

**ANALYSIS OF COVID-19 RELATED DEATH CASES ADMITTED IN A TERTIARY LEVEL DEDICATED COVID HOSPITAL IN EASTERN INDIA FROM MAY 2020 TO SEPTEMBER 2020**

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**ABSTRACT**

**Objectives:** To analyze of COVID-19 related death cases admitted in a tertiary level dedicated COVID hospital in eastern India from May 2020 to September 2020. **Methods:** A total of 312 Death cases in COVID-19 patients admitted in IPD of Medical College & Hospital, Kolkata from May, 2020 to September 2020 was enrolled. Data collected were analyzed according to standard statistical methods. **Results:** Average age of deceased was 57.98 years  $\pm$  1.11 and more >60 years of age was 45.6% of all deceased. Average age of males and females were almost similar. 67% of deceased were male and 33% were female. 50.7% of patients survived in hospital less than 24 hours only. 80.7% of deceased had co-morbidities. Diabetes (44.4% of deceased) was the leading among co-morbidities followed by hypertension (42% of deceased) and diabetes +hypertension (37.6% of deceased). Amongst deceased 23.5% were smoker and all were male. All patients had shortness of breath (100%) as presenting features and 96.9% had fever and cough each. Diarrhea was present in 23.5% and Anosmia was present in 25.9% of deceased. At admission 90.7% of patients had SpO<sub>2</sub>  $\leq$  90%, 69.1% of deceased had SpO<sub>2</sub>  $\leq$  80%. 15% of patients had hypotension (SBP < 100 mm of Hg). Tachypnoea (RR > 25/min) were present at admission in 53.1% of death cases. Pulse rate > 110/min were present in 42.0% of cases. 33.4% of patients had leukocytosis (>11,000/cmm); whereas only 3.7% of patients had leukopenia. Neutrophil leukocyte ratio > 4 was present in 91.4% of patients. 61.1% of patients had hyponatremia (<135 meq/l). 60.1% of patients had C-reactive protein  $\geq$  50 mg/l. Majority (94.60%) had D-dimer  $\geq$  1000 ng/ml. **Conclusions:** It can be observed that more critical and relatively younger patients came at emergency ward with more critical state leading to death within a day in majority. And half of the patients died within a day. A study with longer period of observation and larger sample size can lead to a real representative death analysis.

**1. INTRODUCTION**

Corona Virus Disease 2019 (2019-nCoV) was first reported in late December 2019, from Wuhan, China.<sup>[1]</sup> Since this sudden outbreak of coronavirus disease 2019 (COVID-19) in just two more months, the epidemic has rapidly spread all over the world and also India. On March 11, 2020, the World Health Organization (WHO) declared the COVID-19 outbreak a pandemic. There are over 10,15,61,219 confirmed cases worldwide as of 30<sup>th</sup> January 2021 and over 1,07,33,131 confirmed cases reported from India.<sup>[2]</sup> In India till 30<sup>th</sup> January 2021, 1,54,147 patients succumbed to death of which over 70% had co-morbidities.<sup>[3]</sup>

The pathological process of severe COVID-19 pneumonia is an inflammation followed by the destruction of the airways and alveolar areas.<sup>[4]</sup> It is

considered that lung injury is not only associated with the direct virus-induced damage, but also the cytokine mediated immune damage triggered by COVID-19. It has shown histologically that in lung there is diffuse alveolar damage and mucinous exudate, which is identical to acute respiratory distress syndrome.<sup>[4]</sup>

COVID-19 infected patients are clinically classified as mild, moderate, and severe disease as per severity. Mild cases are without evidence of breathlessness or Hypoxia (normal saturation); where moderate disease is designated as patients with presence of clinical features of dyspnea and or hypoxia, fever, cough, including SpO<sub>2</sub> < 94% (range 90-94%) on room air, respiratory Rate  $\geq$  24 /minute. And severe disease is denoted as patients with clinical signs of pneumonia plus any one of the

following: a) respiratory rate  $>30$  /minute b) severe respiratory distress with  $SpO_2 <90\%$  on room air.<sup>[5]</sup>

It is seen that aggravation of symptoms occur after 5–7 days of onset of disease in patients with COVID-19 pneumonia and in severe cases there is rapidly progressive acute respiratory failure.<sup>[6]</sup> Mortality is the most important issue when dealing with this kind of pandemic and focus should be on setting up priorities to control pandemic. Under these circumstances, maintaining the healthcare system is the key concern in most of the countries.<sup>[7]</sup>

## 2. AIMS AND OBJECTIVES

To analyze of COVID-19 related death cases admitted in a tertiary level dedicated COVID hospital in eastern India from May 2020 to September 2020.

## 3. STUDY DESIGN

This study was conducted in a retrospective descriptive way. Death cases with COVID-19 infected subjects admitted in IPD of Medical College & Hospital, Kolkata from May, 2020 to September 2020 was enrolled. This protocol has been written and devised in accordance with the Standard Protocol Items: Recommendations for Interventional Trials statement.<sup>[8]</sup>

Data collected from hospital records were analyzed according to standard statistical methods.

## 4. STUDY POPULATION

Death cases of COVID-19 infected subjects admitted in IPD of Medical College & Hospital, Kolkata from May 2020 to September 2020 were enrolled.

### A) Inclusion Criteria

1. Patients fulfilling criteria of defined population
2. Patients  $>12$  years of age

### B) Exclusion Criteria

1. Pregnant women
2. Lactating women
3. Pediatric patients ( $<12$  years of age)

## 5. SAMPLE SIZE

As it is a descriptive study minimum sample size should be 30 (thirty). So, a total of 312 (three hundred and twelve) patients fulfilled all inclusion & exclusion criteria and these patients were enrolled for further analysis.

## 6. STUDY TOOLS

- 1) Predesigned proforma for data collection
- 2) Hospital records including patient particulars, case progress sheet, investigation reports, radiological findings
- 3) SPSS software

## 7. PARAMETERS TO BE ASSESSED

### A) Patient particulars

### B) Clinical, Laboratory & ventilatory parameters from case progress sheet:

Blood pressure, Pulse rate, Temperature,  $SpO_2$ , Respiratory Rate, mini mental state, examination,  $O_2$  requirement,  $O_2$  delivering device, Single breath count, Glasgow coma scale, requirement of invasive/non-invasive ventilation, TLC, NL ratio, platelet count, Hb%, RBS, Urea, Creatinine, SGPT, SGOT, Bilirubin, Sodium, Potassium, Prothrombin time/INR, C-reactive protein, Procalcitonin, blood culture, urine culture, D- Dimer, IL-6,  $PaO_2/FiO_2$  or  $SpO_2/FiO_2$ , PEEP, Chest-Xray, HRCT of thorax)

### C) Radiological findings

## 8. ETHICS

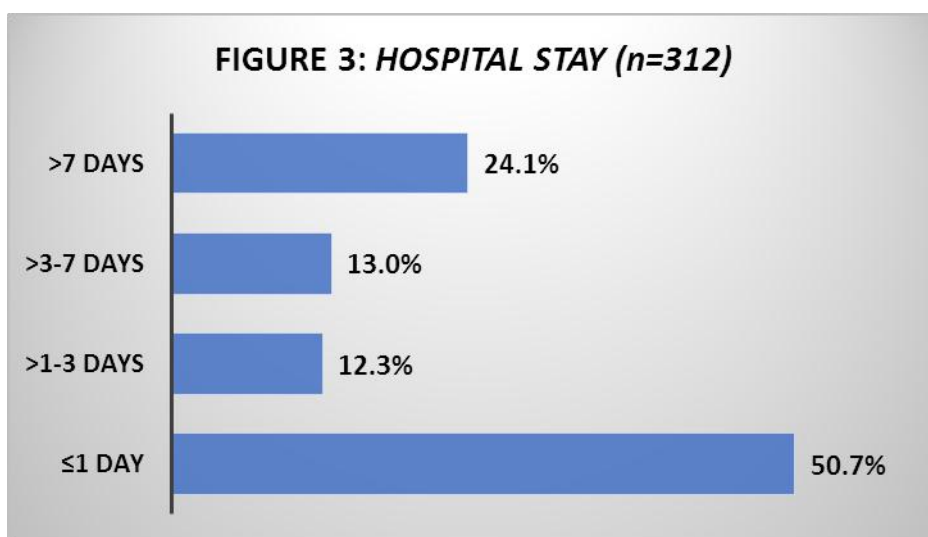
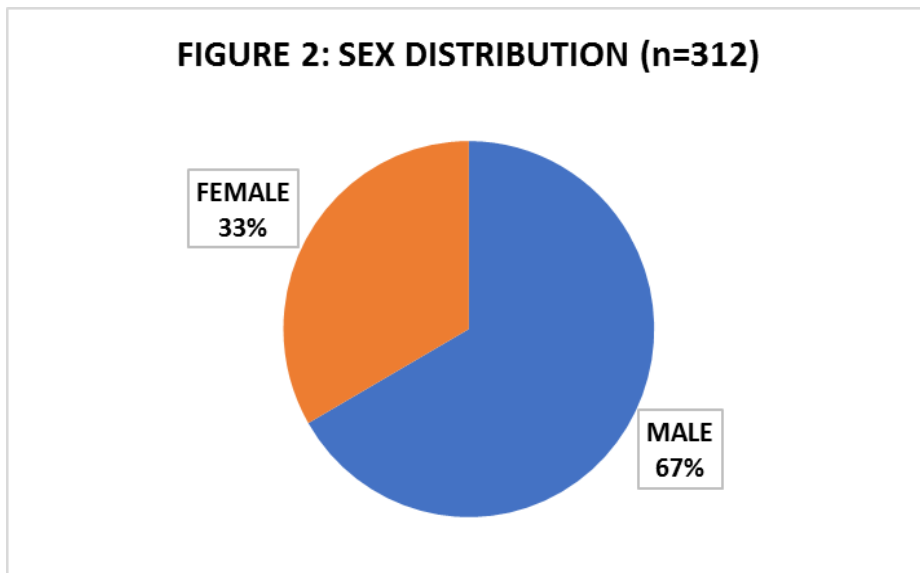
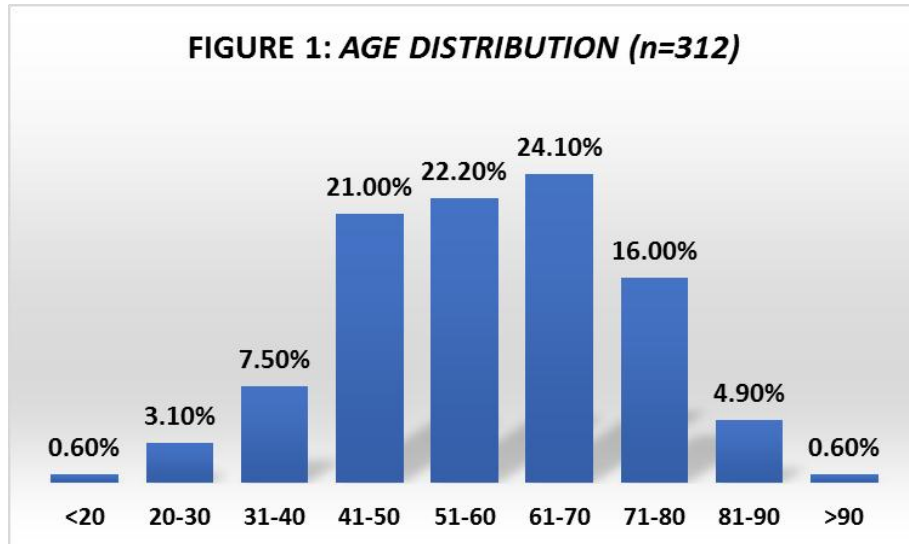
The study protocol submitted to the clinical Research Ethics Committee of Medical College & Hospital, Kolkata for ethical review and got approval.

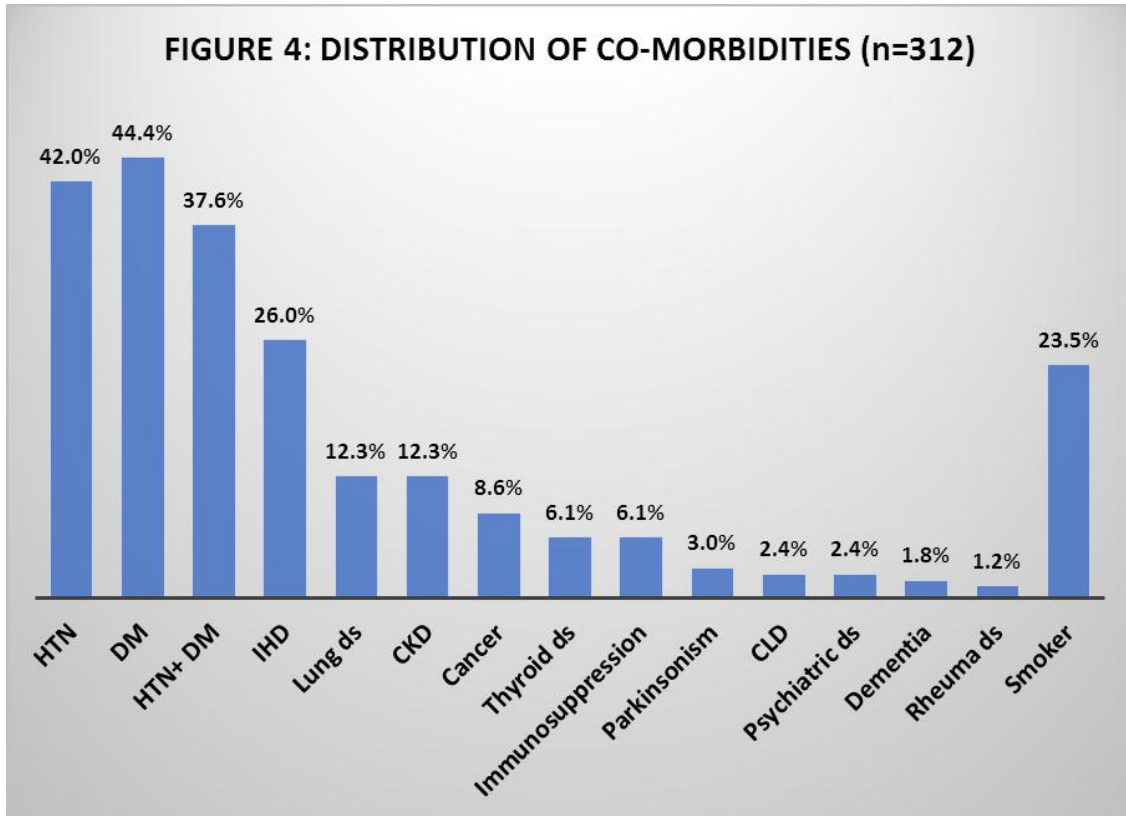
## 9. DATA ANALYSIS

Data was tabulated and analyzed according to appropriate statistical methods.

## 10. RESULTS ANALYSIS

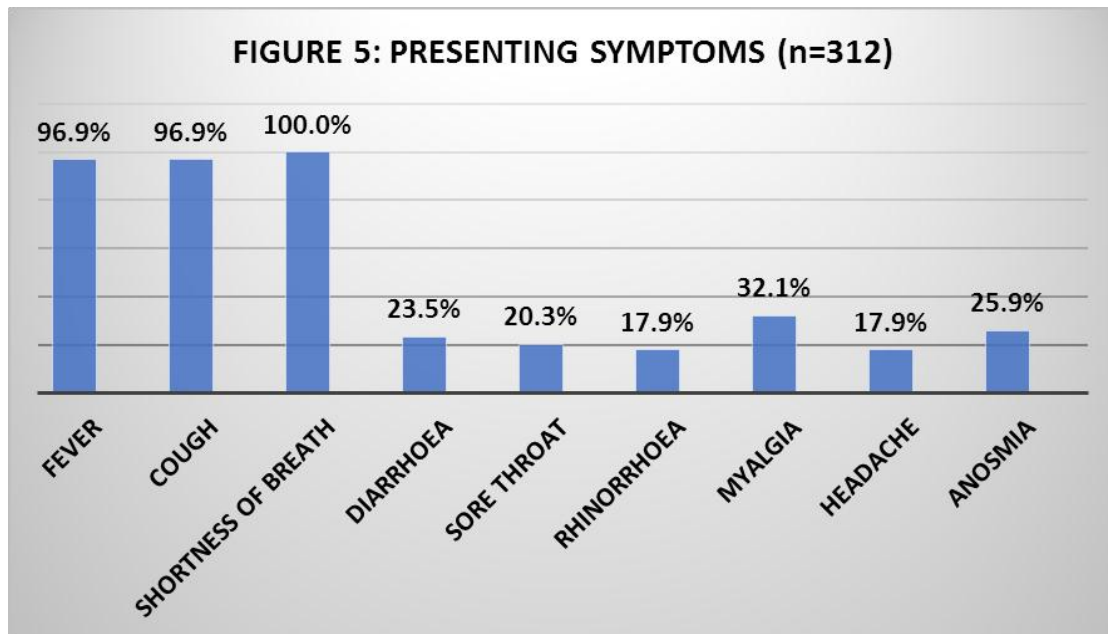
- Average age of deceased= 57.98 years  $\pm$  1.11
- Average age of males amongst deceased= 57.61 years  $\pm$  1.29
- Average age of females amongst deceased= 58.72 years  $\pm$  2.12

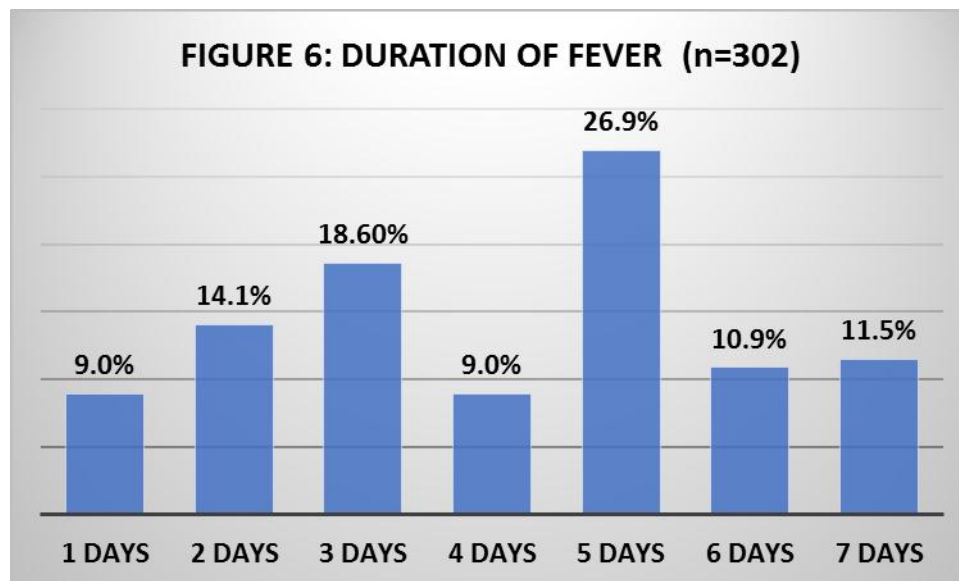




HTN= Hypertension, DM= Diabetes mellitus, IHD= Ischemic heart disease, CKD= Chronic kidney disease, CLD= Chronic liver disease

- Amongst deceased 252 patients (80.7%) had co-morbidities.
- All smokers were male.





**CHART 1: PATIENT STATUS AT ADMISSION (N=312)**

Variables	Percentage
SpO <sub>2</sub> ≤ 90%	90.7%
SpO <sub>2</sub> ≤ 80%	69.1%
SpO <sub>2</sub> ≤ 50%	11.0%
Hypotension (SBP ≤ 100 mm of Hg)	15.0%
Tachypnoea (RR >25/min)	53.1%
Pulse (>110/min)	42.0%
GCS Score ≥ 13	67.7%

**CHART 2: INVESTIGATION DETAILS**

Variables	Percentage
Leucopenia (< 4,000/cmm)	3.7% (n=312)
Leukocytosis (>11,000/cmm)	33.4% (n=312)
NLR ≥ 4.0	91.4% (n=312)
Thrombocytopenia (≤ 1,00,00/cmm)	08.0% (n=312)
Hyponatremia (<135 meq/l)	61.1% (n=302)
C-reactive protein (>50 mg/l)	60.1% (n=257)
D-dimer ≥ 1000 ng/ml	94.6% (n= 231)

## 11. DISCUSSION

Death cases related with COVID-19 infection admitted in IPD of Medical College & Hospital, Kolkata (a dedicated tertiary level COVID hospital) from May, 2020 to September 2020 were analyzed. A total of 312 patients were enrolled for analysis.

In our study average age of deceased was 57.98 years ± 1.11 and more >60 years of age was 45.6% of all deceased. [FIGURE 1] Average age of males amongst deceased was 57.61 years ± 1.29 and average age of females amongst deceased= 58.72 years ± 2.12.

Amongst deceased 67% of patients were male and 33% were female. [FIGURE 2] 50.7% of deceased stayed in hospital less than 24 hours only; whereas 24.1% of patients stayed for more than 7 days. [FIGURE 3]

Amongst deceased 80.7% patients had co-morbidities. Diabetes (44.4% of deceased) was the leading among co-

morbidities followed by hypertension (42% of deceased) and diabetes +hypertension (37.6% of deceased). Ischemic heart disease was present in 26% of patients and chronic kidney disease was present in 12.3% of patients. Amongst deceased 23.5% were smoker and all were male. [FIGURE 4]

All COVID-19 related death cases had shortness of breath (100%) as presenting features and 96.9% had fever and cough each. Diarrhea was present in 23.5% and Anosmia was present in 25.9% of deceased. Myalgia and headache were present in 32.1% and 17.9% of deceased respectively. [FIGURE 5] The patients who presented with fever 5 days fever was majority (26.9%) followed by 3 days fever (18.6%) and 2 days fever (14.1%). [CHART 6]

At admission 90.7% of patients had SpO<sub>2</sub> ≤90%, 69.1% of deceased had SpO<sub>2</sub> ≤ 80%. 15% of patients had hypotension (SBP<100 mm of Hg). Tachypnoea

(RR>25/min) were present at admission in 53.1% of death cases. Pulse rate > 110/min were present in 42.0% of cases. Majority (67.7%) had GCS score  $\geq$  13 [CHART 1]

33.4% of patients had leukocytosis (>11,000/cmm); whereas only 3.7% of patients had leukopenia. Neutrophil leukocyte ratio > 4 was present in 91.4% of

patients. Thrombocytopenia (platelet count  $\leq$ 1,00,000/cmm) were present in 8% of cases. [CHART 2]

Amongst deceased 61.1% of patients had hyponatremia (<135 meq/l). 60.1% of patients had C-reactive protein  $\geq$  50 mg/l. Majority (94.60%) of deceased had D-dimer  $\geq$  1000 ng/ml. [CHART 2]

**Table 1: Comparative study between COVID-19 related deaths in different parts of the world.**

Attributes	J Korean Med Sci <sup>7</sup>	Jonathan M et al <sup>9</sup>	This study
Age	<ul style="list-style-type: none"> <li>Average age= 75.5</li> <li>&gt;70 years = 63%</li> </ul>	<ul style="list-style-type: none"> <li>Average age= 78 years</li> <li>&gt;65 years= 79.6%</li> </ul>	<ul style="list-style-type: none"> <li>Average age=58 years</li> <li>&gt;60 years=45.6%</li> <li>&gt;65 years=34%</li> <li>&gt;70 years=21.2%</li> </ul>
Sex	<ul style="list-style-type: none"> <li>Male = 61.1%</li> </ul>	<ul style="list-style-type: none"> <li>Male = 55.4%</li> </ul>	<ul style="list-style-type: none"> <li>Male =67%</li> </ul>
Hospital stay	Symptom onset to death= 10 days (avg.)	No data	<1 day= 50.7%
Co-morbidity	90.7%	76.4%	80.7%
Diabetes	29.6%	39.5%	44.4%
Cardiovascular Disease	59.3%	60.9%	Hypertension + IHD =68%
Renal disease	20.8%	9.3%	12.3%
Neurologic Diseases	12.9%	18.5%	Parkinsonism + Dementia=4.4%
Psychiatric illness	13%	No data	2.8%
Chronic liver disease	3.7%	2.3%	2.4%
Cancer	13%	No data	8.4%
Immunosuppression	1.9%	15.6%	6.1%
Presenting symptoms	No data	No data	<ul style="list-style-type: none"> <li>SOB= 100%</li> <li>Fever= 96.9%</li> <li>Cough= 96.9%</li> <li>Diarrhea=23.5%</li> <li>Anosmia=25.9%</li> </ul>
Vitals at admission	No data	No data	SpO <sub>2</sub> : <90%=90.7% Tachypnoea: 53.1% Hypotension: 15.0% Pulse> 110/min:42.0% GCS: $\geq$ 13= 67.7%
Leukocytosis	No data	No data	33.4%
Leucopenia	No data	No data	3.7%
NLR >4	No data	No data	91.4%
Thrombocytopenia	No data	No data	8%
Hyponatremia	No data	No data	61.1%
C-Reactive Protein	No data	No data	>50 mg/l= 60.1%
D-dimer	No data	No data	>1000 ng/ml= 94.6%

## 12. CONCLUSION

If we compare this study with USA and south Korean study [TABLE 1], we find that average age in our study is lower and a smaller number of older people died due to COVID related condition. Deaths due to COVID-19 was more skewed towards males in our study in comparison with other two studies. All the co-morbidity data were similar in our study in comparison with other two studies. Other parameters such as presenting features, presenting vitals, leukocytosis, hyponatremia, NLR, thrombocytopenia, D-dimer, CRP were

extensively analyzed in our study. It can be observed that more critical and relatively younger patients came at emergency ward leading to death. And half of the patients died within a day. This can attribute in respect with age comparison of deceased with other two studies. However, a study with longer period of observation and larger sample size can lead to a real representative death analysis.

**13. REFERENCES**

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