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ORIGINAL ARTICLE

In Patients with Covid-19, The Association of Diabetes Melltus and Impaired Glucose Tolerance

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ABSTRACT

Objective: Patients with COVID-19 are being studied to assess the prevalence of diabetes mellitus and decreased glucose tolerance.

Study Design: Cross-sectional study

Place and Duration: THQ hospital Jaranwala, Punjab medical college Faisalabad. Dec 2020-Nov 2021

Methods: In this research, one hundred and sixty individuals, both males and females, who had coronavirus illness, were included. The ages of the patients varied from 20 to 75 years. Following the receipt of informed written consent, we gathered extensive demographic information on all of the enrolled patients, including their age, gender, BMI, educational achievement, and location of residence, as well as their medications. The blood of all of the patients was tested for corona disease using the RT-PCR method. The 75-g oral glucose tolerance test was performed after screening positive participants (fasting capillary glucose >100 mg/dl and 200 mg/dl) and each sixth consecutive negative subject (fasting capillary glucose 100 mg/dl) for a total of seven consecutive days. For the purpose of data analysis, the SPSS 24.0 programme was used.

Results: Patients included in the study were on average 62.8±10.35 years old, with a BMI of 30.10±17.35kg/m^2. More over half of the people in the study were male 100 (62.5%), while the other were 60 (37.5%) female. Patients were illiterate in the majority of cases. Hypertension, hyperlipidemia, chronic renal disease, and coronary artery disease were the most prevalent co-morbidities. Diabetes mellitus was found in 56.3 % of the individuals studied, with the vast majority of cases being pre-existing. Impaired glucose tolerance was seen in 40% of the instances in which pancreatic cancer was the most common. Intubation was used in 37 (23.1%) studied. There were a total of 22 (13.8 %) deaths in this study.

Conclusion: Covid-19 was discovered to be more common in persons with diabetes and impaired glucose metabolism. Another sign of primary infection that was previously misunderstood has been connected to an abnormality in glucose metabolism. To get to the bottom of the disease's pathogenesis, researchers need to look into how SARS-CoV-2 impacts glucose metabolism.

Keywords: Mortality, IGT, Covid-19, Co-morbidities , DM,

INTRODUCTION

SARS-CoV-2, the new coronavirus that causes coronavirus disease 2019 (COVID-19), was initially identified in Wuhan, China, in December 2019 and has since spread globally. The World Health Organization's COVID-19 dashboard shows 44,351,506 confirmed cases of COVID-19, including 1,171,255 fatalities, as of October 29, 2020.. COVID-19's mortality rate has been calculated at 0.5–1.0%. [1-3] From 1 March to 30 May 2020, there were 122,300 more fatalities in the United States, of which COVID-19 was officially blamed for 95,235 (or 79%). [4] It is important to stress that fatalities from COVID-19 and seasonal influenza are not the same, since they do not represent front-line clinical circumstances in the same manner. For example, in places affected by the COVID-19 epidemic, resources such as ventilators and intensive care units (ICUs) are in limited supply. [5] People with diabetes are becoming more numerous as the population becomes older, urbanisation increases and obesity and inactivity rise [6]. Africa has a dearth of epidemiological studies examining the prevalence of non-communicable illnesses, thus additional research is required. Diabetes prevalence and prevalence among diabetics must be accurately estimated for rational planning and effective resource allocation. [7]

In December, the first SARS-CoV-2-associated atypical pneumonia cases were found. WHO designated coronavirus disease 2019 (COVID-19) a pandemic on March 11th, 2020 owing to the virus' rapid spread around the globe. As a result of COVID-19's wide variety of clinical manifestations, the disease may cause symptoms ranging from mild upper respiratory tract illness to respiratory collapse and mortality, necessitating hospitalisation. The SARS-CoV-2 virus is one of the most prevalent causes of severe acute respiratory syndrome (SARS) in humans, with 82 percent similarity to the human SARS virus and a lipid bilayer-encased envelope of proteins (SARS). [8]

According to the World Health Organization (WHO), around 65,666,000 persons worldwide were diagnosed with either type 1 or type 2 diabetes in 2016. According to data collected from 187 WHO member nations, diabetes mellitus is now the eighth major cause of disability-adjusted life years (DALYs), up from the fifteenth position in the last DALY report from 2000 [9]. SARS-CoV-2 is more likely to infect diabetics because of the disease's tendency to increase the chance of developing higher symptoms or infection rates. The first thing to know is that diabetics are more vulnerable to infectious microorganisms, and this is true for both DM1 and DM2 patients [10]. Second, imagine that SARS-CoV-2 is spread to diabetic patients and they get sick. A severe form of COVID-19 is thus more likely in diabetic individuals, who have been shown to have a reduced viral clearance rate and a greater pathogen affinity for cellular binding [11]. Angiotensin-converting enzyme 2 (ACE2) receptor number may be increased in organs such as the liver, resulting to a greater affinity for SARS-CoV-2 since the stated receptor is shown to be responsible for the viral binding [12].

An assessment of the incidence of diabetes and impaired glucose tolerance in patients with coronavirus infection is the major focus of this population-based study.

MATERIAL AND METHODS

This cross-sectional study was conducted at THQ hospital Jaranwala, Punjab medical college Faisalabad and comprised of 160patients f both genders had COVID-19 infection. We gathered extensive demographic information on all enrolled patients, including age, gender, BMI, level of education, and location of residence, after getting informed written consent. In this research, pregnant women and patients who did not sign a formal permission form were excluded.

Patients were between the ages of 20 and 75. To quickly evaluate the fasting blood glucose content in capillary capillary blood, the glucose oxidase approach was utilised with a portable electronic blood glucose monitor. People with a fasting capillary glycemia of 100 mg/dl or above (positive screening test) were tested for capillary glucose two hours following an oral glucose tolerance test (second phase of the study). Every sixth participant

who tested negative (FCG 100 mg/dl) on the initial screening was given a glucose load test. If a patient had previously been diagnosed with diabetes or had a blood glucose level of 200 mg/dl or above after a fast or two-hour capillary glycemia test, diabetes was assumed to be present. Impaired glucose tolerance (IGT) was defined as a two-hour capillary glycemia below 140 mg/dl but more than 200 mg/dl, whereas an FCG of less than 140 mg/dl was considered normal glucose tolerance. People with hypertension had a systolic blood pressure (SBP) more than 140 mmHg and a diastolic blood pressure (DBP) less than 90 mmHg. Obesity was defined as a body mass index (BMI) more than or equal to 25, while overweight was defined as a BMI of 18.5 to 24.9. The data were analyzed using SPSS 24.0.

RESULTS

Patients included in the study were on average 62.8±10.35 years old, with a BMI of 30.10±17.35 kg/m^2. More over half of the people in the study were male 100 (62.5%), while the other were 60 (37.5%) female. Patients were illiterate in the majority of cases 95 (59.4%). We found 90 (56.3%) cases had rural residency. (table 1)

Table 1: Baseline characteristics of enrolled cases

Variables	Frequency	Percentage
Mean age (years)	62.8±10.35	
Mean BMI (kg/m^2)	30.10±17.	
Gender		
Male	100	62.5
Female	60	37.5
Education Level		
Literate	65	40.6
Illiterate	95	59.4
Residency		
Rural	90	56.3
Urban	70	43.7

Hypertension, hyperlipidemia, chronic renal disease, and coronary artery disease were the most prevalent co-morbidities.(Table 2)

Table 2: Comorbidities among enrolled cases

Comorbidities	Frequency	Percentage
hypertension	70	43.8
hyperlipidemia	40	25
chronic renal disease	30	18.8
artery disease	20	12.5

Table 3: Frequency of Impaired glucose tolerance and diabetes mellitus

Variables	Frequency	Percentage
DM		
Yes	90	56.3
No	70	47.7
IGT		
Yes	64	40
No	96	60

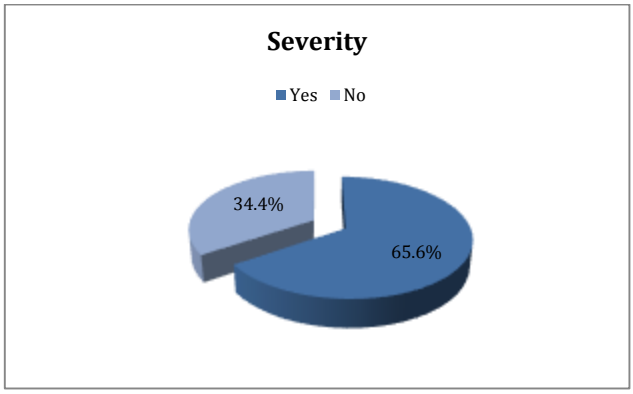

Figure 1: Disease severity among cases

Diabetes mellitus was found in 56.3 % of the individuals studied, with the vast majority of cases being pre-existing. Impaired glucose tolerance was seen in 40% of the instances in which pancreatic cancer was the most common.(table 3)

Severity of disease found among 105 (65.6%) cases among all patients.(fig 1)

Among 92 cases of DM, mostly were obese or overweight had BMI >25kg/m^2. Pancreatic cancer among IGT cases were found among 40 cases.(table 3)

Table 3: Type of patients among DM and IGT cases

Variables	Frequency	Percentage
DM >30kg/m^2		
Yes	83	90.2
No	9	9.8
IGT (Pancreatic Cancer)		
Yes	40	62.5
No	24	37.5

Intubation was used in 37 (23.1%) studied. There were a total of 22 (13.8 %) deaths in this study.(fig 2)

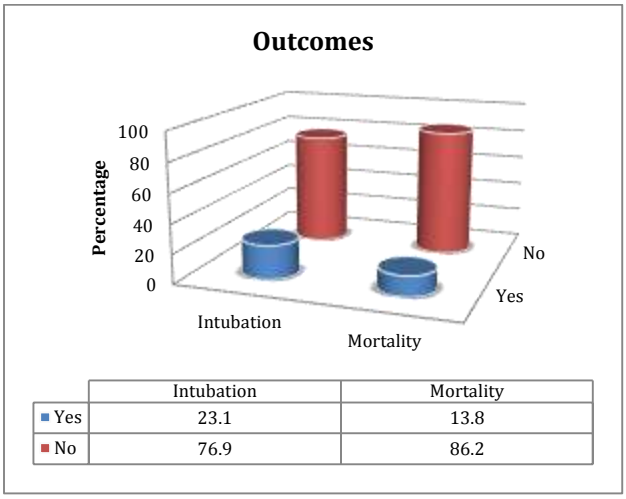

Figure 2: Intubation and frequency of mortality

DISCUSSION

It is necessary to identify risk factors for severe Covid-19 infection in SARS-2-CoV patients in order to inform therapeutic decisions concerning patient care. First-person experiences from countries impacted by the outbreak revealed a significant association between older age and increased mortality risk. [13] It has been shown that patients with co-morbid disorders such as hypertension, obesity, and diabetes were at a greater risk of getting severe Covid-19 than those who did not have these conditions. The findings of this research will be very useful in managing the clinical course of Covid-19 in critically ill patients as well as in advancing our understanding of the disease's origin, among other things.[14]

In current study 160 patients of coronavirus disease with mean age 62.8±10.35 were included. There were 70 (60.9%) male patients and 45 (38.1%) females. More over half of the people in the study were male 100 (62.5%), while the other were 60 (37.5%) female. Patients were illiterate in the majority of cases 95 (59.4%). We found 90 (56.3%) cases had rural residency. Previous researches showed resemblance to our study.[15,16] Hypertension, hyperlipidemia, chronic renal disease, and coronary artery disease were the most prevalent co-morbidities. When diabetic individuals have elevated glucose levels, COVID-19 has an early impact on them, which is a risk factor. As a consequence of having a high glucose level, the condition of the pancreas may worsen. According to a number of independent investigations, the

risk of SARS-CoV-2 infection in diabetics and non-diabetics varies markedly. In present study diabetes mellitus was found in 56.3 % of the individuals studied, with the vast majority of cases being pre-existing. Impaired glucose tolerance was seen in 40% of the instances in which pancreatic cancer was the most common. In their study, the researchers discovered that diabetics had a 79 percent higher chance of developing heart disease than individuals who did not have diabetes.[17,18]

Severity of disease found among 105 (65.6%) cases among all patients. This group's development of severe Covid-19 seems to be unrelated to changes in glucose metabolism or host immunity. Covid-19 patients have not been diagnosed with AIDS or lupus-related immune dysregulation illnesses to yet. Covid-19 lymphoma patients have not been found to be presently active. There is a correlation between abnormalities in glucose metabolism and SARS-CoV-2 infection, as shown by these data. The majority of the 92 diabetic patients had a body mass index (BMI) more than 25 kg/m2. In 40 instances with IGT, pancreatic cancer was discovered. Diabetes affected more than half of the Covid-19 patients who were in the most critical condition, with a mean body mass index (BMI) of more than 30 and elevated blood glucose levels in the majority. [19]

Intubation was used in 37 (23.1%) studied. There were a total of 22 (13.8 %) deaths in this study. Diabetes patients with inadequate glycemic control are more likely to develop COVID-19 and die. Diabetes patients with COVID-19 and an elevated HbA1c level (more than or equal to 86 mmol/mol) have an increased risk of mortality [20]. Patients with hyperglycemic diseases had a mortality rate of 41.7 percent, according to a retrospective study. More COVID-19 patients died in the hospital when they had poor glycemic control or hyperglycemia [21]. Diabetic ketoacidosis or hyperglycemia may quickly lead to death in those with severe COVID-19 disease. When patients stop using glucose-lowering medications, they put themselves at greater risk of contracting SARS, which might exacerbate their metabolic syndrome..

CONCLUSION

Covid-19 was discovered to be more common in persons with diabetes and impaired glucose metabolism. Another sign of primary infection that was previously misunderstood has been connected to an abnormality in glucose metabolism. To get to the bottom of the disease's pathogenesis, researchers need to look into how SARS-CoV-2 impacts glucose metabolism.

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