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Prevalence of Co-Morbidities and Mortality among Patients Hospitalized with COVID-19 in TMSS Medical College & Rafatullah Community Hospital

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Abstract **Original Research Article**

Background: The COVID-19 pandemic, which has caused significant illness and mortality, has spread quickly throughout the world. Comorbidities coexisting with COVID-19 have been described as risk factors for adverse outcomes repeatedly. In order to determine if diabetic patients' prognoses are better or worse than those of non-diabetics, we sought to determine the prevalence of SARS CoV-2 in these individuals. **Objective:** The aim of this study was to determine the prevalence of SARS CoV-2 in individuals with diabetes mellitus and determine whether or not their prognosis differed from non-diabetics. ***Methods:*** A total of 654 COVID-19-positive patients were admitted to TMSS Medical College and Rafatullah Community Hospital in Bogura, Bangladesh, between June 1 and August 31, 2020. A purposive sampling technique was used to choose 341 patients with confirmed SARS-CoV-2 among them for this study. There will be no new investigative techniques, major danger, or financial load on the patient as a result of the study. This being a retrospective study informed consent was not taken. We investigated and compared their socio-demographic information, clinical traits, morbidities, lab results, and CT scan results. ***Results:*** The majority of the patients (75.4%) had at least one co-morbidity. They had the highest prevalence of DM (180; 52.8%), HTN (177; 51.9%), bronchial asthma (50; 14.7%), cardiac disease (35; 10.3%), and CKD (30; 8.8%). In comparison to younger patients, elderly individuals had a significantly higher prevalence of all comorbidities. Individual death rates for patients with diabetes, hypertension, heart disease, CKD, CVD, and COPD were all significantly higher than those of those without those comorbidities. ***Conclusion:*** In this study, we found that co-morbidities, a risk factor for the rapid progression of the Covid-19 symptoms, worsen the prognosis. Co-morbidity patients who are infected with Covid-19 should therefore receive extra care because they could get worse at any time.

Keywords: COVID-19, Prevalence, Morbidities, Hypertension, Diabetes, Attentiion.

1. INTRODUCTION

A seafood wholesale shop in Wuhan, China, was connected to a cluster of patients with pneumonia of unknown origin in December 2019 [1]. When it quickly spread throughout the entire world, the World Health Organization designated it a pandemic and named the illness COVID-19. The Ministry of Health and Family Welfare (MoHFW) in Bangladesh equipped the PCR facility at the IEDCR (Institute of Epidemiology, Disease Control, and Research) to test samples from suspected COVID-19 cases for 2019-nCoV in response to outbreaks in several nations. On March 8, 2020, [2, 3] the first COVID-19 cases in Bangladesh were officially reported. Despite the fact that COVID 19 infection typically results in a mild acute respiratory infection with few or no symptoms, some patients can potentially get unusual & severe pneumonia, acute respiratory distress syndrome, septic shock, multiple organ failure, and death [4]. 20–51% of patients reported having at least one comorbidity at the time of admission, with diabetes (10–20%), hypertension (10– 15%), and other cardiovascular and cerebrovascular illnesses (7–40%) being the most prevalent [5]. Diabetes (9.7%, 95% CI: 7.2-12.2%) and hypertension (21.1%, 13.0-27.2%) were the most common concomitant conditions, followed by cardiovascular disease (8.4%, 3.8-13.8%) and respiratory system disease (1.5%, 0.9-2.1%) [6]. The

pathophysiology of COVID-19 may be related to illnesses such as hypertension, diabetes, respiratory system disease, cardiovascular disease, and their susceptibility conditions. The influenza and next SARS-CoV-2 vaccine recommendations should include people with hypertension, diabetes, respiratory system disease, and cardiovascular disease. More studies with sufficient power should be done to demonstrate the link because the level of evidence is insufficient [7]. We will therefore carry out a retrospective analysis at TMC and RCH to determine the prevalence of co-morbidities and death among COVID-19 patients who were hospitalized. These inclusion and exclusion criteria were used to guide the purposive sampling process for this investigation. All subjects with confirmed COVID 19 positivity meet the inclusion criteria. Negative COVID 19 cases serve as an exclusion criterion. The patient's evaluation was based on their medical history, physical examination, investigations (including HRCT), and any in-patient treatments they received.

2. METHODOLOGY

This retrospective study was conducted in the Department of Medicine, TMSS Medical College, and Rafatullah Community Hospital in Bogura, Bangladesh, from 1 June 2020 to 31 August 2020. 341 patients were chosen at random from a total of 654 COVID-19-positive patients who were hospitalized to this institution during that time. There was no informed consent obtained because this was a retrospective study. There will be no new investigative techniques, major danger, or financial load on the patient as a result of the study. This work was examined and authorized by the ethical review committees of TMSS Medical College and Rafatullah Community Hospital. The patients' electronic medical records and treatment files included all the information, including demographic, clinical, laboratory, radiological, and therapy features as well as treatments and hospital outcomes. All of the patients had COVID-19 confirmed cases, and this study did not include any suspected or COVID-19 negative cases. All of the patients had nose or throat swabs taken from their upper respiratory tracts, which were then examined using a reverse transcription-polymerase chain reaction to determine whether they had SARS-CoV-2 infection. For categorical data, descriptive statistics included frequency analysis (percentages), and for continuous variables, mean, standard deviation, or median and inter-quartile range. For comparisons, the appropriate one-sample t-test or Mann-Whitney U-test will be used for continuous data, and the Chi- squared test or Fisher exact test will be used for categorical variables. SPSS Windows version 25 will be used to process, alter, and analyze the interesting variables. A 95% confidence interval was used to define statistical significance as a P- value of 0.05 or lower. Tables and charts will be used to display the results.

3. RESULT

A total of 654 COVID-19 patients were admitted to Rafatullah Community Hospital between June 1 and August 31, 2020, and 341 of those patients were randomly chosen using the purposive sample approach. Of them, 103 (30.2%) were women and 238 (69.8%) men; 25 (7.3%) were illiterate and 39 (11.4%) were retired or unemployed. The majority of the patients (254; 75.4%) had at least one comorbidity, while 84 (24.6%) did not. Among them, the most prevalent conditions were DM (180; 52.8%), HTN (177; 51.9%), bronchial asthma (50; 14.7%), heart disease (35; 10.3%), and CKD (30; 8.8%). With the exception of bronchial asthma, which was seen in groups of patients similarly, the prevalence of other comorbidities was considerably higher in older patients than in younger individuals. It was seen that male patients had noticeably more comorbidities than female patients. The most frequent initial symptoms were fever (312, or 91.5%), cough (294, or 86.2%), and shortness of breath (189, or 55.4%), with sore throats (97, or 28.4%), fatigue (28.2%), nausea/vomiting (81, or 23.8%), headache (78, or 22.9%), myalgia (71, or 20.8%), diarrhea (53, or 15.5%), and chest pain/tightness (22 or 6). Patients with diabetes, hypertension, heart disease, and chronic kidney disease (CKD) had significantly higher serum creatinine levels than those without these comorbidities. Patients with cardiac disease, bronchial asthma, CKD, cerebrovascular illness, and COPD had considerably higher D-dimer levels. 43 patients out of 341 were referred, and no current information on their survival could be found. Therefore, the data are considered missing. 5 (6.0%) of the 84 patients without comorbidities died, compared to 40 (15.6%) of the 257 patients with comorbidities. According to this study, patients with diabetes, hypertension, heart disease, chronic kidney disease, cardiovascular disease, and COPD all had considerably higher individual death rates than those without those comorbidities.

Table 1: Demographic information with frequency of comorbidities and symptoms

Variables		Frequency (N=341)	Percent
Age	Mean (±SD)	51 (±15)	N/A
Sex	Male	238	69.8
	Female	103	30.2
Education	Illiterate	25	7.3
	Primary	85	24.9
	SSC	24	7.0
	HSC	97	28.4
	Graduate and above	69	20.2
	Missing	41	12.0

Variables		Frequency (N=341)	Percent
Occupation	Unemployed/Retired	39	11.4
	Service	71	20.8
	Business	93	27.3
	Farmer	24	7.0
	Housewife	83	24.3
	Missing	31	9.1
Comorbidities	No comorbidity	84	24.6
	DM	180	52.8
	HTN	177	51.9
	Heart disease	35	10.3
	Bronchial asthma	50	14.7
	CKD	30	8.8
	CVD	7	2.1
	COPD	6	1.8
Symptoms	Fever	312	91.5
	Cough	294	86.2
	Shortness of breath	189	55.4
	Fatigue	96	28.2
	Sore throat	97	28.4
	Headache	78	22.9
	Chest pain/ tightness	22	6.5
	Diarrhea	53	15.5
	Myalgia	71	20.8
	Nausea/ vomiting	81	23.8

N= Total number of cases with common variables.

Table 2: Prevalence of comorbidities in different age and sex group of patients

Variables		Comorbidity absent	Comorbidity present	DM	HTN	Heart disease	Bronchial asthma	CKD	CVD	COPD
		Count (Percent)	Count (Percent)	Count (Percent)	Count (Percent)	Count (Percent)	Count (Percent)	Count (Percent)	Count (Percent)	Count (Percent)
Age group	**<20**	4 (4.8%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
	20-29	18 (21.4%)	2 (0.8%)	0 (0.0%)	1 (0.6%)	1 (2.9%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
	30-39	19 (22.6%)	25 (9.7%)	10 (5.6%)	12 (6.8%)	1 (2.9%)	8 (16.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
	40-49	19 (22.6%)	43 (16.7%)	27 (15.0%)	31 (17.5%)	2 (5.7%)	7 (14.0%)	2 (6.7%)	0 (0.0%)	0 (0.0%)
	50-59	12 (14.3%)	88 (34.2%)	67 (37.2%)	55 (31.1%)	9 (25.7%)	15 (30.0%)	12 (40.0%)	2 (28.6%)	1 (16.7%)
	>60	12 (14.3%)	99 (38.5%)	76 (42.2%)	78 (44.1%)	22 (62.9%)	20 (40.0%)	16 (53.3%)	5 (71.4%)	5 (83.3%)
	***P*-value**	**0.000[a]**		**0.000[a]**	**0.000[a]**	**0.002259[a]**	**0.088178[b]**	**0.001003[b]**	**0.027681[c]**	**0.023461[c]**
Sex	**Male**	49 (58.3%)	189 (73.5%)	133 (73.9%)	119 (67.2%)	21 (60.0%)	39 (78.0%)	20 (66.7%)	4 (57.1%)	5 (83.3%)
	Female	35 (41.7%)	68 (26.5%)	47 (26.1%)	58 (32.8%)	14 (40.0%)	11 (22.0%)	10 (33.3%)	3 (42.9%)	1 (16.7%)
	***P*-value**	**0.008406[a]**		**0.081673[a]**	**0.284211[a]**	**0.182774[a]**	**0.171341[a]**	**0.695995[a]**	**0.475026[b]**	**0.441254[b]**

N= Number of cases with common variables, The Chi-square statistic is significant at the .05 level, a. Pearson Chi-Square, b. Likelihood ratio, c. Linear-by-Linear Association.

Table 3: Symptoms analysis of patients with multiple comorbidities

Variables	No comorbidity N=84	1 Comorbidity N=115	2 Comorbidities N=85	3 Comorbidities N=36	4 Comorbidities N=14	5 Comorbidities N=6	6 Comorbidities N=1	*P* value
Fever	70 (83.3%)	107 (93.0%)	78 (91.8%)	36 (100%)	14 (100%)	6 (100%)	1 (100%)	**0.012361[b]**
Cough	68 (80.0%)	97 (84.3%)	76 (89.4%)	34 (94.4%)	13 (92.9%)	5 (83.3%)	1 (100%)	**0.379117[b]**
Shortness of breath	44 (52.4%)	60 (52.2%)	47 (55.3%)	22 (61.1%)	12 (85.7%)	3 (50.0%)	1 (100%)	**0.067966[c]**
Fatigue	9 (10.7%)	29 (25.2%)	22 (25.9%)	22 (61.1%)	7 (50.0%)	6 (100%)	1 (100%)	**0.000[b]**
Sore throat	9 (10.7%)	25 (21.7%)	25 (29.4%)	23 (63.9%)	10 (71.4%)	4 (66.7%)	1 (100%)	**0.000[b]**
Headache	9 (10.7%)	20 (17.4%)	19 (22.4%)	19 (52.8%)	4 (28.6%)	6 (100%)	1 (100%)	**0.000[b]**
Chest pain/ tightness	2 (2.4%)	7 (6.1%)	5 (5.9%)	4 (11.1%)	2 (14.3%)	1 (16.7%)	1 (100%)	**0.002367[c]**
Diarrhea	5 (6.0%)	18 (15.7%)	8 (9.4%)	15 (41.7%)	5 (35.7%)	1 (16.7%)	1 (100%)	**0.000022[b]**
Myalgia	12 (14.3%)	19 (16.5%)	21 (24.7%)	14 (38.9%)	3 (21.4%)	2 (33.3%)	0 (0.0%)	**0.007933[c]**
Nausea/ vomiting	10 (11.9%)	20 (17.4%)	20 (23.5%)	20 (55.6%)	5 (35.7%)	6 (100%)	0 (0.0%)	**0.000[b]**

N= Number of cases with common variables, The Chi-square statistic is significant at the .05 level, b. Likelihood ratio, c. Linear-by-Linear Association.

Table 4: Summary of investigation reports and abnormalities of patients with different comorbidities

Variables		All patients	Comorbidity absent	Comorbidity present	DM	HTN	Heart disease	Bronchial asthma	CKD	CVD	COPD
		N=341	N=84	N=257	N=180	N=177	N=35	N=50	N=30	N=7	N=6
Hemoglobin percentage	Mean	11.87 (±1.8)	12.33	11.71	11.57	11.49	11.21	11.64	9.71	8.48	9.63
	<10 g/dL	24 (7%)	2 (2.4%)	22 (8.6%)	20 (11.1%)	19 (10.7%)	5 (14.3%)	4 (8.0%)	10 (33.3%)	3 (42.9%)	3 (50.0%)
	***P* value**	**N/A**	**0.033173[b]**		**0.001877[a]**	**0.005567[a]**	**0.085275[c]**	**0.764981[c]**	**0.000005[c]**	**0.008938[c]**	**0.005356[c]**
Total count of white	Mean	8301 (±3715)	7620	8564	9103	8642	8395	8009	8262	8590	12500
	≥11000/ mm^3	40 (11.7%)	7 (8.3%)	33 (12.8%)	28 (15.6%)	23 (13.0%)	5 (14.3%)	5 (10.0%)	2 (6.7%)	0 (0.0%)	1 (16.7%)
	***P* value**	**N/A**	**0.265075[a]**		**0.020276[a]**	**0.451049[a]**	**0.582451[c]**	**0.680647[a]**	**0.553886[c]**	**1.000[c]**	**0.529776[c]**
Neutrophil Lymphocyte ratio	Mean	4.53 (±2.79)	3.68	4.87	5.18	4.83	4.65	4.46	4.58	13.50	8.51
	>3	135 (39.6%)	28 (33.3%)	107 (41.6%)	78 (43.3%)	69 (39.0%)	12 (34.3%)	30 (60.0%)	9 (30.0%)	2 (28.6%)	3 (50.0%)
	***P* value**	**N/A**	**0.000857[a]**		**0.001423[a]**	**0.035908[a]**	**0.561155[a]**	**0.006510[a]**	**0.754823[c]**	**0.548063[c]**	**0.552516[c]**
Random blood glucose	Mean	11.7 (±6.1)	8.4	12.6	13.9	12.0	11.7	13.0	11.4	12.9	5.5
	>10mmol/L	70 (20.5%)	24 (28.6%)	46 (17.9%)	25 (13.9%)	31 (17.5%)	4 (11.4%)	4 (8.0%)	3 (10.0%)	0 (0.0%)	2 (33.3%)
	***P* value**	**N/A**	**0.035516[a]**		**0.001330[a]**	**0.152309[a]**	**0.159442[a]**	**0.017588[a]**	**0.134935[a]**	**0.071232[b]**	**0.606756[c]**
C- reactive protein	Mean	55.7 (±47.4)	47.5	58.4	60.5	53.4	43.7	61.1	47.7	79.3	45.5
	>10 mg/L	300 (88.0%)	66 (78.6%)	234 (91.1%)	167 (92.8%)	158 (89.3%)	31 (88.6%)	47 (94.0%)	29 (96.7%)	7 (100%)	6 (100%)
	***P* value**	**N/A**	**0.002266[a]**		**0.003946[a]**	**0.447064[a]**	**1.000[c]**	**0.156298[a]**	**0.078276[b]**	**1.000[c]**	**1.000[c]**
Serum ferritin	Mean	500.8 (±426.9)	394.1	542.1	582.8	495.5	483.5	514.6	519.2	621.2	653.5
	>normal	135 (39.6%)	30 (35.7%)	105 (40.9%)	79 (43.9%)	64 (36.2%)	9 (25.7%)	24 (48.0%)	6 (20.0%)	2 (28.6%)	4 (66.7%)
	***P* value**	**N/A**	**0.015611[a]**		**0.002008[a]**	**0.764863[a]**	**0.680380[a]**	**0.322137[a]**	**1.000[c]**	**0.522419[c]**	**0.045772[b]**
Serum creatinine	Mean	1.75 (±2.49)	1.50	1.83	1.97	1.97	2.99	2.16	5.93	4.61	3.88
	>1.5mg/dL	126 (37%)	23 (27.4%)	103 (40.1%)	78 (43.3%)	76 (42.9%)	20 (57.1%)	19 (38.0%)	23 (76.7%)	4 (57.1%)	3 (50.0%)
	***P* value**	**N/A**	**0.022297[a]**		**0.007666[a]**	**0.017133[a]**	**0.007752[a]**	**0.883487[a]**	**0.000004[a]**	**0.432964[c]**	**0.676705[c]**
Serum ALT	Mean	56 (±71)	66	53	54	55	81	74	35	55	57
	>40U/L	223 (65.4%)	64 (76.2%)	159 (61.9%)	116 (64.4%)	108 (61.0%)	22 (62.9%)	32 (64.0%)	18 (60.0%)	6 (85.7%)	5 (50.0%)
	***P* value**	**N/A**	**0.016593[a]**		**0.696149[a]**	**0.077408[a]**	**0.738910[a]**	**0.822283[a]**	**0.515336[a]**	**0.428989[c]**	**0.668630[c]**
D-dimer	Mean	1.12 (±2.5)	1.01	1.15	1.25	1.11	2.56	1.17	2.22	3.50	7.15
	>0.5µg/mL	186 (54.5%)	48 (57.1%)	138 (53.7%)	107 (59.4%)	93 (52.5%)	25 (71.4%)	20 (40.0%)	26 (86.7%)	7 (100%)	6 (100%)
	***P* value**	**N/A**	**0.581834[a]**		**0.054725[a]**	**0.440267**	**0.034213[a]**	**0.025351[a]**	**0.000216[a]**	**0.017351[c]**	**0.033732[c]**

N= Number of cases with common variables.

Table 5: Relationship between comorbidities and hospital outcome

Variables		All patients	Comorbidity absent	Comorbidity present	DM	HTN	Heart disease	Bronchial asthma	CKD	CVD	COPD
		N=341	N=84	N=257	N=180	N=177	N=35	N=50	N=30	N=7	N=6
Hospital outcome	Alive	253	66 (78.6%)	187 (72.8%)	123 (66.7%)	123 (69.5%)	21 (60.0%)	36 (72.0%)	13 (43.3%)	3 (42.9%)	2 (33.3%)
	Dead	45	5 (6.0%)	40 (15.6%)	36 (20.0%)	33 (18.6%)	12 (34.3%)	7 (14.0%)	16 (53.3%)	3 (42.9%)	4 (66.7%)
	Referred	43	13 (15.5%)	30 (11.7%)	21 (11.7%)	21 (11.9%)	2 (5.7%)	7 (14.0%)	1 (3.3%)	1 (14.3%)	0 (0.0%)
	***P* value**	**N/A**	**0.029794[a]**		**0.000101[a]**	**0.002222[a]**	**0.001101[b]**	**0.815529[a]**	**0.000[b]**	**0.046411[b]**	**0.005480[b]**

N= Number of cases with common variables, The Chi-square statistic is significant at the .05 level, a. Pearson Chi-Square, b. Fisher's Exact Test.

4. DISCUSSION

341 patients who tested positive for COVID-19 in total were included in this retrospective analysis. These inclusion and exclusion criteria were used while using the purposive sampling technique. All subjects with confirmed COVID 19 positivity meet the inclusion criteria. Negative COVID 19 cases serve as an exclusion criterion. The patient's evaluation was based on their medical history, physical examination, investigations (including HRCT), and any in-patient treatments they received. Most of the patients were male which was similar with earlier investigations [8-13]. In earlier studies [8-13], diabetes mellitus was the most prevalent comorbidity, followed by hypertension, bronchial asthma, heart disease, and chronic renal disease. In our study, however, diabetes mellitus was the most prevalent comorbidity. In this study, fever was the most frequent symptom, followed by cough and shortness of breath. These findings were consistent with most other investigations [8-13]. Raised white cell counts, increased neutrophil lymphocyte ratios, elevated CRP, D- dimer, and serum ferritin values were the most prevalent investigative abnormalities found in patients with comorbidities. These findings were also consistent with most other investigations [8-13]. In other trials, the death rate of patients with comorbidities was much greater than those without comorbidities. Similar effects on the hospital outcome were also caused by the presence of comorbidities [8-13]. In this study, individuals with CKD, CVD, COPD, diabetes, hypertension, and heart disease all had considerably higher individual death rates. The entire intervention was carried out in accordance with the principles of human research outlined in the Helsinki Declaration [14] and was carried out in accordance with all applicable laws and the General Data Protection Regulation's rules (GDPR) [15].

Limitation of the Study

This investigation was carried out at a single hospital facility with a small sample size. There is no clearly defined geographic area. It wasn't necessary for every patient in a possible area to attend. Patients could not be monitored for an extended period of time.

5. CONCLUSION & RECOMMENDATION

This study set out to assess the prevalence of SARS CoV-2 in people with diabetes mellitus and see if their prognosis was any different from that of people without the condition. All age groups are affected by the extremely deadly COVID-19 disease, but old age and the presence of much co-morbidity are exceedingly bad for the patient's health. Comorbidities in patients lead to more severe symptoms and worse hospital outcomes. Diabetes mellitus, hypertension, chronic renal disease, ischemic heart disease, and chronic pulmonary disease all play a part in the complications and fatalities associated with COVID-19.

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