COVID – 19 Mortality in Hospitalized Diabetic Patients

Diabetes as a Predictor of in – Hospital Mortality Among Hospitalized Patients with COVID – 19 at a Tertiary Care Hospital

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ABSTRACT

Objective: To compare the outcome of COVID – 19 in patients presenting with diabetes versus non - diabetic population at a tertiary care hospital.

Study Design: Descriptive case series study

Place and Duration of Study: This study was conducted at the COVID – wards of Nishtar Hospital, Multan, from June 2020 to May 2021.

Materials and Methods: A total of 246 COVID – 19 patients of either sex aged 20 – 75 years of age who were PCR confirmed for COVID – 19 were included in our study. These COVID patients were divided in 2 groups i.e. group A and group B. Group A having COVID - 19 patients comprised of diabetic patients and group B also having COVID - 19 patients without diabetes were taken and followed till discharge to ascertain outcome of COVID – 19 and all information were recorded in the proforma. Collected Data was entered into SPSS version 22 and was analyzed through its statistical package. Descriptive statistics was used to analyze the data. Mean ±S.D was calculated. Mortality in both groups was compared with chi – square test at 0.05 level of significance. Effect modifiers like age, gender, obesity, diabetes, hypertension and IHD were controlled by stratification.

Results: This study enrolled a total of 246 COVID – 19 patients, of which 186 (75.6%) were male patients and 60 (24.4%) were female patients. Mean age of these 246 COVID patients was 50.78 ±12.13 years (range; 29 – 74 years). Of these 246 hospitalized patients with COVID, 93 (37.8%) were from rural areas while 153 (62.2%) belonged to urban areas. Poor socioeconomic status was noted in 78 (31.7%) and 168 (68.3%) were from middle income families. Of these 246 patients, 72 (29.3%) were diabetic, 125 (50.8%) were hypertensive and 46 (18.7%) had history of ischemic heart disease. Mean body mass index was 25.32 ± 2.28 kg / m^2 and obesity was noted in 36 (14.6%) of our study cases. Mortality was noted to be 25 (10.2%) in these hospitalized COVID patients, mortality in diabetic patients was 29.2% versus 2.3 % in non – diabetic patients (P < 0.001).

Conclusion: The results of this study have shown that mortality was significantly associated with diabetes as it was statistically significant more prevalent in diabetics than those of non – diabetic corona-virus disease patients. Mortality was also significantly associated in patients with increasing age, hypertension, ischemic heart disease and obesity. The optimal glycemic control in these patients can help to reduce further adverse outcomes such as mortality.

Key Words: Diabetes, Mortality, Morbidity, Corona – virus disease

INTRODUCTION

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Corona Virus Disease – 2019 (COVID) outbreak which has become global public health issue, has badly affected the whole world, since its start in December – 2019 from China in local seafood markets and now the disease has spread all over the world with mortality rates varying from 1 % to as high as 11 % from Italy[1, 2]. Clinical presentation of COVID–19 vary with regards to patients characteristics including asymptomatic, mild to moderate infection of upper respiratory tract to respiratory failure due to severe pneumonia which may lead to death. Mortality rates are being reported from different countries which indicate higher proportions of deaths in patients with different diseases, chronic lung injury, advanced age, male gender and cancers[3–5]. COVID-19 has been proven to be highly contagious and soon after its initial outbreak, no. of patients and

rate of mortality surpassed the numbers of SARS outbreak in 2003. COVID-19 with average incubation period of 5.2 days has very transmissibility rate of 4.02, indicating that each patient will infect approximately 4 persons. Human to human transmission of the virus has been reported through respiratory droplets, body secretions and aerosols transmission has also been documented[6-8]. Majority of the new cases are healthcare workers and close contacts (family members, colleagues, friends) of these index patients which may have symptoms (mild to severe) or may even be asymptomatic [9]. This study opened a new horizon of research. Keeping these in view as COVID-19 is an infectious disease, the relationship needs to be understand for betterment of human being[10-12].

Mortality rates are being reported from different countries which indicate higher proportions of deaths in patients with underlying illnesses such as diabetes, hypertension, coronary heart disease, chronic obstructive pulmonary disease (COPD), asthma, chronic lung injury, advanced age, gender and cancers [9–11]. COVID-19 has badly affected everyone in terms of financial, social, economic and physical aspects have cost more than thirty thousand human lives in Pakistan. It has been reported from different parts of the world that majority of deaths in COVID-19 patients are being reported in diabetic, hypertensive and cardiac patients, particularly in older ages. No such study has been done in our population so far, to explore the role of these co-morbidities in COVID-19 mortalities. Our study will ascertain and anticipate the role of diabetes in disease severity and prognosis and help to protect these vulnerable subsets of our population from adverse events of COVID-19.

MATERIALS AND METHODS

A total of 246 COVID – 19 patients of either sex aged 20 – 75 years of age who were PCR confirmed for COVID – 19 were included in descriptive case series study which was conducted from June 2020 to May 2021. Patients have chronic Kidney disease, CLD, malignancies and clinically positive but PCR negative and patients not willing to be included in the study. Sample size was 246 patients, sample size has been calculated using P=20 % [10] at 95 % CI and 5 % margin of error using Epi – info software of CDC. After approval from the ethical review committee, 246 COVID-19 patients fulfilling the inclusion criteria were selected from COVID wards of Nishtar Hospital Multan. After taking informed written consent after describing them objectives of this study, ensuring them confidentiality of the information given to us in this study and fact that there is not any risk involved to the patient while taking part in this study. These COVID patients were divided in 2 groups i.e. group A and group B. Group A having COVID - 19 patients comprised of diabetic patients and group B also having

COVID-19 patients without diabetes were taken and followed till discharge to ascertain outcome of COVID-19 and all information was recorded in the proforma. Collected Data was entered into SPSS version 22 and was analyzed through its statistical package. Descriptive statistics was used to analyze the data. Mean ±S.D. was calculated for age of the patients, duration of stay and BMI. Frequencies and percentages were calculated for qualitative variables like gender, age groups, obesity, mortality and residential status. Mortality in both groups was compared with chi – square test at 0.05 level of significance. Effect modifiers like age, gender, obesity, diabetes, hypertension, obesity and IHD were controlled by stratification and their effect on outcome was seen applying Chi square test taken $P \leq 0.05$ as significant.

RESULTS

Table No.1: Stratification of outcome with regards to study variables

Study Variables	Mortality		P value
	Yes	No	
Gender			
Male (n=186)	17	169	0.336
Female (n=60)	08	52	
Age groups			
Up to 50 Years (n=125)	01	124	< 0.001
> 50 Years (n=121)	24	97	
Residential status			
Rural (n=93)	07	86	0.385
Urban (n=153)	18	135	
Socioeconomic status			
Poor (n=78)	07	71	0.822
Middle Income (n=168)	18	150	
Hypertension			
Yes (n=125)	18	107	0.025
No (n=121)	07	114	
Obesity			
Yes (n=36)	14	22	< 0.001
No (n=210)	11	199	
Ischemic Heart Disease			
Yes (n=46)	18	28	< 0.001
No (n=200)	07	193	
Diabetes			
Yes (n=72)	21	51	< 0.001
No (n=174)	04	170	

This study enrolled a total of 246 COVID – 19 patients, of which 186 (75.6%) were male patients and 60 (24.4%) were female patients. Mean age of these 246 COVID patients was 50.78 ±12.13 years (range; 29 – 74 years). Of these 246 hospitalized patients with COVID, 93 (37.8%) were from rural areas while 153

(62.2%) belonged to urban areas. Poor socioeconomic status was noted in 78 (31.7%) and 168 (68.3%) were from middle income families. Of these 246 patients, 72 (29.3%) were diabetic, 125 (50.8%) were hypertensive and 46 (18.7%) had history of ischemic heart disease. Mean body mass index was 25.32 ± 2.28 kg / m^2 and obesity was noted in 36 (14.6%) of our study cases. Mortality was noted to be25 (10.2%) in these hospitalized COVID patients, mortality in diabetic patients was 29.2% versus 2.3 % in non – diabetic patients (P < 0.001).

DISCUSSION

Different factors have been implicated with increased risk of mortalities associated with coronavirus disease which may include; male gender, increasing age, diabetes, hypertension, increased body mass index, ischemic heart disease, malignancy and chronic obstructive pulmonary disease (COPD). Available studies have revealed that hyperglycemia among COVID patients is implicated in different clinical issues such as high ICU admissions, increased rate of mechanical ventilation and significant rise in inflammatory markers. It has also been reported that COVID patients with diabetes have 2 to 4 times increased rate of mortality as well as disease severity as compared with non – diabetic COVID patient, primarily due to compromised immune response against viral infections. Hyperglycemia has been associated with poor intracellular degradation of pathogens, phagocytosis and neutrophil chemotaxis which ultimately improves binding affinity of viruses while entering cells [13,14]. This phenomenon affects to decrease viral clearance in human bodies. Furthermore, hyperglycemia has also been shown to induce glycosylation of protein molecules which alters composition of complements and hence it leads to more susceptibility for viral inflammation and damage. Hence, integrated team effort is required among diabetic COVID patients for minimizing risk of medical complications and deaths [15].

This study enrolled a total of 246 COVID – 19 patients, of which 186 (75.6%) were male patients and 60 (24.4%) were female patients. A study conducted in Kuwait by Al – Sabah et al [13] has also reported 81.6 % male patients hospitalized due to COVID, similar to our results. Kalligeros et al [16] from USA has also reported 62 % male patients were hospitalized due to COVID, similar to our results. Warraich et al [17] from Hyderabad has also reported 68 % male patients hospitalized for COVID, similar to our results. Sajjad et al [18] has reported 58 % male patients hospitalized due to COVID which is similar to our results. Bari et al [19] from Rawalpindi has also reported 58 % male patients hospitalized for COVID, similar to our results.

Mean age of these 246 COVID patients was 50.78 ±12.13 years (range; 29 – 74 years). Of these 246

hospitalized patients with COVID. A study conducted in Kuwait by Al – Sabah et al [13] has also reported 40.5 years mean age of the patients hospitalized due to COVID, similar to our results. Kalligeros et al [16] from USA has also reported 57 years mean age of the patients which were hospitalized due to COVID, similar to our results. Warraich et al [17] from Hyderabad has also reported 53.3 ± 8 years mean age of the hospitalized patients due to COVID, similar to our results. Sajjad et al [18] has reported 68 ± 12 years mean age of the patients hospitalized due to COVID which is similar to our results. Bari et al [19] from Rawalpindi has also reported 47.81 ± 8.71 years mean age of the patients hospitalized for COVID, similar to our results.

Of these 246 patients, 72 (29.3%) were diabetic, 125 (50.8%) were hypertensive and 46 (18.7%) had history of ischemic heart disease. A study conducted in Kuwait by Al – Sabah et al [13] has also reported 23.4 % diabetic and 20.4 % hypertensive patients hospitalized due to COVID, similar to our results. Kalligeros et al [16] from USA has also reported 36.8 % diabetes, 64 % hypertension and 24.2 % IHD in patients who were hospitalized due to COVID, similar to our results. Sajjad et al [18] has reported 47 % hypertension in patients hospitalized due to COVID which is similar to our results.

Mean body mass index was 25.32 ± 2.28 kg / m^2 and obesity was noted in 36 (14.6%) of our study cases. A study conducted in Kuwait by Al – Sabah et al [13] has also reported 13.5% obese patients hospitalized due to COVID, similar to our results. Kalligeros et al [16] from USA has reported 34 % obese patients which were hospitalized due to COVID, different from our findings. The reason for this difference is due to higher prevalence obesity among American population as compared with Asian population.

Mortality was noted to be25 (10.2%) in these hospitalized COVID patients, mortality in diabetic patients was 29.2% versus 2.3 % in non – diabetic patients (P < 0.001). Warraich et al [17] from Hyderabad has also reported 8.8 % mortality in hospitalized patients. Bari et al [19] from Rawalpindi has reported 18 % mortality among patients hospitalized for COVID, slightly higher than our results.

CONCLUSION

The results of this study have shown that mortality was significantly associated with diabetes as it was statistically significant more prevalent in diabetics than those of non – diabetic corona-virus disease patients. Mortality was also significantly associated in patients with increasing age, hypertension, ischemic heart disease and obesity. The optimal glycemic control in these patients can help to reduce further adverse outcomes such as mortality.

Author's Contribution:

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Conflict of Interest: The study has no conflict of interest to declare by any author.

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