

## IMPACT OF DIABETES MELLITUS ON PATIENTS WITH COVID-19

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### Abstract

**Background:** The aim of the study was to analyze the demographical and routine laboratory parameters in COVID-19 patients having diabetes and to observe the impact of diabetes on the COVID-19 disease severity and outcome. **Methods:** In this retrospective study, consecutive COVID-19 patients of all age groups were enrolled. Demographical, clinical and laboratory details were collected and analysed. Patients were classified into two groups: group I (diabetic patients, n=50), group II (non-diabetic with no other comorbidity, n=50). **Results:** The mortality rate was 9/50(18.00%) in the diabetic COVID-19 patients. Also, 43/50 (86.00%) patients had severe COVID-19 disease and 21/50 (42.00%) of patients required ventilator support during the treatment. **Conclusion:** The severity, ventilator requirement and mortality were considerably higher in COVID-19 patients having diabetes.

**Key words:** Mortality, Neutrophil to lymphocyte ratio, SARS-CoV-2.

### Introduction

Diabetes mellitus (DM) is one of the most prevalent chronic conditions with devastating multi-systemic complications. It is estimated that currently 463 million people are affected by diabetes globally. A study shows that a person having DM is more susceptible to SARS-CoV-2 infection. Though, the majority of corona virus illnesses does not affect the patients severely, but previous outbreaks of two corona viruses by severe acute respiratory syndrome corona virus (SARS-CoV) in 2002–2003 and Middle East respiratory syndrome corona virus (MERS-CoV) in 2012 caused severe pneumonia having a mortality rate of 10% and 36% respectively. Data suggests diabetes to be an independent risk factor for prediction of severity and death in both the outbreaks.(1-5)

### Materials and Methods

This is a retrospective descriptive observational study. The patients were admitted here after being diagnosed COVID-19 by real-time polymerase chain reaction (RT-PCR). The demographical, clinical and laboratory details on the day of admission were collected from hospital data base and analysed thoroughly. Patients were classified into two

groups namely: Group I (diabetic patients, n=50), Group II (non-diabetic with no other comorbidity, n=50) based on their clinical history. Death was the primary outcome. The secondary outcomes were severity of disease and requirement for ventilator support. The study was conducted after obtaining the approval from the ethical committee of the institute. Patients having comorbidity other than diabetes mellitus and with incomplete information were excluded from the study.

### Statistical Analysis:

All statistical analyses were performed by EPI-Info Software. Data are presented as count (percentages) for categorical variables. Results for continuous variables are expressed as mean  $\pm$  SD or median  $\pm$  IQR (Inter Quartile Range) as indicated. Categorical variables between groups are compared using the  $\chi^2$  test or Fisher exact test, and continuous variables are analysed using Student's t test or Mann-Whitney U test as appropriate. A value of  $p < 0.05$  is considered statistically significant.

### Results

**Table 1: Comparisons of Demographical and Clinical details of Group I and Group II**

PARAMETER	Diabetic Patients (Group-I, n=50)	Non-diabetic with no other comorbidity (Group-II, n=50)	P Value
Age(years)	57.21 $\pm$ 12.41	41.23 $\pm$ 15.12	<0.001
Male	32 : 18	37 : 13	0.4842
<b>Outcomes</b>			
Severe disease	43 (86.00%)	22 (44.00%)	<0.05
Required Ventilator Support	21(42.00%)	7(14.00%)	<0.05
Non-survivors	9(18.00%)	3(6.00%)	<0.001

The mortality rate was 9/50(18.00%) in the diabetic COVID-19 patients. Also, 43/50 (86.00%) patients had severe COVID-19 disease and 21/50 (42.00%) of patients required ventilator support during the treatment

#### Discussion:

This study represents the first description of diabetic patients with COVID-19 disease from an apex COVID-19 care centre in north India. Overall, the mortality in COVID-19 disease varies from 0.7% to 10% but a study from Italy reported a mortality rate of 20.3% in COVID-19 patient with diabetes mellitus [6]. We found the mortality rate was 18.00% in patients with diabetes. Data suggests that diabetes is responsible for approximately one-third of deaths in hospitals in COVID-19 patients [7].

Diabetes has been shown to be an independent risk factor for mortality in previous pandemics including H1N1, SARS and MERS [8]. Studies show that diabetics have two fold higher risk of disease severity as well as higher mortality compared to non-diabetics [9]. Mortality rate is higher in those diabetic patients having poor glycemic control, higher HbA1c and higher body mass index (BMI) [10, 11]. Different factors lead to poor prognosis in patients with diabetes like age, gender, civilization, obesity, pro-inflammatory and pro-coagulative state in patients [12, 13]. Various studies like CORONADO reported that black, Asian and minority ethnic (BAME) may have a higher rate corona infection and may also have poor outcome [14]. COVID-19 related mortality in the diabetic population is more in males, elderly and in patient having severe inflammatory response, altered hepatic, renal, coagulation markers and cardiovascular complications [10, 15]. As seen in the present study. Of all the diabetic non-survivors in our study, one-third were elderly patients and more than four-fifth were males. In SARS and MERS pandemic also, increasing age has been postulated as chief predictor of mortality [16, 17]. The case fatality rate was twice in males in comparison to females, and 12- times higher in patients more than 80 years of age [12]. However, we found the case fatality rate was 6.5 times in males compared to females and two times in patients of less than 60 years of age compared to those more than 60 years of age.

#### Conclusion:

The severity and mortality are considerably higher in COVID-19 patients having diabetes. The requirement of ventilator was also higher in diabetic patients.

#### References:

1. International Diabetes Federation. IDF diabetes atlas. 9th ed. Brussels: IDF, 2019. Available from URL: <https://www.diabetesatlas.org/en/>. Accessed on September 29, 2020.
2. Li Y, Han X, Alwalid O, Cui Y, Cao Y, Liu J, Gu J, Wang L, Fan Y, Shi H. Baseline characteristics and risk factors for short-term outcomes in 132 COVID-19 patients with diabetes in Wuhan China: A retrospective study. *Diabetes Res Clin Pract.* 2020; 166: 108299.
3. Song Z, Xu Y, Bao L, Zhang L, Yu P, Qu Y, Zhu H, Zhao W, Han Y, Qin C. From SARS to MERS, thrusting coronaviruses into the spotlight. *Viruses.* 2019; 11(1): 59.
4. World Health Organization. Clinical management of COVID-19. Available from URL: <https://www.who.int/publications/i/item/clinical-management-of-covid-19>. Accessed on October 09, 2020.
5. Ministry of Health & Family Welfare, Government of India. Clinical management protocol for COVID-19. Available from URL: <https://www.mohfw.gov.in/pdf/UpdatedClinicalManagementProtocolforCOVID19dated03072020.pdf>. Accessed October 09, 2020.
6. Pal R, Bhadada SK. COVID-19 and diabetes mellitus: An unholy interaction of two pandemics. *Diabetes Metab Syndr.* 2020; 14(4): 513-17.
7. Barron E, Bakhai C, Kar P, Weaver A, Bradley D, Ismail H, Knighton P, Holman N, Khunti K, Sattar N, Wareham NJ. Associations of type 1 and type 2 diabetes with COVID-19-related mortality in England: a whole-population study. *Lancet Diabetes Endocrinol.* 2020; 8(10) :813-22.
8. Gupta R, Ghosh A, Singh AK, Misra A. Clinical considerations for patients with diabetes in times of COVID-19 epidemic. *Diabetes Metab Syndr.* 2020; 14(3) :211.
9. Kumar A, Arora A, Sharma P, Anikhindi SA, Bansal N, Singla V, Khare S, Srivastava A. Is diabetes mellitus associated with mortality and severity of COVID-19? A meta-analysis. *Diabetes Metab Syndr.* 2020; 14(4): 535-45.
10. Holman N, Knighton P, Kar P, O'Keefe J, Curley M, Weaver A, Barron E, Bakhai C, Khunti K, Wareham NJ, Sattar N. Risk factors for COVID-19-related mortality in people with type 1 and type 2 diabetes in England: a population-based cohort study. *Lancet Diabetes Endocrinol.* 2020; 8(10) :823-33.
11. Hartmann-Boyce J, Morris E, Goyder C, Kinton J, Perring J, Nunan D, Mahtani K, Buse JB, Del Prato S, Ji L, Roussel R. Diabetes and COVID-19: risks, management, and learnings from other national disasters. *Diabetes Care.* 2020; 43(8) :1695-703.
12. Apicella M, Campopiano MC, Mantuano M, Mazoni L, Coppelli A, Del Prato S. COVID-19 in people with diabetes: understanding the reasons for worse outcomes. *Lancet Diabetes Endocrinol.* 2020; 8(9): 782-92.
13. Huang I, Lim MA, Pranata R. Diabetes mellitus is associated with increased mortality and severity of disease in COVID-19 pneumonia—a systematic review, meta-analysis, and meta-regression. *Diabetes Metab Syndr.* 2020; 14(4): 395-403.

14. Vas P, Hopkins D, Feher M, Rubino F, B Whyte M. Diabetes, obesity and COVID-19: A complex interplay. *Diabetes Obes Metab.* 2020; 22: 1892–96.
15. Yan Y, Yang Y, Wang F, Ren H, Zhang S, Shi X, Yu X, Dong K. Clinical characteristics and outcomes of patients with severe covid-19 with diabetes. *BMJ Open Diab Res CA.* 2020; 8(1):e001343.
16. Choi KW, Chau TN, Tsang O, Tso E, Chiu MC, Tong WL, Lee PO, Ng TK, Ng WF, Lee KC, Lam W. Outcomes and prognostic factors in 267 patients with severe acute respiratory syndrome in Hong Kong. *Ann Intern Med.* 2003; 139(9): 715-23.
17. Hong KH, Choi JP, Hong SH, Lee J, Kwon JS, Kim SM, Park SY, Rhee JY, Kim BN, Choi HJ, Shin EC. Predictors of mortality in Middle East respiratory syndrome (MERS). *Thorax.* 2018; 73(3): 286-9.