha S	Superintendent	Dr. Abhilash PM	Asst Surgeon,/Nodal officer,/physician	Mary John	Pharmacy store superintendent
Dr. Manoj Kumar	JC General Medicine	Dr. Aneesh Pilla	Assistant Surgeon, General Surgery	Latha Kumari	Nursing superintendent

Dr.Winson Edikkula	ENT asst Surgeon	Dr. Lakshmi Rekha	Pediatrician	Sunila	Head nurse HIC
Dr. Ricky	Pulmonologist	Dr.Winson Idikkula	Asst surgeon ENT		
Dr. Lakshmi Rekha	JC Pediatrics	Dr. Mathen Fincy	JC ophthalmology		
Dr. Dhanya. R	JC Anaesthesia				
Dr. Sukesh	Psychiatrist Asst surgeon				
Dr. Abhilash PM	nodal officer				

8. GOVT. MEDICAL COLLEGE THRISSUR

Medical Board Member	Designation	Clinical Team	Designation	Name Of Paramedical Staff	Designation
Dr.M.A Andrews	Principal	Dr.Rajesh .K.R	ASO PROFESSOR ,MEDICINE NODAL OFFICER	Sr. Jessy	NURSING SUPT
Dr.BijuKrishnan.R	Superintendent	Dr.Geo Paul	ASST PRF OF MEDICINE	Sr.Lizzy	NURSING SUPT
Dr. Jayachandran.N.V	HOD medicine	Dr.Renny Issac	ASST PRF OF MEDICINE	Sr.Radhamani .T.B	NURSING SUPT
Dr.Shamsad Beegum	HOD Anaesthesia	Dr.Ranadeep	ASST PROF ANASTHESIOLOGY	Mr.Abbobacker	Store Superintendent
Dr.Thomas George	HOD Pulmonary Medicine	Dr.Jijith Krishnan	ASST PROF MEDICINE		
Dr. Binu Areekal	PEID cell coordinator	Dr.Mani .O.K	CONSULTANT ,RESPIRATORY MEDICINE		
Dr. Prasad	HOD Pathology				

9. GENERAL HOSPITAL ALAPPUZHA

Medical Board Member	Designation	Clinical Team	Designation	Name Of Paramedical Staff	Designation
Dr. Jamuna Varghese	Superintendent	Dr.Joshy.K	Junior Consultant(General Medicine)	Smt.Mercy Thomas	Nursing Superintendent

Dr.Rejithkumar	Consultant(General Medicine)	Dr.Shabeer	Consultant	Sri.M.A.Satheesh	Store Superintendent
Dr.Shabeer	Consultant(General Medicine)	Dr.Deepu.B	Junior Consultant(Respiratory Medicine)	Dr.Shalima.S	RMO
Dr.Shanti	Consultant(Paediatrics)	Dr.Shanti	Consultant(Paediatrics)	Sri.Renjith.K.R	Lab Technician
Dr.Deepu.B	Junior Consultant(Respiratory Medicine)	Dr.Mini.R	Consultant(Anaesthesia)	Sri.Subaida.A	Radiographer
Dr.Shalima.S	RMO	Dr.Lubin.B	Junior Consultant(ENT)		
		Dr.Deepu.S	Assistant Surgeon		

10. THQH HARIPAD

Medical Board Member	Designation	Clinical Team	Designation	Name Of Paramedical Staff	Designation
DR SUNIL .S	Superintendent	Dr Prasanth Kumar	Junior Consultant (ENT)	Smt. Sophy S	Nursing Superintendent
DR KRISHNAKUMAR	Deputy Superintendent	Dr Shika Sugathan	JuniorConsultant (Paediatrics)	Smt. Girija J	Store Superintendent
DR KARTHIKA MOHANDAS	Consultant (General Medicine)	Dr Viswanath V	Junior Consultant (Orthopedics)	Smt. Raji S	Lab Incharge
DR SINU R V	Junior Consultant (General Medicine), NODAL OFFICER	Dr Rinku	Assistant Surgeon	Sri Kapil Dev	Radiographer
DR HARRY JACOB	Junior Consultant (Respiratory Medicine)	Dr Rosmy Varghese	Junior Consultant (Opthalmology)	Sri Mohanan	Radiographer
DR RAZEENA BEEGUM N	Consultant (Paediatrics)	Dr Anu Ashraf	Junior Consultant (Orthopedics)		
DR DEEPAK NAIR	RMO	Dr Dileep Das	Assistant Surgeon		
		Dr Goggy	Assistant Surgeon		
		Dr Iran Shah	Assistant Surgeon		
		Dr Chandrajith	Assistant Surgeon		

		Dr Lakhan	Assistant Surgeon		
		Dr Jariya	NHM		

11. GENERAL HOSPITAL KASARAGOD

Medical Board Member	Designation	Clinical Team	Designation	Name Of Paramedical Staff	Designation
Dr.Rajaram K K	Superintendent	Dr.M.Kunhiraman	Physician& Nodal Officer	Mrs.Snishi.	Nursing Sperintendent
Dr.M.Kunhiraman	Nodal Officer& Con Physician	Dr.P.Krishna Naik	Physician	Ajith Kumar E	Store Superintendent
Dr.Krishna Naik. P	Consultant Physician	Dr.Janardhana Naik C H	Physician	Kamalakshy	Head Nurse
Dr.Janardhana Naika.C.H	Consltant Physician	Dr.Aparna Kp	Psychiatrist	Deepak	Lab Technician
Dr.Narayana Naik B	S Consultant Paediatrics	Dr.Sunil Chandran	Surgeon	Preetha	Radiographer
Dr.Jamaludeen	J C Ent	Dr.Narayana Naik.B	Paediatrician		
Dr.Aparna K.P	J C Pshychiatry	Dr.Preema.K B	Paediatrician		
		Dr.Asharani.	Ent		
		Dr.Mahesh	Ortho		
		Dr.Aravind.V.Ashok	Psychiatrist		
		Dr.Vasanthi	Obg		
		Dr.Anoop	Anaesthetist		
		Dr.Dhanasree	Asst Surgeon		
		Dr.Zahid	Radiation Oncology		
		Dr.Aparna .B	Asst Surgeon		
		Dr.Shereena	Paediatrician		

12. GENERAL HOSPITAL THALASSERY

Medical Board Member	Designation	Clinical Team	Designation	Name Of Paramedical Staff	Designation
Dr Piyush.M	Superintendent	Dr Ajith Kumar K N	Physician	Mrs.Ramini	Nursing Superintendent
Dr Ajith Kumar.K.N	Chief Consultant(Medicine)N.Officer	Dr Aneesh	Physician	Prakashan	Store Superintendent
Dr Jithin	Deputy Superintendent/Rmo	Dr Sivashankaran	Paediatrician		
Dr Sivashankaran	Consultant In Paediatrics	Dr Muneer	Psychiatrist		
Dr Muneer	JC Psychiatry	Dr Karim	Pulmonologist		
Dr Aneesh	Consultant In Medicine	Dr Vineetha	Ent Surgeon		
Dr Vijumon	Consultant In Orthopaedics				

13. DISTRICT HOSPITAL MANANTHAVADY

Medical Board Member	Designation	Clinical Team	Designation	Name Of Paramedical Staff	Designation
DR DINESHKUMAR AP	SUPERINTENDENT	DR RAJAN	SR CONSULTANT ENT	SMT.BHAVANI	NURSING SUPERINTENDENT
DR NOONA MARJA	DY SUPERINTENDENT	DR RATNAVALLY	JC MEDICINE	SRI. MOHANAN	STORE SUPERINTENDENT
DR CHANDRASEKHARAN	NODAL OFFICER, CONSULTANT IN PAEDIATRICS	DR SONY	JC MEDICINE	SMT.SHIMNA	LAB IN CHARGE
DR SAKEER	RMO	DR USMAN	JC ANAESTHESIOLOGY	SMT LILLY	XRAY TECHNICIAN
DR SAJESH	CONSULTANT IN MEDICINE	DR JAYAKUMAR	JC ENT		
DR AJITH A	JC RESPIRATORY MEDICINE	DR RUBY	CONSULTANT IN OPHTHALMOLOGY		

DR USMAN VP	CONSULTANT IN ANAESTHESIOLOGY	DR JUBESH	CONSULTANT IN SURGERY		
DR SURESH K	CONSULTANT IN ORTHOPEDICS	DR ATHISH	JC SURGERY		
DR BIPIN	JC IN FORENSIC MEDICINE	DR BINIJA	BLOOD BANK OFFICER		
		DR RAJALAKSHMI	JC RADIOLOGY		

14. GOVT. MEDICAL COLLEGE THIRUVANANTHAPURAM

Medical Board Member	Designation	Clinical Team	Designation	Name of Paramedical Staff	Designation
Dr Sara Varghese	Principal	Dr Selvaraj Chettiyar	Prof of Medicine	Deepa	Icn
Dr Sharmad Ms	MCH Superintendent	Dr Aruna	Prof of Medicine	Chithra	Icn
Dr Santhosh Kumar	Sat Superintendent,Hod Paediatrics	Dr Sreekantan	Prof of Medicine	Beena	Link Nurse
Dr Ravikumar Kurup	Hod Medicine	Dr Sreenath	Prof of Medicine	Vinitha	Link Nurse
Dr Suresh M K	Nodal Officer	Dr Ratheesh	Asso Prof Of Medicine	Amina	Link Nurse
Dr Indu P S	Hod Community Medicine	Dr Sajeesh	Asso Prof Of Medicine	Nahina	Link Nurse
Dr Anitha Kumari	Hod Respiratory Medicine	Dr Harikrishnan	Asso Prof Of Medicine	Ponnamma	Nursing Superintendent
Dr Anil Sathydas	Asso Prof Critical Care	Dr Praveen	Asso Prof Of Medicine	Prabha	Nursing Superintendent
Dr Joby John	Deputy Superintendent	Dr Kamala	Asso Prof Respiratory Medicine	Geetha	Nursing Superintendent
Dr Sunil Kumar	Deputy Superintendent	Dr Praveen	Asst Prof Of Respiratory Medicine	Anitha	Nursing Superintendent
Dr Shiju Majeed	Deputy Superintendent	Dr Athul Gurudas	Asst Prof Of Infectious Diseases	Nisa	Nursing Superintendent
Dr Mohan Roy	Rmo	Dr Kirankumar	Asst Prof Of Infectious Diseases	Mini	Head Nurse
Dr Sujatha	Deputy Superintendent	Dr Anuja	Peid Cell		

Dr Santhosh Kumar	Deputy Superintendent				
Dr Aravind R	Hod Infectious Diseases				

15. GOVT. MEDICAL COLLEGE KANNUR

Medical Board Member	Designation	Clinical Team	Designation	Name of Paramedical Staff	Designation
Dr.K.M.Kuriakose	Principal	Dr.Sarosh kumar	Asso. Prof General Medicine	Rosamma	Nursing superintendent
Dr.Sudeep. K	Superintendent	Dr.Manu Mathews	Asso. Prof General Medicine	Meera Bhaskaran	Lecturer. Pharmaceutical science
Dr. Pramod	Nodal Officer	Dr. Kadeeja beevi	Asso. Prof General Medicine	Merlit Thomas	Lecturer. Pharmaceutical science
Dr. Jayasree.A.K	HOD. Community Medicine	Dr. Surag	Asso.Prof. General Medicine	Aswathy	Lecturer. Pharmaceutical science
Dr. Manoj.. D.K	HOD. Respiratory Medicine and deputy supdt	Dr. Rajeev ram	Asso.Prof. Respiratory Medicine	Soumya George	Asst. Prof. Nursing College
Dr. Vimal Rohan	Asst. Professor. Emergency Medicine & deputy supdt (casualty)	Dr. Arunsree	Senior resident. General Medicine	Vinod	Health Inspector
Dr. Sarin.S.M	RMO	Dr.Harikrishnan	Senior resident. General Medicine	Sreekumar	Lab technician
Dr. Ranjith Kumar	HOD.General Medicine	Dr. Rajani	Professor. Respiratory medicine	Ajimol Joseph	Nurse supervisor
Dr. Charls Thomas	HOD. Anaesthesia	Dr. Sarin. S.M	Asso. Prof General Medicine	Roselet Jose	Nurse supervisor
Dr. Ajith	HOD. Gynaecology	Dr. Ramesan	Asso.Prof. General Medicine	Rejimol	Staff Nurse
Dr. Ganesh.B. Mallar	M.O Infection Control	Dr. Abhishek	Asst. Prof. Physical Medicine	MariyammaJohn	Staff Nurse

Dr. Manoj Kumar	ARMO	Dr. Shabnam	Asst. Prof. Gynaecology	Reena Augustine	Staff Nurse
Dr. MTP Mohammed	HOD. Paediatrics	Dr. Resmi	Asst. Prof. Gynaecology	Lizy Chacko	Staff Nurse
		Dr. Shaji	Asst. Prof. General Medicine	Razia	Staff Nurse
		Dr. Rijith Kannan	Asso.Prof. General Medicine	Robin baby	Staff Nurse

16. GOVT. MEDICAL COLLEGE ERNAKULAM

Medical Board Member	**Designation**	**Medical Board Member**	**Designation**
Dr.Satheesh.V	Principal	Dr.Fathahudeen.A	HOD,Pulmonary and Critical care Medicine
Dr.Fathahudeen.A	Nodal officer and Vice Principal	DrJacob K Jacob	Professor of Medicine
Dr.Peter Vazhayil	Superintendent	Dr.Renimol.B	Additional Professor of Internal Medicine
Dr.Ganesh Mohan	RMO and Assistant Nodal Officer	Dr.Joe Joseph	Associate Professor of Medicine
Dr.Manjula. VD	HOD,Community Medicine	Dr.Radha .KR	HOD ,Gynaecology
Dr.Jacob K Jacob	Professor of Internal Medicine	Dr.Raju George	HOD,Cardiology
Dr.shiji K Jacob	HOD,Paediatrics	Dr.Usha	HOD,Nephrology
Dr.Geetha Nair	Deputy.Supdt.		

17. GOVT. MEDICAL COLLEGE KOTTAYAM

Medical Board Member	**Designation**	**Clinical Team**	**Designation**	**Name Of Paramedical Staff**	**Designation**
Dr. Mohanan.P.P	Principal	Dr. Sajith Kumar. R	Professor, Infectious Diseases	Ms. Ajithamoni AN	Nrsg Supdt Grade 2
Dr. Jayakumar.T.K	Superintendent	Dr. Harikrishnan. V.G	Assistant Professor, Infectious Diseases	Ms. Viji MN	Nrsg Supdt Grade 2

Dr. Sajith Kumar.R	Nodal Officer	Dr. Krishnakumar. S	Assistant Professor, Infectious Diseases	Ms. Molly Joseph	Nrsg Supdt Grade 2
Dr. Anitha Bhaskar	PEID Cell Coordinator	Dr. Ratheesh Kumar. R	Assistant Professor, Anesthesiology	Ms. Kathreena KG	Nrsg Supdt Grade 2
Dr. Sanghamitra.P	Professor, General Medicine	Dr. Anuraj. V.T	Assistant Professor, Anesthesiology	Ms. Beenamma Thomas	Nrsg Supdt Grade 2
Dr Venugopal.K.P	Professor Pulmonary Medicine	Dr. Anjali Prem	Assistant Professor, Obstetrics & Gynaecology		
Dr. Omana.S	Professor, Paediatrics				
Dr. Jose Joseph	*Retired Principal (former Principal)*				
Dr. Rajakumari P K	*Retired Professor, General Medicine (former member)*				

18. GENERAL HOSPITAL THRISSUR

Medical Board Member	**Designation**	**Clinical Team**	**Designation**	**Name Of Paramedical Staff**	**Designation**
Dr Sreedevi T P	Superintendent	Dr Raghunandan P V	JC Pulmonology & Asst Nodal Officer	Smt. Rajani P	Nrsg Superintendent
Dr Sumesh T Krishnan	Consultant , Medicine & Nodal Officer	Dr Prashanth G	RMO, Asst Surgeon	Smt Bindhu A	Store Superintendent
Dr Deepa P S	Consultant , Medicine & HOD Medicine	Dr Dileep Das	Asst Surgeon	Sri. Kishore K K	Sr Lab technician
Dr Vidya V	Sr Consultant , Pulmonology & HOD Pulmonology	Dr Pournamy Mohan	Asst Surgeon	Smt . Priya V V	HIC Nurse
Dr Joe Kuruvila	Consultant, Anaesthesia	Dr Sujith J Bunglavan	Asst Surgeon	Smt Ciby M J	HIC Nurse
Dr Beena K R	Consultant, Pediatrics	Dr Remya K A	Asst Surgeon		
Dr Indu V P	HOD Laboratory , Blood Bank and Transfusion	Dr Smitha M	Asst Surgeon		
		Dr Sheetal john	Asst Surgeon		

		Dr Nikhitha Basheer	NHM Medical Officer		
		Dr Sreeya Sreedhar	NHM Medical Officer		
		Dr Abhaya V S	NHM Medical Officer		
		Dr Govind A N	Asst Surgeon, (ADHOC)		
		Dr Jyolsna M S	Asst Surgeon (ADHOC)		

19. GOVT. MEDICAL COLLEGE KOLLAM

Medical Board Member	Designation	Clinical Team	Designation	Name Of Paramedical Staff	Designation
Dr N. ROY	PRINCIPAL	Dr JACOB ANTONY	ASSOC. PROFESSOR MEDICINE	Ms SHEEJA	NURSING SUPT.
Dr HABEEB NASEEM	MEDICAL SUPERINTENDENT	Dr SUNIL PRASOBH	ASSOC. PROFESSOR MEDICINE	Ms VIJAYALEKSHMI	NURSING SUPT.
Dr SHAHUL HAMEED	HOD MEDICINE	Dr RENJITH SANU WATSON	ASSOC. PROFESSOR MEDICINE	Ms JAYANTHI	HEAD NURSE
Dr SANUJA SARASAM	HOD PEDIATRICS	Dr SINDHU	ASST PROFESSOR PULMONARY MEDICINE	Ms RAJALEKSHMI	HEAD NURSE
Dr JYOTHI. E	HOD PULMONARY MEDICINE	Dr RAJATHILAKAM	ASST. PROFESSOR PULMONARY MEDICINE	Ms SYLVI	HEAD NURSE
Dr PRABHASH. R	HOD ANAESTHESIA	Dr SUDHARMA	ASST. PROFESSOR MEDICINE	Ms SELVI	HEAD NURSE, ICU
Dr GEETHA RAVEENDRAN	HOD MICROBIOLOGY	Dr MOHAMMAD NASEEM	ASST. PROFESSOR MEDICINE	Ms JEEJA	HEAD NURSE, ICU
Dr ANUJA A	HOD COMMUNITY MEDICINE	Dr SREENA	ASST. PROFESSOR MEDICINE	Ms SAINO THAMBI	HEAD NURSE
Dr SALIMA REMA WINDSOR	CLINICAL NODAL OFFICER	Dr VYSAKH	ASST. PROFESSOR MEDICINE	Ms LISHA	IC NURSE
Dr RANDHEER S	CLINICAL NODAL OFFICER	Dr BINU ABRAHAM	ASSOC. PROFESSOR PEDIATRICS	Ms ARUN	IC NURSE

Dr GOPAKUMAR	Dy. MEDICAL SUPERINTENDENT	Dr LAKSHMON	SR MEDICINE		
Dr SHIRIL ASHRAF	RMO	Dr ANTONY	SR MEDICINE		
Dr KIRAN N	ARMO				

20. GOVT. MEDICAL COLLEGE ALAPPUZHA

Medical Board Member	Designation	Clinical Team	Designation	Name Of Paramedical Staff	Designation
DR. VIJAYALAKSHMI M C	PRINCIPAL	DR T K SUMA	PROFESSOR OF MEDICINE (CHIEF MEDICAL OFFICER)	REVAMMA G	NURSING OFFICER
DR. RAMLAL R V	MEDICAL SUPERINTENDENT	DR SURESH RAGHAVAN	HOD MEDICINE (IN CHARGE)	SUBHA P	NURSING SUPERINTENDENT
DR. ABDUL SALAM	DEPUTY SUPERINTENDENT	DR LINETTE J MORRIS	HOD ANESTHESIA	LISA V MATHEW	NURSING SUPERINTENDENT
DR. NONAM CHELLAPPAN	R M O	DR JOSE O	ADDITIONAL PROFESSOR PEDIATRICS	MURAD DAMODARAN	STORE SUPERINTENDENT
DR. SUMA T K	CHIEF MEDICAL OFFICER	DR JAYACHANDRAN R	ASSISTANT PORFESSOR MEDICINE	SHYLA VARGHESE	HEAD NURSE
DR. JUBY JOHN	NODAL OFFICER	DR. JUBY JOHN	ASSISTANT PORFESSOR INFECTIOUS DISEASES	JANEESH N M	LINK NURSE (CORONA)
DR. SURESH RAGHAVAN	HOD MEDICINE (IN CHARGE)	DR. BINDHU C G	ASSISTANT PORFESSOR PULMONARY MEDICINE	AMPILIMOLK K	INFECTION CONTROL NURSE
DR. SHANAVAS A	HOD PEDIATRICS	DR. ANEESH K V	ASSISTANT PROFESSOR ANESTHESIA		

DR VENUGOPAL P	HOD PULMONARY MEDICINE	DR. KARTHIKA M	PIED CELL		
DR LALITHAMBIKA	HOD GYNAECOLOGY	DR. SAJAD K	SENIOR RESIDENT MEDICINE		
DR SOBHA KARTA	HOD MICRO BIOLOGY	DR. NAVANEETH G	SENIOR RESIDENT MEDICINE		
DR SAJAD K	ASSISTANT NODAL OFFICER				
DR NAVANEETH G	ASSISTANT NODAL OFFICER				
REVAMMA G	NURSING OFFICER				

21. DISTRICT HOSPITAL THODUPUZHA

Medical Board Member	**Designation**	**Clinical Team**	**Designation**	**Name Of Paramedical Staff**	**Designation**
DR SUJA JOSEPH	SUPERINTENDENT	Dr.Neeraj	ASS SURGEON	ANNAMMA	NURSING SUPERINTENDENT
DR JOSEMON P GEORGE	NODAL OFFICER	DR MAYA RAJ	JC GYNAEC	USHAKUMARI PK	HIC HEAD NURSE
DR JONES MANUAL	JUNIOR CONSULTANT IN ANASTHESIA	Dr.Cyriac George	JC PSYCHIATRY	P S RAVIKUMAR	STORE SUPERINTENDENT
DR SITHARA MATHEW	JUNIOR CONSULTANT IN GENERAL MEDICINE	Dr.Anjana MA	JC RADIO DIAGNOSTICS	MOLLY JOSEPH	LAB INCHARGE
DR ROJAS M MATHEW	JUNIOR CUNSULTANT IN ENT	Dr.Aneesh Varghese	JC ORTHO		
DR DANIEL GEORGE	JUNIOR CUNSULTANT IN PAEDIATRICS	Dr.Rojas M Mathew	JC ENT		
		Dr.Aleena	CMO		
		Dr.Jobin Mathew	JC PEADIATRICS		
		Dr.Leojan	ASS SURGEON		

		Dr.Mijesh KV	CONSULTANT ORTHO		
		Dr.Ramesh Chandran	CONSULTANT PSYCHIATRY		
		Dr.Sajith Krishnan	JC SURGERY		
		Dr.Sithara Matew	JC GENERAL MEDICINE		
		Dr.Girish Francis	JC PAEDIATRICS		

Acknowledgment

The State of Kerala has taken initiative well in time to put up surveillance, testing, contact tracing, isolation and treatment mechanism to contain COVID epidemic.

The teams of doctors in COVID Hospitals and the respective Medical Boards at the Institution and State level have been constantly monitoring the serious cases and they have been providing the best of care possible. We appreciate the hard work of all the clinicians and the team in the COVID Hospitals and all the Doctors of Institution Medical Board and State Medical Board.

The Department has developed the user-friendly software to collect the information regarding the patients. Mr Rahul, Consultant IT Mission has developed the software within a short span of time. We appreciate his committed efforts.

It is noteworthy to mention the efforts taken by Dr Santhosh Kumar, Chairman State Medical Board in coordinating with all the clinician teams and the respective Medical Boards. Dr Libu has taken huge efforts in following up with all concerned in the field, coordinating with State Medical Board and drafting the report.

It is hoped that the Clinical Management Report of 500 patients will give information to all. It will be our endeavour to publish the next volume by taking into consideration the next set of patient's data including the patients covered in this report. I request to the health experts and practitioners to give their suggestions to further improve the report.

We once again appreciate the untiring efforts of the teams working at the COVID Hospitals to provide the care and support to COVID patients.

Dr Rajan Khobragade
Principal Secretary
Health & Family Welfare
Government of Kerala
Thiruvananthapuram

Depaartment of Health & Family Welfare
Government of Kerala
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