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ORIGINAL ARTICLE

Comparison of the Covid-19 Infection Severity in Known Diabetic Patients vs. Known Hypertensive Patients Admitted in A Tertiary Care Hospital in Peshawar

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ABSTRACT

Objectives: To compare the severity of COVID-19 infection among known diabetic and known hypertensive patients who were admitted in a tertiary care hospital in Peshawar, Pakistan.

Methodology: A cross-sectional clinical study was conducted for comparison in diabetic vs hypertensive patients in the department of medicine of Lady Reading Hospital, Peshawar during the period from April-June 2021. All the patients were admitted in COVID ward and COVID ICU, showed their full consent and active participation in this study. Along with patient's ECG and Echo report, a questionnaire based on Canadian categorization employed for angina grading and NYHA categorization to classify shortness of breath was used.

Results: The mean age group taken for the sample was (n=140) with maximum age of 84 years. Majority were 102(72.9%) males and females were 38(27.1%). According to laboratory tests performed on patients of COVID-19 about 48(34.4%) of patients showed positive diabetes mellitus findings. Also, patients with positive hypertension found were 67(47.9%). The average stays of patients, at the hospital, was 15-40 days. About 58.3% of mortality was noted in patients with diabetes mellitus, a bulk of patients expired were from ICU-COVID-UNIT and 55.2% was the mortality rate in patients with positive hypertension according to our clinical findings and assessment. About 7.9% of COVID inpatients had cardiac infraction with severe condition and such patients who faced congestive heart failure expired. Almost 56(40%) of the patients were found with severe condition and 63(45%) were diagnosed with moderate condition during their stay at hospital.

Conclusion: Regardless of age, gender and disease the death rate evaluated was 50%. Moreover, in diabetics and hypertensive patients there should be raised awareness for preventing the severity of disease.

Keywords: COVID-19, Infection severity, Diabetic patients, Hypertensive patients, Tertiary care hospital, Pakistan

INTRODUCTION

COVID-19 which first emerged as typical lung fever by the end of December 2019 and proclaimed as epidemic by world health organization (WHO) has been prompted swiftly worldwide, and had created a global impact since it firstly affected the city of China, Wuhan which resulted in serious health consequences in over more than 30 countries worldwide[1]. COVID-19 pneumonia has a higher mortality rate than other viral pneumonias. Following the outbreak, there was an unprecedented demand for intensive care services due to the high number of patients requiring ventilator support[2]. By nearly affecting every country, As of September 18, 2022, the WHO reported confirmed cases of COVID-19 609 million and over 6.5 million deaths worldwide.

The foremost source which caused this scathing acute respiratory disorder as SARS-COV-2. The virus produces severe bacteremia that can progress to sepsis syndrome of respiratory distress (ARDS). The disease has been then labelled as COVID-19 (third discovered mortal beta-coronavirus) by the World Health Organization[3]. Even though acute respiratory malfunction and diffuse alveolar destruction are the primary diagnostic features of this virus, the involvement of all major internal organs is also concerning. Aside from the lungs, the latest data indicate that the pancreas is the most vulnerable organ in these patients, with evidence of diabetes and hypertension in almost 50% of mortalities[4].

SARS-CoV-2, according to Francesco Rubino, causes ketosis-prone high blood sugar levels by binding to its cell membrane entry ACE-2 receptor sites, which are prevalent in pancreatic beta cells and adipose fat cells, causing abnormal glucose metabolism and β cells obliteration. Diabetes mellitus (DM) is ended up causing by this framework in SARS-CoV2 patients[4]. Furthermore, SARS-CoV-2 could end up aggravating an immune mediated invasion on pancreas islet cells, imitating the pathogenic mechanisms of type 1 diabetes. Typical modes of transmission for SARS-CoV, MERS-CoV, and contagious viral influenza usually involve respiratory droplets, which seem to be most likely to come about with SARS-CoV-2 also. COVID-19 has been indeed discovered to have a greater level of disease transmission and global epidemic threat than the preceding SARS-CoV, as its potent reproductive number (2.9) is approximated to be extremely high at this preliminary phase than the notified effective 's reproductive number of SARS (1.77)[6].The existence of DM risk factors as well as elevated HbA1C in several patients who are suffering from COVID-19 demonstrate that illnesses unmasking the existing newly diagnosed DM rather than causing the new onset of disease[5].

With one-third of the inhabitants living in south Asia below the poverty Pakistan is considered as a developing country. The health-care approach in Pakistan is already frail and overburdened. COVID-19 supplemented this. A COVID-19 diagnosis was associated with a social stigma. To evade from being diagnosed, patients would frequently conceal etiological possible risk factors and even clinical manifestations of the disease. Several patients, even those with serious diseases, would not attend the hospital until it was too late, and families would keep them at household until it was too late. These findings back up the theory that COVID-19 had a diabetogenic effect in addition to the well-known stress response and hypertension associated with severe illness[7].

MATERIAL AND METHODS

This retrospective clinical research was conducted at a newly raised COVID-19 ward based in Lady Reading Hospital in Peshawar, Pakistan. From April to June 2021, hospital records of almost 140 patients were compiled who were confirmed cases of positive COVID-19.

This hospital is a 1200 bed medical hospital that serves people who present with illness from all over the Punjab. Because there were no international or national standards for managing drastically diseased COVID-19 patients in the initial days of the

global epidemic, the research protocol was authorized based on WHO interim guidance[8]. An acknowledged COVID-19 case was identified by a positive real-time RT-PCR, ECG and Echo report.

Study Design: The population group was chosen based on the following selection criteria: a certain patient addressing with symptomatic onset of fever, cough, headaches, or body aches as well as with high blood sugar level and Blood pressure was included in the study. The clinical assessment was based on the patient's demographic data, clinical manifestations, co-morbidities, and X-ray research results. Patients of all age group, gender, co-morbidities, ventilator status, length of stay (LOS), and consequences in terms of staying alive or dead were all study variables.

Data Collection and Procedure: Patients were approached, and the study's goal was explained. Those who agreed to participate provided written informed consent. During hospitalization, the patients' demographic characteristics (age and gender), medical data (symptoms, comorbidities, treatments, complexities, and outcomes), and laboratory assessments were collected. The Kidney Disease: Improving Global Outcomes definition was used to identify AKI. The clinical outcomes (discharges, mortality, and length of stay) were tracked until June 30, 2020, when the study ended. Mortality is defined in this manuscript as "the death of the patient from the date of inclusion in the study until the end of the observation period."

Mild cases were based on patients with an unsophisticated upper respiratory tract infection who have lenient symptoms such as fever, cough, sore throat, nasal congestion, headache, and no indications of breathlessness or hypoxia (normal saturation). Patients with moderate cases had "Pneumonia with no signs of severe disease." Patients having Pneumonia, Acute Respiratory Distress Syndrome, or both" were considered severe cases[9].

Diagnostic Methods: Although being much insensitive than CT chest, chest radiography is considered the initial line imaging technique utilized for COVID-19 patients, with handheld chest radiography modules in use for easiness of disinfection and eradicating the necessity for transferring patients[10]. The majority of radiological literature concerns for the role of chest CT and its demonstration in COVID-19. According to some Chinese studies, CT has a diagnostic accuracy relatively higher than that of the preliminary RT-PCR swab test10, but due to contamination, prevention and control issues, decontamination, and a lack of CT attainability in some regions of the world, portable chest radiography is the most commonly used imaging method for the recognition and follow-up of COVID-19 lung indications[11]. According to the American College of Radiology, CT decontamination required after scanning COVID-19 patients may cause radiological facilities to be disrupted, and portable radiography may be recommended to decrease the cross contamination risk[12].

All research participants had their ECGs and echocardiograms done within the same day. With the patient at rest in a supine position, a 12 lead ECG has been documented at a paper rate of 25 mm/s and a calibration of 1 mV/10 mm[13].

RESULTS

From April to June 2021, out of all cases of COVID-19 an average of total 140 patients were included in the data analysis. Out of mean total 140 patients 102(72.9%) were male and 38(27.1%) were females. Almost all ages of people were included in this data analysis and the mortality rate among these patients irrespective of age and gender was equal.

SPSS 23.0 was used to analyze the data. Variables are depicted in the form of percentages by applying filters to analyze the data. The survivors' and no survivors' frequency range of demographic variables, clinical manifestations, and comorbidities were described and compared.

Table 1 shows that demographic analysis which we concluded during our research on patients with diabetes and hypertension. In this table it shows some of the features of employment status, gender, age range and their average monthly income showing their status relation to disease.

Table 1: Demographical data Analysis of Patients

Variable	No. of Patients (n= 140)	Percentages %
Gender	Male Female	72.9% 27.1%
Age Range	20-40 41-60 61-84	14.3% 57.1% 28.6%
Average Monthly Income	5k-30k 31k-60k 61k-90k 91k-120k Did Not Mentioned	50.7% 13.6% 2.9% 0.7% 32.1%
Employment Status	Un-Employed Self-Employed Retired House Wives Govt. Employee Private Jobs Other Jobs Did not Specified	30.7% 3.6% 12.1% 22.9% 12.1% 5% 3.6% 10%
Patients with Diabetes Mellitus	Positive= 48 Negative= 92	34.3% 65.7%
Patients with Hypertension	Positive= 67 Negative= 73	47.9% 52.1%

Table 2: Clinical Findings of the Patients (n= 140)

Final Outcome	Alive = 70 Dead = 70	50% 50%
Clinical Condition	Critical = 11 Severe = 56 Moderate = 63 No record = 10	7.9% 40% 45% 7%

Other reported symptoms and disease were Body Aches, Chest Infection, Sinusitis, Orthopedic, ex TB, CVA, Post Splenectomy Cholecystectomy, HEC, TVE and CAD.

Table 3: Severity of Infection among COVID-19 Patients (Diabetic vs Hypertensive)

Infection Symptoms	Diabetes Mellitus (Positive n= 48)	Hypertension (Positive n= 67)
Asymptomatic	27.1%↑	22.4%
Cough Dry Productive	91.7%	94%↑
Sore throat	43.8%↑	38.8%
Fever	89.6%↑	86.6%
Chills or rigors	27.1%↑	20.9%
Shortness of breath	95.8%↑	95.5%
Fatigue	56.3%↑	44.8%
Malaise	8.3%	14.9%↑
Myalgia	20.8%↑	17.9%
Arthralgia	16.7%↑	14.9%
Headache	22.9%↑	17.9%
Diarrhea	4.2%	4.5%↑
Nausea	16.7%↑	11.9%
Vomiting	4.2%	7.5%↑
Loss of smell	68.8%↑	67.2%
Loss of taste	66.7%↑	64.2%
Acute Respiratory Distress Syndrome	70.8%↑	67.2%
Coronary Heart Disease	50%	50.7%↑
Chronic Kidney Disease	45.8%	46.3%↑
Chronic Liver Disease	22.9%	23.9%↑

Table 3 shows that the severity of infections symptoms were more severe and higher among known diabetic patients as compared to known hypertensive patients. It can also be observed that few symptoms like dry cough, Malaise, diarrhea, vomiting, heart-kidney-liver diseases were higher among hypertensive

patients. But overall the severity and complexity of infections symptoms were more common among diabetic patients.

Table 4: Mortality Rate Percentages Comparison between DM and HTN Patients

Diabetes Mellitus (Positive n= 48)	Hypertension (Positive n= 67)
58.3%	55.2%

Table 4 presents the mortality rate among the patients (n= 140). As described in table 3, the severity of symptoms associated with COVID-19 infection was observed and recorded higher among the patients of DM as compared to HTN patients. So, Table 4 also validates the findings that the higher severity and complexity of COVID-19 symptoms among DM is the main reason for mortality among the patients.

DISCUSSION

The principal aim of our research was to scrutinize the severity of infection among COVID-19 patients who are known as Diabetic and hypertension patients and compare the clinical characteristics and associated factors of Diabetic and hypertension patients[14]. The research and clinical assessment of our study shows that mortality rate in 70 patients was (50%). All of the results included in our data analysis were based on observations and clinical results based on ECG and ECHO reports. Patients of Diabetes Mellitus with Positive ratio were 48 and patients of positive Hypertension were 67. The asymptomatic ratio was 27.1% in diabetic patients and 22.4% in hypertensive patients. Cough Dry Production in diabetics recorded was 91.7% and 94% in hypertensive patients. Sore throat ratio was 43.8% in most of the diabetic patients and 38.8% in hypertensive patients. Recorded ratio of Fever was 89.6% in diabetics and in hypertensive patients it was concluded on assessment as 86.6%. also, the Shortness of breath showed a ratio of 95.8% in diabetics and 95.5% in patients with positive hypertension. The proportion of Headache (22.9% DM^{+}, 17.9% HTN^{+}), Diarrhea (4.2% DM^{+}, 4.5% HTN^{+}) and Nausea (16.7% DM^{+}, 11.9% $HTN^{+)}$ was recorded in most of the patients who were diagnosed with initial stage of COVID-19. Some other fractions were documented in our clinical assessment for the comparison of hypertension and diabetics in COVID patients.

CONCLUSION

The research and clinical assessment of our study shows that mortality rate in 70 patients was (50%) regardless of their age, gender or their clinical condition. Hence, this shows that further and more advanced awareness should be created by health care practitioners among people living in low areas in order to prevent the highly increasing death rate due to COVID-19. There should be more advanced studies and research should be concluded by medical research workers in order to understand the better mechanism of progression of COVID in patients with diabetes and hypertension.

Study Limitations: The following are the study's limitations: first, we were unable to evaluate the influence of medical infrastructure and distinctive treatment regimens on survival rates. Second, because the study was only conducted in one center, the findings cannot be generalized to the entire population. As a result, prospective cohort study studies are suggested.

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Conflict of Interest: The authors of this article declared no nepotism regarding this research and publication of this manuscript.

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