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RESEARCH ARTICLE

CORRELATION OF DURATION OF DIABETES MELLITUS AND SEX SPECIFIC DISTRIBUTION AS A RISK FACTOR FOR PROGNOSIS OF COVID-19

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ABSTRACT

To know whether duration of diabetes is a risk factor influencing the progression and prognosis of novel coronavirus disease (COVID-19).Material and Methods: A total 96 consecutive patients confirmed with COVID-19 with diabetes mellitus were studied in MGM Medical College and Hospital. Demographic data, medical history, symptoms and signs, laboratory findings, chest computed tomography (CT) as well the treatment measures were collected and analysed. Results: We found that majority of cases with COVID-19 and diabetes mellitus were more between age group of 31 to 40 (n = 29). Male to female ratio was 1.5:1. Patients having duration of Diabetes mellitus of more than 10 years were having bad prognosis. (1% Surived).These patients were at higher risk of severe pneumonia, release of tissue injuryrelated enzymes, excessive uncontrolled inflammation responses and hypercoagulable state associated with dysregulation of glucose metabolism. Furthermore, serum levels of inflammation-related biomarker such as D-dimer, were significantly higher ($P < .01$) in diabetic patients compared with those without, suggesting that patients with diabetes are more susceptible to an inflammatory storm eventually leading to rapid deterioration of COVID-19. Conclusions: Our data supports the notion that duration of diabetes mellitus and sex specific distribution should be considered as a risk factor for a rapid progression and bad prognosis of COVID-19. More intensive attention should be paid to male patients with diabetes mellitus with long duration and having COVID-19

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INTRODUCTION

Diabetes mellitus is one of the leading causes of morbidity worldwide and is anticipated to rise substantially over the next decades (1). Several investigations have demonstrated a higher susceptibility to some infectious diseases in diabetic people, like Staphylococcus aureus and Mycobacterium tuberculosis (2-4) probably owing to the dysregulated immune system (5). It has reported that plasma glucose levels and diabetes are independent predictors for mortality and morbidity in patients with SARS.(6)A retrospective study in Wuhan, China revealed that of the 41 COVID-19 patients, 32% of them had underlying diseases, and among which 20% was diabetes (7). Therefore, these diabetic patients might be at increased risk of COVID-19 and have a poorer prognosis.

Aims and objectives: To know whether diabetes is a risk factor to influence the progression and prognosis of COVID-19.

MATERIALS AND METHODS

96 COVID-19 patients who were admitted to MGM Medical college and Hospital from September 2022 to February 2024 were included in this study according to the inclusion criteria. Their basic information, laboratory examinations were collected and analysed. The present study was conducted in Department of biochemistry and central investigation laboratory at MGM Medical college and hospital Aurangabad. The study was approved by Institutional Ethical and Research committee to use patients blood in the research study.

INCLUSION CRITERIA:

1. Patients more than18 years old. All Samples from SARS(Severe acute respiratory syndrome) COVID-19Infected Patient with Diabetes mellitus disorder.

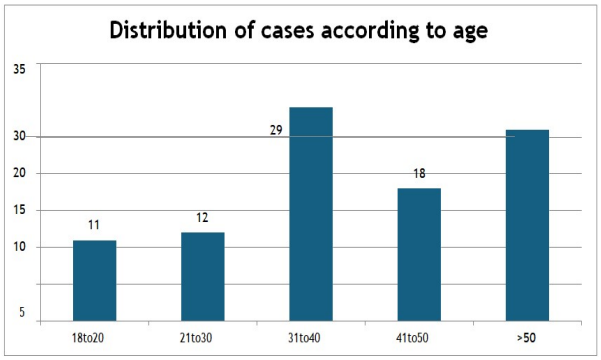
EXCLUSION CRITERIA: <18 years age excluded

OBSERVATION AND RESULTS

Table1. Distribution of cases according to age in DM with COVID-19

Sr No	Age	Number of cases N	Percentage%
1	18to20	11	11 %
2	21to30	12	13 %
3	31to40	29	30 %
4	41to50	18	19 %
5	>50	26	27 %
Total		96	100 %

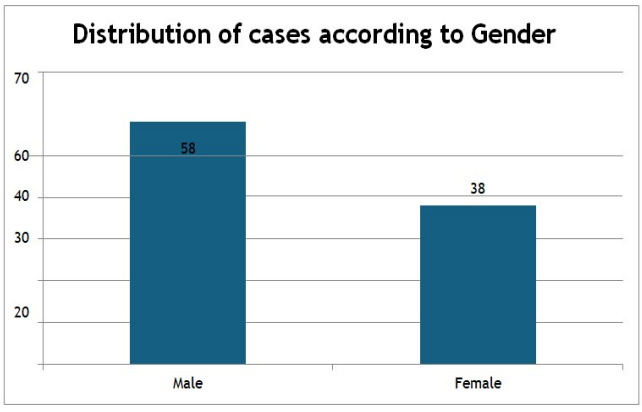
As shown Table 1, majority cases were between 31to 40 years i.e.29 (30%) cases followed by 26 (27 %) in age >50 years.



Graph 1 Majority cases were between 31to 40 years i.e.29 (30%) cases followed by 26 (27 %) in age >50 years.

Sr No	Gender	Number of cases N	Percentage%
1	Male	58	60 %
2	Female	38	40 %
Total		96	100 %

As shown Table 2, male cases were 58 (60%) and female cases were 38(40%). Male to female ratio was 1.5:1 (Graph 2)

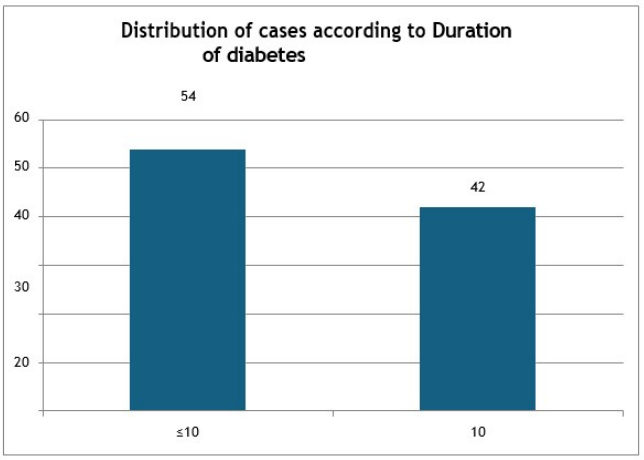


Graph 2. Showing Distribution of cases according to Gender in DM with COVID-19

Table 3. Distribution of cases according to Duration of Diabetes Mellitus with COVID-19

Sr No	Duration of diabetes (Years)	Number of cases N	Percentage %
1	≤10	54	56 %
2	>10	42	44 %
Total		96	100 %

As shown Table 3, Duration of diabetes (Years) was ≤10 in 54(56%) cases and 10 years in 42.(44 %)(Graph 1)

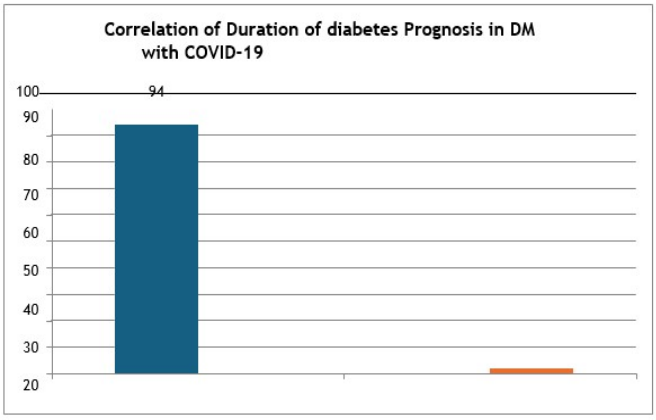


Graph 3. Showing Duration of diabetes (Years) was ≤10 in 54(56%) cases and 10 years in 42.(44 %)(Graph 3) (27%) cases of > 50years (Graph1)

Table 4. Correlation of Duration of diabetes & Prognosis in DM with COVID-19

Sr No	Duration of Diabetes (Years)	Survived N (%)	Not Survived N (%)	Total N (%)	Chi Square	P value
1	≤10	93(97%)	1(1%)	94(98%)	41.74	<
						0.0000
						1(S)
2	>10	1(1%)	1(1%)	2(2%)		
Total		94(98%)	2(2%)	96(100%)	-	-

As shown in Table 4, amongst 94 (98 %) cases who had Duration of diabetes ≤10, 93(98%) Survived whereas amongst 2(2%) cases who had Duration of diabetes>10,1(1%) Survived. Result showed statistically significant correlation between duration of diabetes & prognosis(P<0.00001).(Graph 4)



Graph 4. Correlation of Duration of diabetes & Prognosis in DM with COVID-19

Table 5. Distribution of cases according to Prognosis in DM with COVID-19

Sr No	Prognosis	Number of cases N	Percentage %
1	Survived	94	98 %
2	Not survived	2	2 %
Total		96	100 %

Table 6. Distribution of cases according to Blood sugar profile in DM with COVID 19

Sr No	Blood sugar profile	Mean	SD
1	Fasting blood sugar	150.70	18.21
2	Postprandial blood sugar	311.50	47.05

DISCUSSION

Diabetes, a major metabolic disorder, is one of the leading causes of mortality and morbidity throughout the world (8). Several studies have shown that diabetics infected with Influenza A (H1N1), MERS-CoV, and SARS-CoV exhibit severe disease symptoms and succumb to death compared to non-diabetic individuals (9,10 ,11). Similarly, infection with SARS-CoV-2 is also associated with severe complications in diabetics. For example, SARS-CoV-2 infection led to the release of unusually high glucocorticoids and catecholamines, which further elevated blood glucose (12). The hyperglycemic condition, in turn, recruits the pro-inflammatory monocytes, enhances platelet reactivity, and therefore contributes to increases in the number of cardiovascular deaths in diabetic individuals (13). COVID-19 is a disease caused by a SARS-CoV-19 virus. It can be very contagious and Spreads quickly.Over one million people have died from COVID-19 in the United States of America. Diabetes Mellitus is considered one of the major comorbidities encountered in severe forms of COVID-19. Many reports showed that the prevalence of DM was nearly 10%, and his incidence in severe cases was about twofold that of non-severe patients.D-dimer is a marker of fibrin and fibrinolysis turnover, with unique molecular properties to work as a biological marker for haematological abnormalities(clotting disorder). Hyperglycaemia in diabetes is thought to cause dysfunction of the immune response,in many ways such as altering macrophages functions and deregulating neutrophil synthesis,which may lead to failure to control the spread of pathogens in diabetic Mellitus subjects. Therefore, Diabetic subjects are known to be more susceptible to infections.(14) With this background we have conducted present study in 96 diabetes mellitus patient with covid-19disease.Role of D-dimer, fasting blood glucose level(FBG),Post prandial blood sugar level(PPSL)were evaluated in all the patient and result in Diabetes Mellitus patient with covid-19disease.

Age distribution: In present study As shown Table1,majority cases were between 31 to 40 years i.e.29 (30%) cases followed by 26 (27%) cases of > 50 years.(Graph1) In similar study by Dipesh Karki,1Roshani Gurung, number of cases found as age 20 to 39-13%,40 to59–37%,60and above 35%.(15). In similar study by Lilith Faucheux, number of cases were found as age >50 is 29%.(16)

Gender distribution: In present study As shown Table2, male cases were 58(60%) and female cases were 38(40%).Male to female ratio was1.5:1.(Graph2). In similar study by Hannah M.Nemec,MD1,Allison Ferenczy, according to gender distribution was male N=46 C female N=51.(17). In similar study by Farideh A. Javid1*,Fadi Abdul Waheed1,according to gender distribution was male N=251 C female N=344.(18). In similar study by Noha M. Elemam, B. Pharma, PhD, according to gender distribution was male N=170 C female N=69. (19)

Duration of diabetes distribution: As shown Table 3, Duration of diabetes (Years) was≤ 10 in 54 (56%) cases and >10 years in 42 (44%).(Graph3) In similar study by Muhammed Kermalia, Raveena Kaur Khalsaa duration of Diabetes was ≤15 years in166(60%) cases and >15years in 111(40%).(20).

Distribution of cases according to Blood sugar profile: In Present Study As shown Table 6, Fasting blood sugar mean±SD was150.70±18.21and Postprandial blood sugar mean± SD was311±47.05(Graph4). In similar study by Weijia Xiea ,Na Wua Bin Wang Fasting blood sugar mean ±SD was 177.70±24.20 and Postprandial blood sugar mean ±SD was341±59.04. (21) In similar study by Nirmala Devi Chandrasekaranand Thirunavukkarasu Sathish, Fasting blood sugar mean ±SD was136.20±16.50and Postprandial blood sugar mean ±SD was 280 ± 42.08. (22)

Distribution of cases according to Prognosis: In present study As shown Table 4 and 5 ,94(98%)cases had survived at the time of discharge.(Graph 4) In similar study by Md.Shahed Morshed, Abdullah Al Mosabbir 869 out of 925(94%) case had survived at the time of discharge.(23). In present study by Jennifer E.Nyland, Nazia T. Raja-Khan, Kerstin Bettermann,28630 (97%)out of 29516covid-19 patient with diabetes mellitus had survived at the time of discharge. (24)

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