

**Correlation between COVID-19 Severity and D Dimer Levels.**Prabhash Bhavsar<sup>1</sup>, Dileep Singh Nirwan<sup>2</sup><sup>1</sup>Associate Professor, Department of Biochemistry, Govt. Medical College, Dungarpur<sup>2</sup>Assistant Professor, Department of Biochemistry, PDU Medical College, Churu

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Conflict of interest: Nil

**Abstract:****Background:** The aim of our study was to study the correlation of COVID 19 severity with D-dimer in RT PCR confirmed cases of COVID 19.**Methods:** We conducted a Cross sectional analytic study on 180 patients (60 asymptomatic, 30 each with mild, moderate, severe and critical illness) diagnosed with COVID-19 clinically, radiologically and confirmed by RTPCR at Shree Haridev Joshi General hospital and Government medical college, Dungarpur. Total 3 ml of venous blood sample was collected from each subject in Citrate vacutainers. D dimer was estimated on ECL105 coagulation analyzer.**Results:** The mean ng/ml value of D dimer levels in various group were as follows – 5.87±16.7 in asymptomatic, 7.37±19.2 in mild symptomatic, 76.6±146.8 in moderate illness, 508.9±780.6 in severe and 3275.7±5595.0 in critically ill patients. T-test analysis shows that mean D dimer levels had no statistically significant difference between asymptomatic and mild symptomatic COVID 19 subjects, however in all the subsequent severity groups had significantly high D dimer levels. It can be said that with increase in severity of COVID 19, the D dimer levels also increased.**Conclusion:** Investigating D-dimer dynamics over time and its correlation with treatment response and long-term complications could provide valuable insights. Exploring D-dimer's utility in specific patient subgroups or for risk stratification to personalize treatment strategies holds promise. Large-scale, multi-center studies with standardized protocols are crucial to confirm findings and establish generalizable D-dimer thresholds for clinical practice.**Keywords:** D-dimers, COVID-19, CRP.

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**Introduction**

COVID-19 rapidly became a global emergency after its first outbreak in China in early December of 2019 [1]. On 30 January 2020 COVID-19 was declared a Public Health Emergency of International Concern (PHEIC) with an official death toll of 171 and by 31 December 2020, this figure stood at 1.8 million [2].

COVID-19 occurs due to SARS-CoV-2 viral infection of the respiratory tract. The rapid deterioration in health is believed to be due to a hyper-inflammatory process. Many inflammatory markers were observed to be increased during the disease progression like elevated cell counts, D-dimers, C-Reactive protein (CRP), interleukin 6 (IL-6), ferritin, erythrocyte sedimentation rate (ESR), Lactate Dehydrogenase (LDH) etc [3].

Patients with SARS-CoV-2 infection can experience a range of clinical manifestations, from no symptoms to critical illness. In general, adults with SARS-CoV-2 infection can be grouped into the following severity of illness categories (i) Asymptomatic or presymptomatic infection:

Individuals who test positive for SARS-CoV-2 but have no symptoms consistent with COVID-19. (ii) Mild illness: Individuals who have any of the various signs and symptoms of COVID-19 (e.g., fever, cough, sore throat, malaise, headache, muscle pain, nausea, vomiting, diarrhea, loss of taste and smell) but do not have shortness of breath, dyspnea, or abnormal chest imaging. (iii) Moderate illness: Individuals who show evidence of lower respiratory disease during clinical assessment or imaging and who have an oxygen saturation measured by pulse oximetry (SpO<sub>2</sub>) ≥94% on room air at sea level. (iv) Severe illness: Individuals who have SpO<sub>2</sub> 30 breaths/min, or lung infiltrates >50%. (v) Critical illness: Individuals who have respiratory failure, septic shock, and/or multiple organ dysfunction [4].

The aim of our study was to study the correlation of COVID 19 severity with D-dimer in RT PCR confirmed cases of COVID 19.

**Material and Methods**

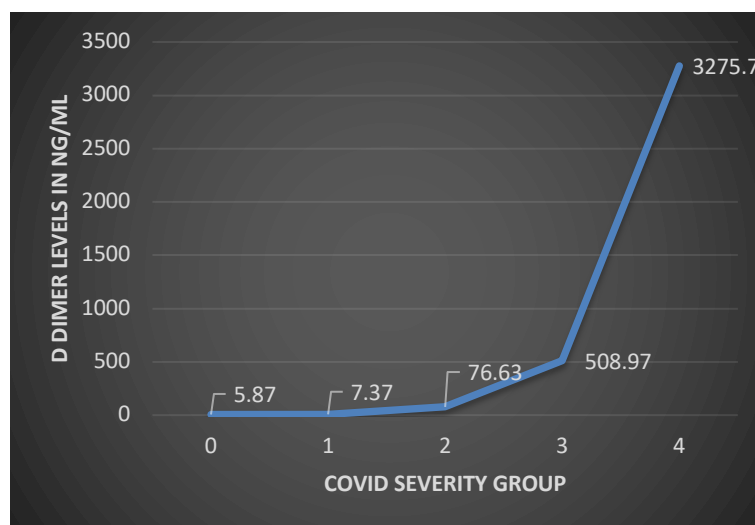
We conducted a Cross sectional analytic study on 180 patients (60 asymptomatic, 30 each with mild, moderate, severe and critical illness) diagnosed with COVID-19 clinically, radiologically and confirmed by RTPCR at Shree Haridev Joshi General hospital and Government medical college, Durgapur. Total 3 ml of venous blood sample was collected from each subject in Citrate vacutainers. D dimer was estimated on ECL105 coagulation analyzer. The data was analyzed using SPSS v21.0. Data is represented as mean ± SD. The mean value between various groups was compared using ANOVA. Pearson’s correlation coefficient was used to compare two numerical data. The p-value <0.05 was taken as significant.

**Results & Discussion**

The mean ng/ml value of D dimer levels in various group were as follows – 5.87±16.7 in asymptomatic, 7.37±19.2 in mild symptomatic, 76.6±146.8 in moderate illness, 508.9±780.6 in severe and 3275.7±5595.0 in critically ill patients. T-test analysis shows that mean D dimer levels had no statistically significant difference between asymptomatic and mild symptomatic COVID 19 subjects, however in all the subsequent severity groups had significantly high D dimer levels. It can be said that with increase in severity of COVID 19, the D dimer levels also increased.

**Table 1: Comparison of D dimer in various stages of COVID 19**

	Group	N	Mean	Std. Deviation	p-value of t-test
D Dimer	0	60	5.87	16.663	Group 0 vs Group 1 = 0.703
	1	30	7.37	19.247	
	2	30	76.63	146.804	Rest all intergroup comparison p-value <0.001
	3	30	508.97	780.627	
	4	30	3275.70	5595.07	



**Graph1: D dimer levels with increasing covid severity**

**Discussion**

D-dimer, a fibrin degradation product, has emerged as a potential biomarker for predicting the severity of COVID-19 infection. Numerous studies have explored the association between D-dimer levels and disease progression, mortality, and various clinical outcomes. This review aims to provide a comprehensive overview of current research on D-dimer levels in different grades of COVID-19 severity, highlighting key findings, controversies, and future directions.

The COVID-19 virus triggers an inflammatory response, leading to endothelial dysfunction and microvascular thrombosis. This activation of the

coagulation cascade results in increased D-dimer production, reflecting a hypercoagulable state associated with severe disease.

Multiple studies report a significant correlation between elevated D-dimer levels and increasing disease severity. Patients with critical illness and higher mortality rates consistently show higher D-dimer levels compared to those with mild or moderate presentations [5,6,7]. D-dimer demonstrates potential as a predictor of disease progression and adverse outcomes. Several studies have shown D-dimer levels to be associated with increased risk of respiratory failure, ICU admission, and death [8,9,10]. Determining optimal

D-dimer cut-off values for identifying severe cases remains a subject of debate. Studies report a wide range of values, suggesting further research is needed to establish standardized thresholds across different populations and healthcare settings [11]. While D-dimer is easily accessible and inexpensive, its non-specificity for COVID-19 and dependence on other factors like age and comorbidities necessitate cautious interpretation in conjunction with other clinical data.

### Conclusion

Investigating D-dimer dynamics over time and its correlation with treatment response and long-term complications could provide valuable insights. Exploring D-dimer's utility in specific patient subgroups or for risk stratification to personalize treatment strategies holds promise. Large-scale, multi-center studies with standardized protocols are crucial to confirm findings and establish generalizable D-dimer thresholds for clinical practice.

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