Research Article

Type 2 Diabetes and COVID-19 Related Mortality in Solapur: A Whole Population Study

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ABSTRACT

Presently large-scale study concludes that there are many factors associated with an increased risk of COVID-19-related in-hospital death. Patients with comorbidities may be more susceptible to the COVID- 19 complications and may show compromised immune competency. The aim of the study is to find out increased relative and absolute risks of COVID-19, associated with Diabetes Mellitus in Solapur city. Study design is Cross sectional study. Study group included all patients with COVID -19 diabetic and non-diabetic patients in Solapur. It was observed that among all diabetic patients with COVID-19 fever was the most common initial symptoms; fever (100%) followed by cough (97.16%), Breathlessness (89.05%), dyspnea (9.81%),muscular soreness (6.22%) and chest distress(7.92%). In Diabetic with COVID-19, age distribution of the patients was in between 55-80 years, in non-diabetic COVID patients age group ranges 0-76 years and mortality rate observed in age group with 54-80 years. The present data showed higher mortality rate in patients of Diabetes Mellitus with COVID-19. Further it was observed that the mortality rate was higher in male (11.77 %) as compare to female (10.07 %.). Our study concludes that COVID-19 patients with Diabetes Mellitus are more prone for morbidity as compared with non-diabetic COVID patients. Diabetes Mellitus in COVID- 19 patients increases the susceptibility of complications with concomitant decrease immune system. The total number of COVID- 19 death recorded in Solapur included majority of the patients with Diabetes Mellitus as one of the responsible factor in worsening of the disease.

Keywords: Solapur, Diabetes Mellitus COVID-19, Mortality.

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INTRODUCTION

Coronavirus disease 2019 (COVID -19) is an infectious disease caused by severe acute respiratory syndrome coronavirus -2. It was first identified in Dec. 2019 in Wuhan, Hubei, China, and has resulted in an ongoing pandemic. Now Coronavirus cases have been reported in more than 210 countries across the world. Over 12.94 million people have been infected by novel Coronavirus worldwide. The ongoing pandemic has claimed over a million lives globally, and continues to infect many more every day.

The COVID -19 pandemic worsened in the India. Eight of the ten states with highest caseloads in the country are now adding more than 1,000 new cases every day. Out of these Maharashtra has been reported more than 7,000 cases every day. The number of death being reported every day is steadily climbing up. The first case of COVID-19 pandemic in Maharashtra was confirmed on 9 March 2020. Maharashtra is a hotspot that account for nearly one third of the total cases in India as well as 40% of death. As of 7 July the state's case fatality rate was 4.3% which was lower than global average but significantly higher than the other Indian states with large numbers of cases.

Solapur one of the districts in Maharashtra was declared as green zone, still 11thApril 2020. On 12 th April first Corona case reported in Solapur. Now Solapur is worst affected city in Maharashtra with 4785 (Male 2820 and Female1965) confirmed cases. However total of 2904 (Male 1694 &Female1210) people had recovered from Corona virus and over a 352 (Male 231 & female121), viral outbreak related death occurs. The city has imposed strict quarantine measures and carried out an aggressive and widespread testing programme during the pandemic. The growth rate of the number of cases of COVID -19 deaths has fallen significantly due to lockdown, marking a notable difference between pre lockdown and post lockdown situation.

In India the mortality rate is 3.09 % and cases are seen in states which are declared as red zone. Maharashtra has reported a mortality rate of 3.57%. Now Solapur has become the district with the highest COVID -19 case mortality rate in Maharashtra, at almost 10%. Hit by sudden deluge of cases -200 to 300 detection daily and a

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43% rise in deaths since July 1, the government and local administration are scrambling to bring down the mortality rate.

A recent large-scale study concludes that there are many factors associated with an increased risk of COVID-19-related in-hospital death[8]. Patients with co morbidities may be more susceptible to the COVID- 19 complications and may show compromised immune competency[1].

Hence in the present study we aimed to find out increased relative and absolute risks of COVID-19 associated with Diabetes Mellitus and other co morbidity in Solapur city.

MATERIALS AND METHODS

Study area

The present study is retrospective study of COVID- 19 disease in area of Solapur. This study was conducted in Ashwini Rural Medical College, Hospital and Research Centre Solapur over the period of three months. Ethical clearance was obtained from the institution ethical committee.

Study design:

Cross sectional study

Inclusive criteria:

This study included all positive cases during the outbreak of COVID-19 with complication of Diabetes mellitus infection in the period from 10 April to 27 July 2020 who were seen in the area of Solapur. This study constituted all age groups from infants to old patients.

Exclusion criteria

All Corona negative patients and patients with other complications like hypertension, Cardiac diseases, and Cancer and liver disorders were excluded from the research.

Data Gathering:

The data of COVID -19 Positive patients were reported in Solapur city as declared by the Municipal Corporation was collected and used in this study.

Statistical analysis:

The data was analyzed done by SPSS-17 software.

RESULT

Table 1: Epidemiological, Demographical information collected from medical records

	Diabetic with COVID- 19	Non Diabetic with COVID- 19	Number of Deaths with COVID-19 and DM
Age Group (Range)	55-80 years	0-76 years	54-80 years
Gender			
Male (n %)	332(11.77%)	4453(93.06%)	109(32.83%)
Female (n %)	198(10.07%)	4587(95.86%)	58(29.29%)
Symptoms			
Fever	530(100%)	4255(88.93%)	167(100 %)
Cough	515(97.16%)	3020(63.11%)	96 (57.48%)
Breathlessness	472(89.05%)	513(10.72%)	13(7.78%)
Dyspnea	52(9.81%)	333(6.95%)	7 (4.19%)
Muscular soreness	33(6.22%)	452(9.44%)	6 (3.59 %)
Chest distress	42(7.92%)	243(5.07%)	3(1.79%)

Table 1 depicts the medical data of all patients collected between 10 April to 27 July 2020 which was used for model development. It was observed that among all diabetic patients with COVID-19 fever was the most common initial symptom (100%), followed by cough (97.16%), Breathlessness (89.05%), dyspnea (9.81%),muscular soreness (6.22%) and chest distress(7.92%).

In Diabetic with COVID-19 age distribution of the patients was in between55-80 years, in non-diabetic COVID patients age group ranges 0-76 years and mortality rate observed in age group with 54-80 years. The present data showed higher mortality rate in patients of Diabetes Mellitus with COVID-19. Further it was observed that the mortality rate was higher in male (11.77 %) as compare to female (10.07 %.)

According to an age and gender-wise analysis of COVID -19 deaths with Diabetes Mellitus in Solapur are of people above the age of 40 years. This shows that Diabetes Mellitus is playing a vital role in suppressing the immuno competency of COVID -19 patients leading to higher mortality rate.

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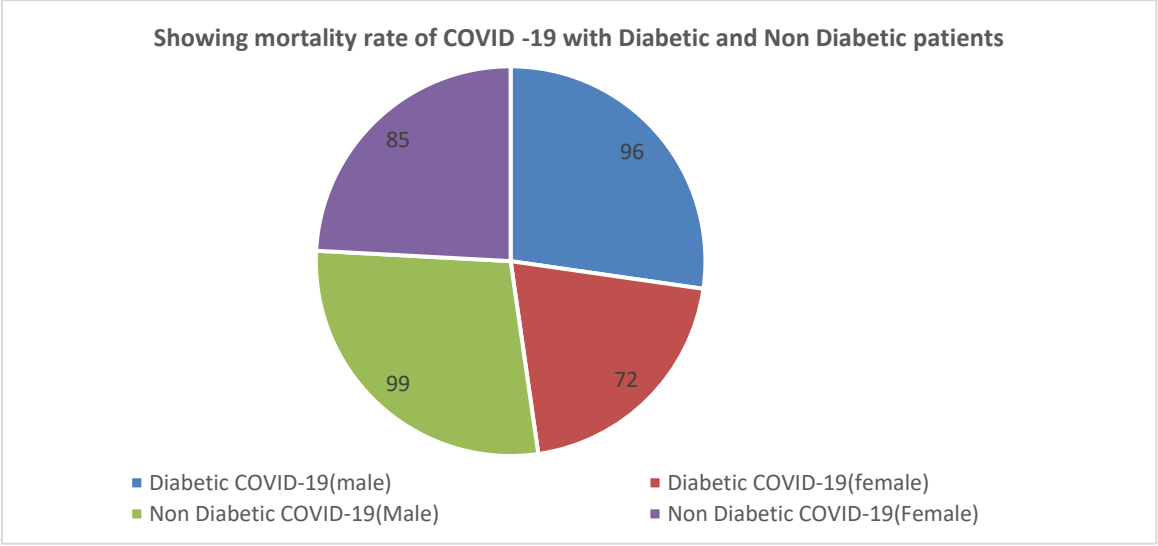
Dig 1: Gender wise mortality rate of COVID -19 with diabetic and non-diabetic



DISCUSSION

Our observations showed that people between all age groups are infected by the new coronavirus. The cross sectional study based on the Municipal data reveals that COVID-19 patients with Diabetes Mellitus showed high mortality rate as compared to COVID with non-diabetic[7,9]. Diabetes is not a new problem, but COVID-19 has put fresh impetus behind the need to tackle the nation's diabetes crisis.

When a diabetic patient develops a viral infection, it becomes harder to treat them due to fluctuations in blood glucose level and possibly, the presence of diabetes complications[2]. There appears to be two reasons for this. Firstly, the immune system is compromised, making it harder to fight the virus and likely leading to a longer recovery period. Secondly, the virus may thrive in an environment of elevated blood glucose.

The actual mechanism of the altered metabolism is unclear, however SARS-Cov-2, may binds to ACE-2 receptors, which are expressed in several key metabolic organs and tissues including the pancreatic β-cells, adipose tissue, small intestine, liver, and kidney[3]. Thus, it is possible that SARS-Cov-2 could cause multiple co-existing alterations of glucose metabolism that can complicate the pathophysiology of pre-existing diabetes or lead to new mechanisms of disease[4,10]. Taken all together, diabetic patients with COVID-19 with an increased requirement of hospitalization need, need intensive attention to reduce the risk of fatalities[5,6].

CONCLUSION

Our study concludes that COVID-19 patients with Diabetes Mellitus are more prone for morbidity as compared with non-diabetic COVID-19 patients. Diabetes Mellitus in COVID-19 patients increases the susceptibility of complications with concomitant decrease immune system. The total number of COVID - 19 deaths recorded in Solapur included majority of the patients with Diabetes Mellitus as one of the responsible factor in worsening of the disease.

Right now, in this pandemic situation, there are no specific vaccines or treatments for COVID-19. However, there are many ongoing clinical trials evaluating potential treatment. Therefore it is a big challenge to the treating physician in the present scenario to take a comprehensive approach to manage patients of COVID -19 with Diabetes Mellitus and continually monitor them in clinical practice.

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