

# COVID-19 AND DIABETES MELLITUS: GLYCEMIC CONTROL AND RISK FACTORS FOR MORTALITY EXPERIENCE FROM PAKISTAN.



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### BACKGROUND

Diabetes mellitus (DM) is characterized by glucose dysregulation by insulin deficiency or resistance. DM is one of the risk factors and found to be associated with high mortality in patients with corona virus disease-19 (COVID-19). Our aim is to highlight the effect of Covid-19 and DM on each other by studying glycemic control and risk factors for mortality.

### MATERIALS

A retrospective observational study from Pakistan. COVID-19 diagnosed patients admitted between the months of March 2020 to March 2021 were included. The patients were divided into DM and non-DM. Demographics, clinical variables and outcome were compared between these groups. Glycemic control during hospitalization (blood glucose level fasting and pre-meal twice a day) was noted. Fasting glucose level >120 mg/dl, and random >200 mg/dl were considered as poor glycemic control. Survivors and non-survivors among DM were compared.

### RESULTS

A total of 366 patients were included, 113(30.87%) DM and 253(69.12%) non-DM. Patients in DM group were older (age >60 years, p=0.039). Significantly more patients with hypertension (p<0.001) and ischemic heart disease (p<0.001) developed COVID-19 in DM group. There was no difference in mortality among both groups (p=0.29). (Table 1). In DM patients, the significant risk factors for mortality were age >60 years, hypertension and renal disease. High fasting and pre-dinner blood glucose levels (mean) obtained at admission and day 5 were significantly associated with mortality. (Table 2)

	Diabetes mellitus (n=113)	Non Diabetes mellitus (n=253)	p-value	OR (95% C.I)
Mean Age (years)	58.14± 11.42	49.69±16.61	<0.001	-
<b>Age groups n (%)</b>				
< 30 years	3 (2.7)	30 (11.9)	0.005	0.203 (0.061 – 0.679)
30 – 45 years	6 (5.3)	68 (26.9)	<0.001	0.153 (0.064 – 0.363)
45 – 60 years	62 (54.9)	88 (34.8)	<0.001	2.325 (1.477 – 3.659)
>60 years	42 (37.2)	67 (26.5)	0.039	1.642 (1.023 – 2.635)
<b>Gender n (%)</b>				
Male	77 (68.1)	172 (68.0)	0.976	1.007 (0.626 - 1.621)
<b>Comorbid conditions n (%)</b>				
Hypertension	77(68.1)	97(38.3)	<0.001	3.440 (2.150 - 5.503)
Ischemic heart disease	21(18.6)	18(7.1)	<0.001	2.980 (1.519 - 5.848)
Renal disease	43(38.1)	85(33.6)	0.409	1.214 (0.766 - 1.925)
<b>Clinical features n (%)</b>				
Fever	113(100)	205(81)	<0.001	1.550 (1.434 - 1.683)
Cough	72(63.7)	134(53)	0.055	1.560 (0.988 - 2.461)
Myalgia	16(14.2)	52(20.6)	0.146	0.638 (0.346 - 1.174)
Difficulty in breathing	90(79.6)	159(62.8)	0.001	2.313 (1.370 - 3.907)
Diarrhea	12(10.6)	17(6.7)	0.202	1.649 (0.760 - 3.580)
<b>ICU admission n (%)</b>	59(52.2)	113(44.7)	0.181	1.354 (0.868 - 2.112)
<b>Outcome n (%)</b>				
<b>Mortality</b>	35(31.0)	65(25.7)	0.29	1.298 (0.796 - 2.115)

### CONCLUSION:

In diabetic patients, advanced age, comorbid and poor glycemic control are associated with increased mortality. More attention should be focused on strict glycemic control as severe COVID 19 infection and its treatment with steroids can have a negative impact on outcome.

TABLE 1: Risk factors for mortality in DM patients

	Expired (n=35)	Alive (n=78)	p-value	OR (95% C.I)
Mean Age (years)	64.09±9.96	55.47±11.08	<0.001	-
Male	25 (71.4)	52 (66.7)	0.615	1.250 (0.523 - 2.988)
<b>Comorbid conditions n (%)</b>				
Hypertension	29(82.9)	48(61.5)	0.025	3.021 (1.122 - 8.133)
Ischemic heart disease	9(25.7)	12(15.6)	0.192	1.904 (0.717 - 5.053)
Renal disease	18(51.4)	25(32.1)	0.050	2.245 (0.993 - 5.075)
Chronic kidney disease	18(51.4)	23(29.5)	0.025	2.532 (1.113 - 5.762)
Acute kidney injury	4(11.4)	3(3.8)	0.200	3.226 (0.682 - 15.264)
<b>Treatment given n (%)</b>				
Antibiotics	34(97.1)	41(52.6)	<0.001	30.683 (3.999 - 235.413)
Methylprednisolone	27(77.1)	62(79.5)	0.778	0.871 (0.333 - 2.278)
Dexamethasone	7(20.0)	18(23.1)	0.393	0.642 (0.232 - 1.781)
Tocilizumab	15(42.9)	25(32.1)	0.267	1.599 (0.699 - 3.614)
Anticoagulation	30(85.7)	61(78.2)	0.351	1.672 (0.563 - 4.967)
Remdesivir	6(17.1)	18(23.1)	0.476	0.690 (0.248 - 1.922)
<b>Glycemic characteristics (Blood glucose mean (+SD))</b>				
Fasting blood glucose (day 1)	254 (133)	192 (109)	0.051	-
Fasting blood glucose (day 5)	232 ( 86)	151 ( 81)	0.004	-
Blood glucose pre-lunch (day 1)	264 ( 151)	213 (122)	0.192	-
Blood glucose pre-lunch (day 5)	226 (96)	179 (84)	0.145	-
Blood glucose pre-dinner (day 1)	277 (99)	218 (111)	0.037	-
Blood glucose pre-dinner (day 5)	267 (102)	180 (77)	0.004	-