Study of Determination of sex differences in the susceptibility, severity, and outcomes of coronavirus disease; an observational study at a tertiary care hospital at Durgapur.

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ABSTRACT

- ***Aim:*** *To Determine the Effect of Sex differences in the Coronavirus disease.*

- ***Research problem:*** *What is the Effect of Sex differences in the Susceptibility, Severity, and Outcomes of Coronavirus disease positive patients admitted into the hospital?*

- ***Method:*** *This study was conducted at The Mission Hospital, a 350-bed super-specialty hospital located in Durgapur, West Bengal, India, it was carried out for 3 months between April 6th and June 10th, 2021, analyzing 84 COVID positive patients closely under medical supervision with all ethical considerations and followed by the COVID guidelines. Patients admitted into MIC, CCU, ICU were included and followed up. Specially designed data collection form was used to collect the patient's details which is later/parallelly been entered into the Electronic Medical Records. The data was analyzed with the Microsoft EXCEL making Tabular plots and calculated percentage variations for specific data and comparative analysis was done.*

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INTRODUCTION

- Sex differences are important factor in epidemiological studies of many diseases.
- It showed significant impact even in coronavirus 2019 infection (COVID-19).
- Evidence from China and Europe has suggested that deaths from COVID-19 infections are higher in men than in women.
- Male-to-female mortality rate of more than 1.0, reaching 3.5 in some cases, globally.
- In India, the mortality rate of COVID-19 is higher for women than for men (previous reports).

INTRODUCTION

- In India, the mortality rate for COVID-19 cases among men is 2.9% and 3.3% for women. Lifestyle plays a crucial role in determining the prognosis of any disease. Lifestyle includes higher smoking and drinking rates among men compared to women.
- Global research reports that women were more likely to respond to the Covid-19 epidemic than men. The reckless attitude among men undermines their ability to take preventive measures, such as washing their hands regularly, wearing a face mask, and staying on top of household orders.

Inclusion Criteria:

- COVID 19 positive cases who were admitted in to MICU, CCU, ICU wards.
- COVID 19 positive cases with other existing co-morbid conditions such as HTN, DM etc., who were admitted into Medical Intensive Care Unit (MICU), Corona Care Unit (CCU), Intensive Care Unit (ICU) wards.

Exclusion Criteria:

- All other communicable diseases, non-communicable diseases, Acute conditions, other Emergency cases were excluded.

Study METHODOLOGY

Sample Size:

- **84** COVID positive patients were observed continuously for 3 months

Data collection type:

- Patients' complete details were collected in the form of Electronic Medical Records (EMR) which were studied to evaluate the research question.

Data collection method:

- Specially designed data collection form were used to collect the patient's details from admission to the discharge point.
- Data is later/parallelly been entered into the Electronic Medical Records.

Patient's Distribution:

- A total of 84 covid patients were monitored for 3 months between April 6th and June 10th, 2021. All the information about these patients were recorded in to the EMRs, each record was specific to each patient. Out of 84 patients there were 49 male patients and 35 female patients. The following graph gives the information about the patient's distribution based on gender.

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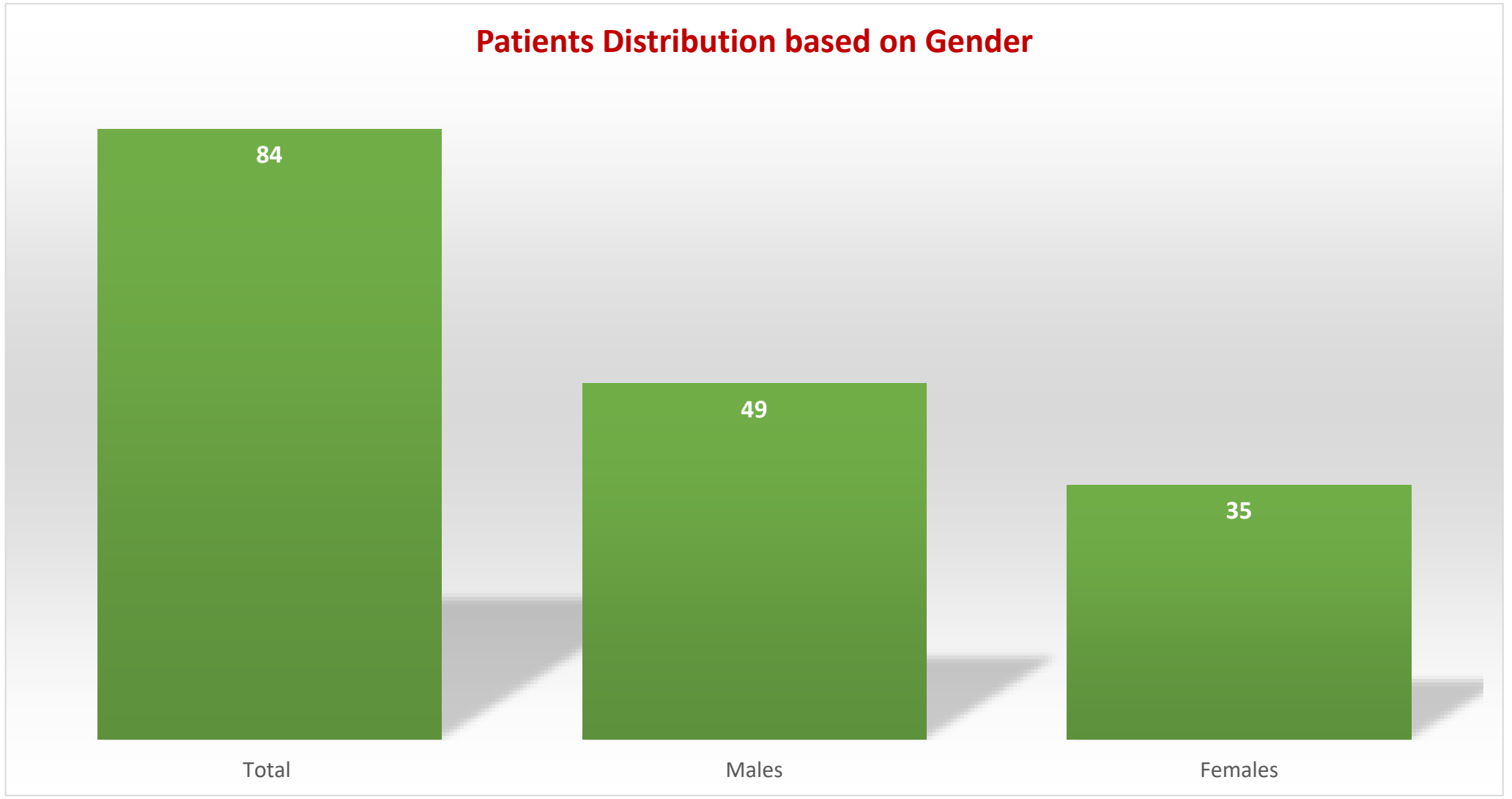

Fig. No. 1: Patients population distribution chart based on their gender.

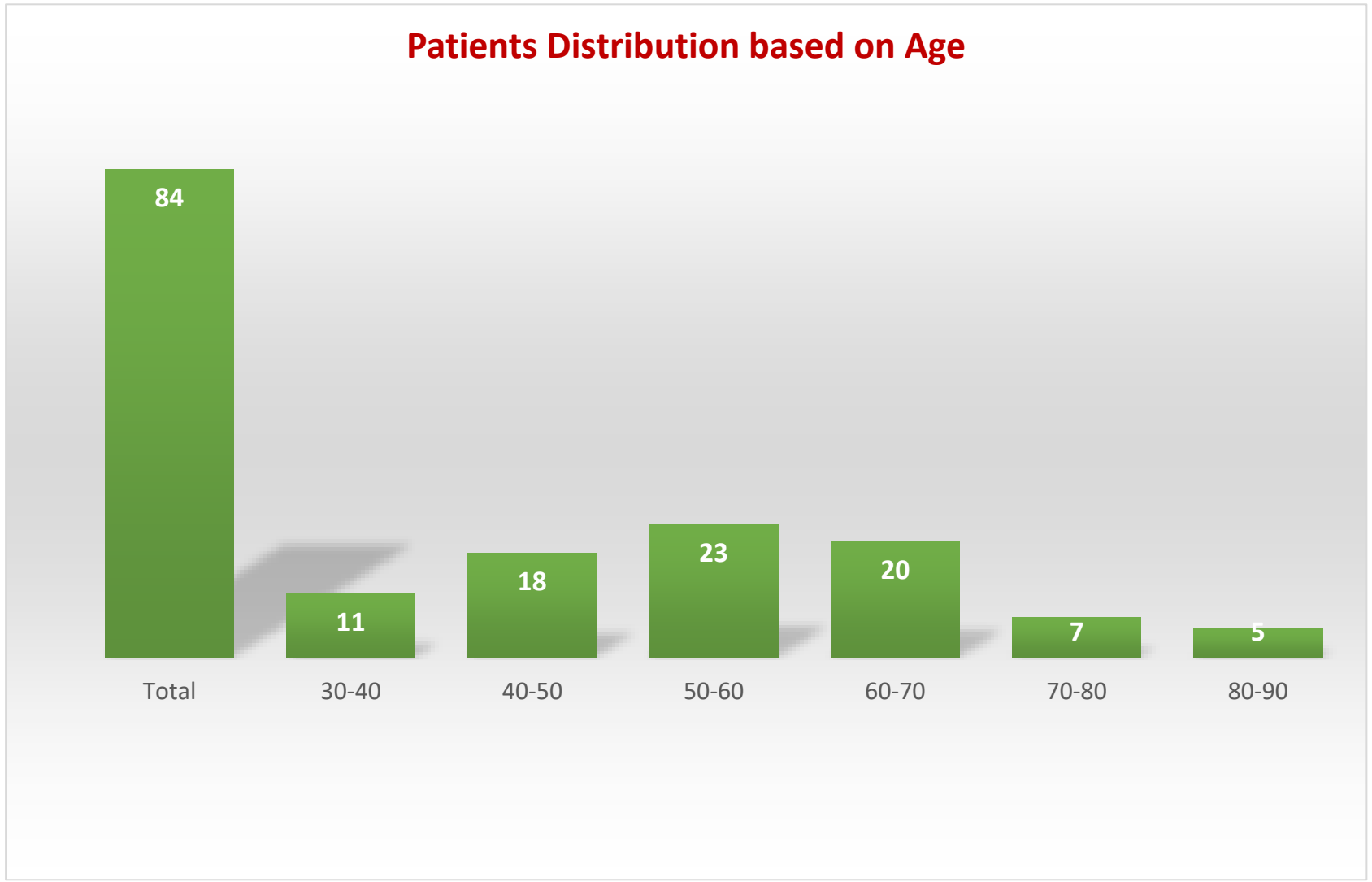

Fig. No. 2: Patients population distribution based on Age

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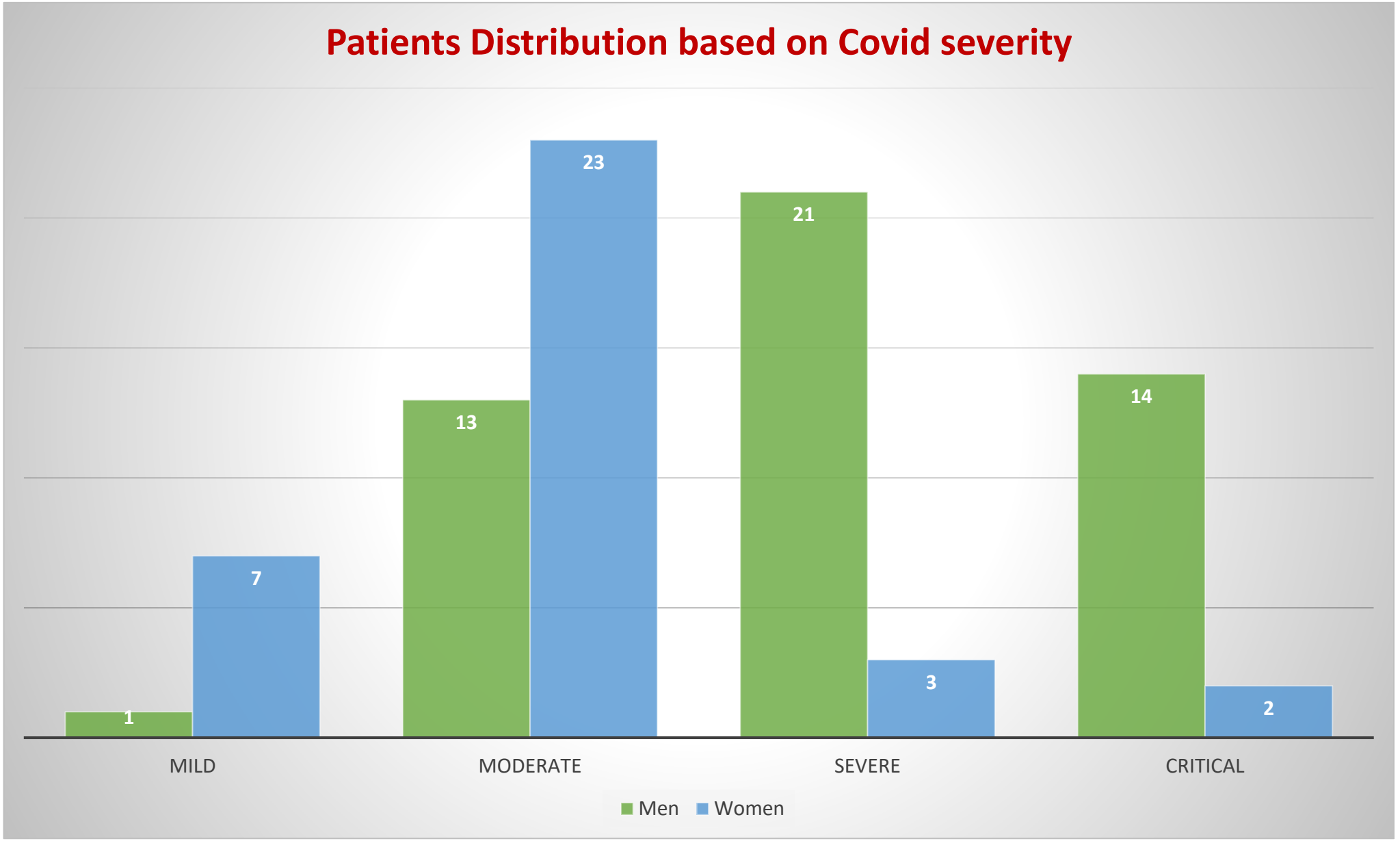

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Fig. No. 3: Patients Distribution based on Covid Severity

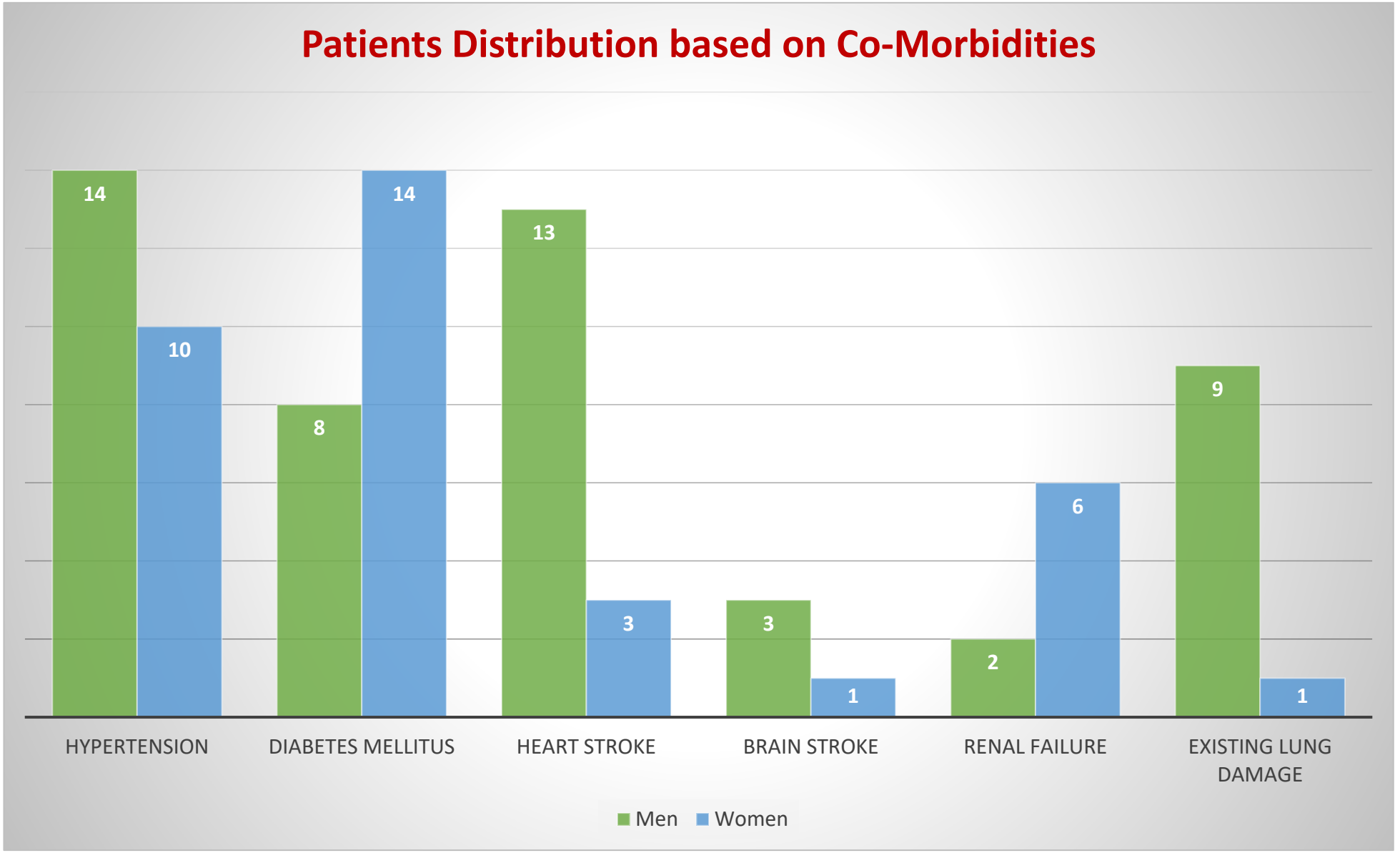

Fig. No. 4: Patients Distribution based on Co-Morbidities

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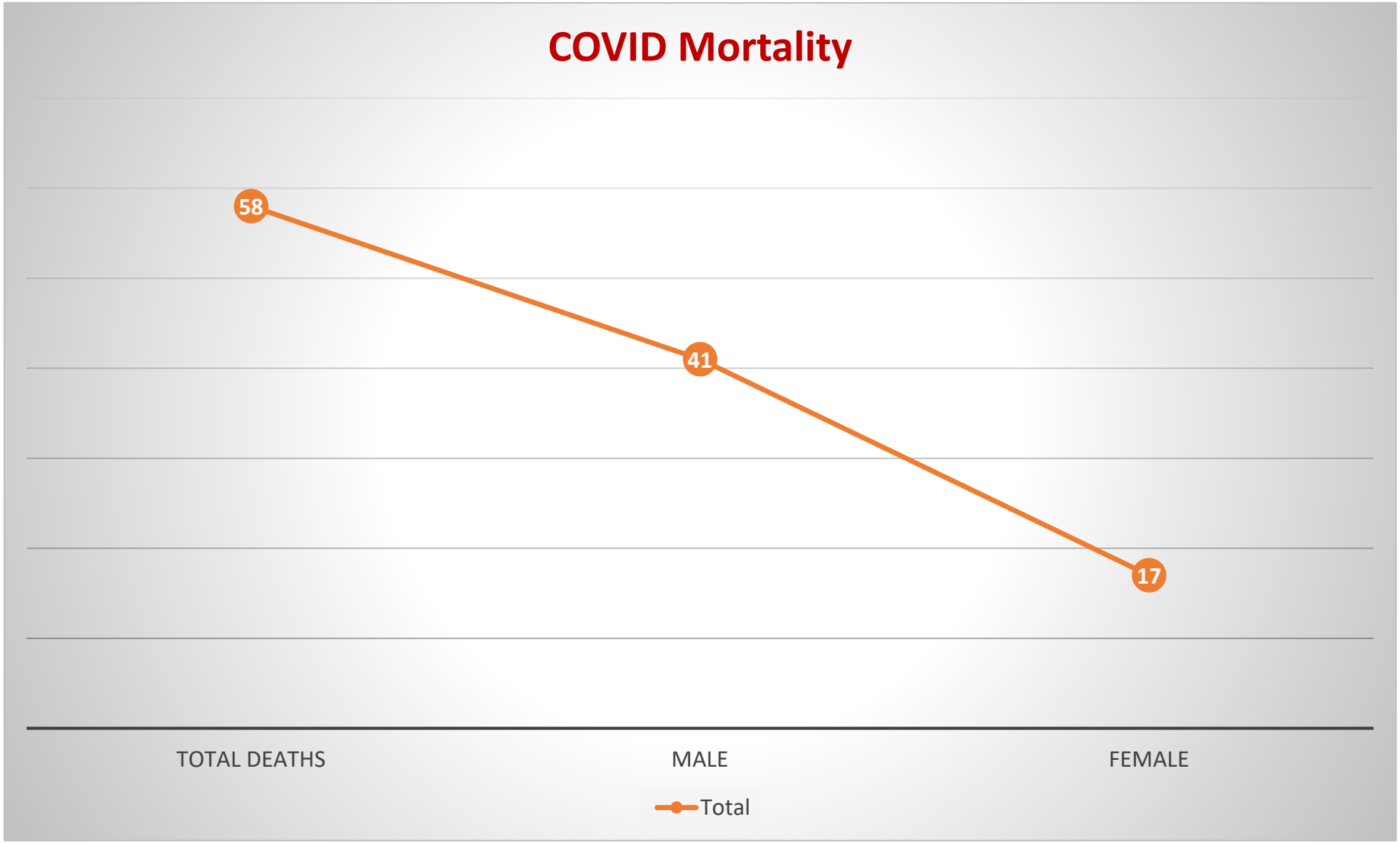

Fig. No. 5: COVID Mortality

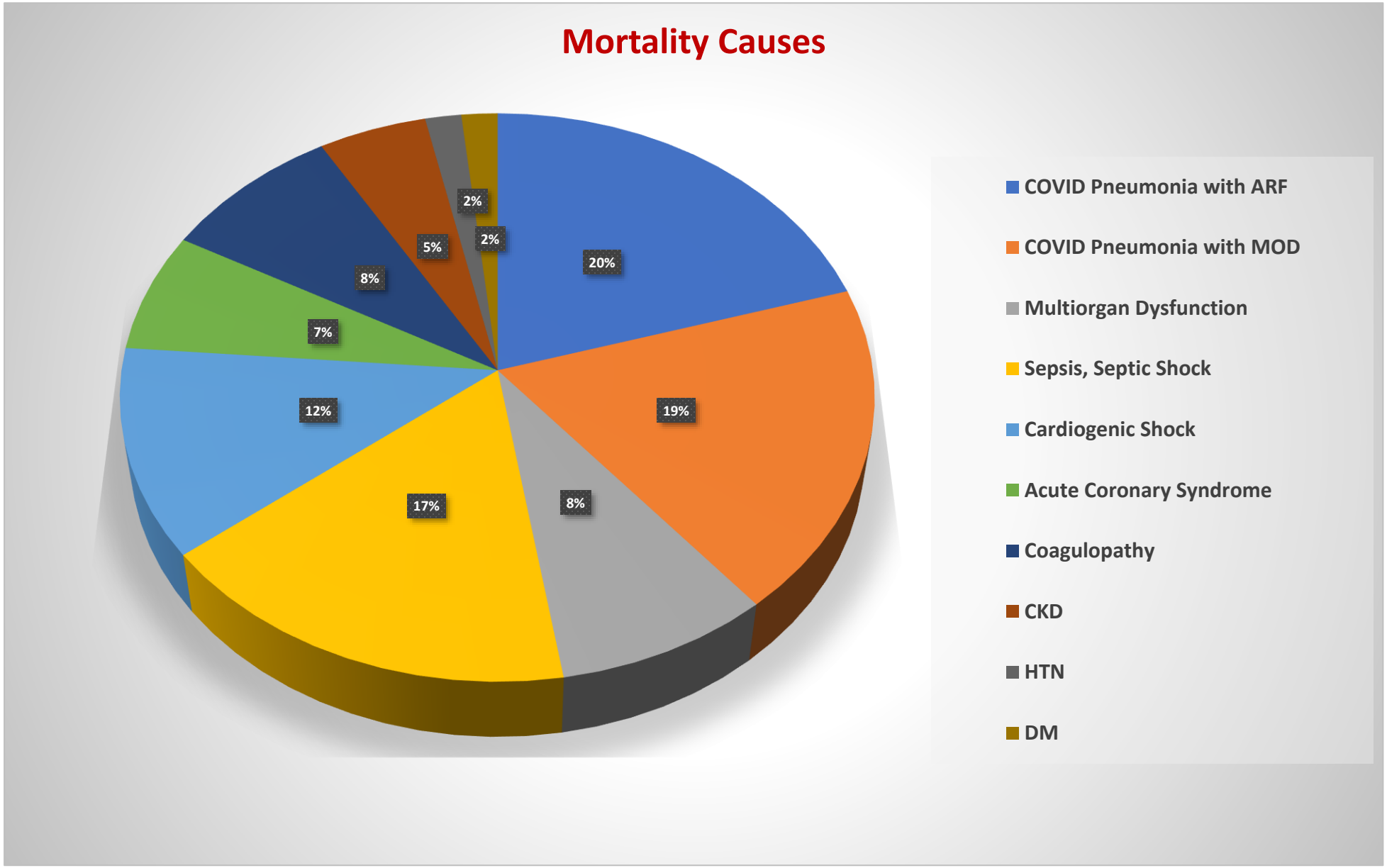

Fig. No. 6: Causes of Mortality

Mortality Rate

- The total Mortality Rate / Death Rate identified for the population admitted into the hospital for 3 months was **69.04%**
- Male death rate **48.8%**
- Female death rate **20.23%.**

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Discussion

- Researches has shown, there are a lot of differences between a male and a female-COVID-19 patients.
- A high incidence, sensitivity, and the mortality rate was observed among men in many countries.
- Male sex, is a poor prognostic factor, as the men are more prone to viral infections, due to differences in the innate immune system, steroid hormones, and factors related to the sex chromosomes.
- The present study clearly demonstrates the above statements.
- Out of 84 patients, 49 males and 35 females were observed.
- Most critical and severe cases were identified in the male population and females were highly noted in the mild and moderate cases

Discussion

- The existing co-morbidities were HTN, DM, Heart Stroke, Brain Stroke, Renal Failure and existing Lung damages.
- Males outstand with the all conditions except for DM, which was ranked by the females.
- The admitted patients were treated with the medicines which were approved by the ICMR and WHO.
- A total of 58 deaths were recorded, of which of 41 deaths were seen in the males and 17 deaths in the females.
- The total Mortality Rate / Death Rate identified in 3 months was **69.04%**, of which male death rate was **48.8% and** female death rate was **20.23%.**
- The major cause of the deaths were precisely identified were COVID Pneumonia with Acute Respiratory Failure, COVID Pneumonia with Multiorgan Dysfunction, Sepsis, Septic shock and cardiogenic shock.

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Discussion

- The social habits, customs, and related diseases are the differences between the two sexes, and hygiene practices and are more likely to affect women than men, while in the smoker, and the related diseases are more common in men than in women.
- Viral penetration is facilitated by the men who are in possession of a genetically higher ACE2 expression in the lung and increased testosterone levels of expression of the TMPRSS2 than in women, whereas the estradiol increase ACE2 activity in females, which can help to protect women against heart disease.
- The direct pro-inflammatory effects of testosterone, and the anti-inflammatory effects of estradiol and lead to an increased inflammatory response in men compared to women.
- Men at any kind of age have a greater thrombotic risk than women, in women the thrombotic risk is lower at fertile age and increases at menopause and/ or under oestrogen therapy. In elderly patients' inflammation leads to an immune defective, proinflammatory, and prothrombotic state, which even worsens, in men more than in women, the course of COVID-19.

Conclusion

- The present observational study concludes that immune dysregulation is more severe in male than in female COVID-19 patients, which in turn due to the sex-related differences in the immune activation ‘set point,’ happening to exert different disease severities and mortalities in men and women.

- This is an evidence suggests to the local and global researches that men are more prone to the COVID and are more vulnerable to the Susceptibility, Severity, and Outcomes of the Corona Virus Disease.

Suggestions

- Sex/Gender to be considered as a variable in the upcoming clinical studies, especially in COVID studies.
- Researches further to be emphasized on sex-dependent diagnostic and treatment methods to provide effective therapy for COVID-19.
- To be focused on conducting national level pilot studies in eradicating the COVID 19.
- To be performing survey studies throughout the waves of the COVID 19.
- Social factors linked to COVID-19 exposure and mortality need to be identified, to enable exploration of intersectional differences.
- To generate gender-equitable solutions to this pandemic, sex- disaggregated data on COVID-19 infection and case fatality rate are needed to develop.


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YOU