

**A Retrospective Comparative study of Gender Differences in D-dimer Levels & Chest CT Severity Score of Covid-19 patients**

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**Type of Publication:** Original Research Article

**Conflicts of Interest:** Nil

**Abstract**

**Background:** Covid-19 pandemic has affected all of us worldwide. There was a need for analysing its effects on the suffered patients for gender disparities in vulnerability.

**Aims and objectives of the study:** Analysis and comparison of the D-dimer levels& CT Chest score variability pattern in both the male and female patients of Covid-19.

**Methods:** A Retrospective Comparative study was done with Covid-19 Inpatients of 25 to 50 years of age, admitted at Sri Chamarajendra Hospital, HIMS, Hassan,

both male and female patients using medical records of Chest CT Score and D-dimer levels. Both analysed together for congruity and then the D-dimer levels Based on CT Chest Score Severity is Compared in Male and Female patients, without revealing the identity of patient. The data is entered into the excel sheet. Data is analysed using SPSS statistics Software and Logistics Regression method. p value <0.05 is considered as significant.

**Observation and Results:** The p value is significant for gender deference. In present study the standard deviation of CT chest score level among males was 7.5 and among

females was 7.0, the p-value is 0.032 and the standard deviation of D-Dimer level among males was 0.9180 and among females was 0.4856, the p-value is 0.001, which is statistically significant. There is significant variation of CT chest score and D-Dimer levels between males and females, with males having higher score and eventually higher morbidity & mortality.

**Conclusion:** The study shows no significant gender differences in D-dimer Levels & Chest CT Severity Score of Covid-19 patients.

**Keywords:** Covid-19, d-dimer levels, CT Chest score, Gender.

### Introduction

Existing literature suggests that coronavirus disease 2019 (COVID-19) kills more men than women.

The death rate for infected Chinese men is 2.8%, while it is only 1.7% for women. (1)

Also, COVID-19 data from several European countries that are broken down by gender show that there are about the same number of cases in both men and women, but the effects are worse in older men. (2)

The D-dimer levels and CT Scoring is a guide of severity of Covid-19 infection.

The sex and gender disparities observed in COVID-19 vulnerability emphasize the need to understand the impact of sex and gender.

Since both males and females were affected in the pandemic, there is also a need to study the correlation between D-dimer levels and CT Score of males and females.

### Aims & Objectives

1. To analyse and compare the D-dimer levels & CT Chest score variability pattern in Male Covid-19 patients.

2. To analyse and compare the D-dimer levels & CT Chest score variability pattern in Female Covid-19 patients.

3. To analyse and compare the D-dimer levels & CT Chest score variability pattern in both the male and female patients of Covid-19.

### Material & Methods

**Study site:** Sri Chamarajendra Hospital, HIMS, Hassan  
Study population Covid-19 inpatients of age group 18 to 60 years admitted during 2<sup>nd</sup> wave

**Study design:** Retrospective study, Comparative Study

**Study size:** A total of **305 patients** medical records were evaluated during the study period.

**Study duration:** 3 months (April 2020 – June 2020)

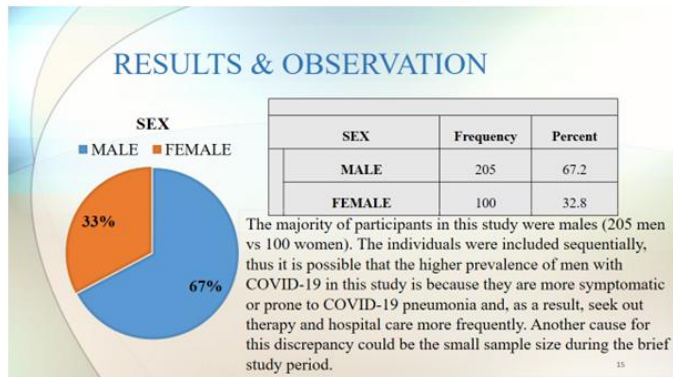
### Inclusion criteria

1. Covid-19 inpatients
2. Both Male and Females
3. Age group -18yrs to 60yrs

### Exclusion criteria

1. <18 yrs of age
  2. >60 yrs of age
  3. Diabetes Mellitus
  4. Hypertension
  5. Previous Respiratory Illness
  6. Any Bleeding Disorders
  7. Patients on anticoagulants
  8. Any other Co-morbidities like Coronary Artery Disease, Cancer, Renal disease.
- Chest CT Score and D-dimer levels were obtained from medical records.
  - The patient's identity was not revealed.
  - Investigation reports were obtained from Department of Radiology and Biochemistry after prior permission from Medical Superintendent.

- The obtained values were analysed and compared with CT severity score according to Chang YC et al study.<sup>8</sup>
- The data was entered into the excel sheet.
- Data was analysed using SPSS statistics Software.
- Mean, Standard deviation, unpaired t-test were used to compare the two groups.
- p value <0.05 was considered as significant.



Graph 1

Unpaired t test					
	Sex	N	Mean	Std. Deviation	P
CT CHEST SCORE	MALE	205	12.13	7.5	0.032 *
	FEMALE	100	10.2	7.0	

- P value is statistically significant.
- There is significant variation of CT chest score between males and females, with males having higher score and eventually higher morbidity & mortality.

Table 1

Unpaired t test					
	Sex	N	Mean	Std. Deviation	P
D-DIMER LEVEL	MALE	205	0.918	0.9180	0.001 *
	FEMALE	100	0.604	0.4856	

- P value is statistically significant.
- There is significant variation of D-dimer levels between males and females, with males having higher levels and eventually higher morbidity & mortality.

Table 2

## Discussion

Men had a higher risk of death or thrombosis than women in this group of adults who were hospitalised with COVID-19.

The difference between men and women was most noticeable in the youngest patients and got smaller as they got older.

Individual end points of thrombosis also showed differences between men and women.

Men had much higher risk of venous thrombo-embolism and high risk of arterial events than women.

Previous studies have shown that the results of COVID-19 are different for men and women, which this analysis confirms. (3)

Similar to what we found, a recent propensity-matched survival analysis showed that comorbid conditions could not fully explain observed differences in mortality by gender. However, interaction testing by age subgroups was not done. (4)

Different levels of sex hormones in women, like the way oestrogen affects the body as a whole, could explain why younger women tend to do better than men, but this needs more research.

Also, modulation of the renin-angiotensin-aldosterone axis, endothelial responses to inflammation, and coagulation profiles vary by gender and age (5), which may also contribute to differences in thrombotic risk. (6)

Except for the peripheral distribution of opacities, which was more prevalent in men, none of the CT findings were significantly different between the sexes.

The previously described immunoprotective mechanisms of oestrogen (7) through activation of oestrogen receptor and subsequent decrease in viral genome transcription and increased immune clearance, in contrast to the opposite effect of androgens via androgen receptor

signalling in viral infections, may account for the lower CT-scores in women younger than 60 years.

### Conclusion

The risk of thrombosis and death is higher in males than in women who are hospitalised with COVID-19, and these disparities are particularly prominent in younger age groups.

The prognosis for both men and women with thrombosis linked to COVID-19 is significant.

To understand the processes behind disparities in cardiovascular outcomes and thrombotic risk in COVID-19 that are specific to age and gender, more research on SARS-CoV-2 pathogenesis and host response is required.

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