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EVALUATION OF THE RISK FACTORS FOR DISEASE PROGRESSION IN COVID-19 PATIENTS

General Medicine

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ABSTRACT

Introduction: After the first case of corona virus disease (COVID-19) in Wuhan, China in late december,2019, the severe acute respiratory syndrome corona virus -2 (SARS-CoV-2) has spread 200 countries in about three months. WHO declared the outbreak as pandemic in march,2020. Over 80% of COVID-19 cases have mild symptoms, however 10-20% of COVID-19 cases proceed to severe disease. It is better to evaluate the risk factors, which are associated with the severity of the disease in COVID-19 patients. **AIMS AND OBJECTIVES:** To study the risk factors, which are associated with disease progression in COVID-19 patients. **MATERIALS AND METHODS:** *Inclusion Criteria:* Patients who are positive for COVID-19 by RTPCR test, COVID-19 patients who require oxygen supplementation and ICU admission. *Exclusion Criteria:* Asymptomatic COVID-19 patients. **RESULTS:** In out study 50 patients of COVID – 19 were taken, who had severe disease. In this study commonest risk factor found was age 60 years which was found in 27 patients (54%). The other common risk factors were diabetes mellitus (40%), hypertension (36%) and obesity (20%). **CONCLUSION:** In our study we found commonest risk factors for disease progression in COVID-19 patients were old age (60 years), diabetes mellitus, hypertension & obesity. To prevent morbidity and mortality in COVID-19 patients with risk factors these patients should be admitted in tertiary care hospital where there are facilities of ICU and frequent monitoring by health care professionals.

KEYWORDS

COVID-19; SARS-CoV-2; risk factors; RTPCR test.z

INTRODUCTION:

After the first case of corona virus disease (COVID-19) in Wuhan, China in December,2019, the severe acute respiratory syndrome corona virus-2 (SARS-CoV-2) has spread to over 200 countries in about three months. On March 11th, 2020, the World Health Organization (WHO) declared the outbreak as pandemic[1,2,3]. The estimated case fatality rate for 2019-n CoV is around 3.5%, which is similar to that of Spanish Influenza (2-3%) and much higher than that of seasonal influenza (0.1%)[4]. Over 80% of COVID-19 cases have mild symptoms, however, 10-20% COVID-19 cases proceed to a severe disease[5].

The identification of risk factors associated with the aggravation of patient symptoms from asymptomatic – mild to severe is essential for providing efficient and appropriate management to patients with COVID-19. Most studies to date have investigated risk factors of mortality in patients with COVID-19[6,7,8]. Older age and history of Coronary Artery Disease were reported to increase the risk of death from COVID-19.

Major risk factors for severe disease are (according to Government of India, Ministry of Health and Family Welfare, Directorate General of Health Services, EMR Division):

- Age 60 years
- Diabetes Mellitus
- Hypertension
- Cardiac disease
- Chronic lung disease
- Cerebrovascular disease (CVA)
- Chronic Kidney disease (CKD)
- Immuno-suppression and Cancer conditions

RESULTS:

In our study 50 patients were taken who were positive for corona by RTPCR test. We took severely ill patients. Severity is based on patients who require oxygen supplementation and who were admitted in COVID-19 ICU.

Table 1: Association of risk factors with severe COVID-19 patients

S.No.	Risk factor	No. of Patients	Percentage
1	Age 60 years	27	54
2	Diabetes mellitus	20	40
3	Hypertension	18	36
4	Obesity	10	20
5	Old CVA	2	4
6	Coronary artery disease	1	2
7	CKD	1	2

In this study the commonest risk factor found was age 60 years, which was found in 27 patients (54%). The second commonest risk factor was Diabetes mellitus which was found in 20 patients (40%). The next risk factor was hypertension, which was found in 18 patients (36%). Obesity was found as a risk factor in 10 patients (20%). Other risk factors were old CVA, Coronary artery disease and CKD, which were found in 4%, 2%, 2% patients respectively.

DISCUSSION:

COVID-19 presents as asymptomatic in many cases, mildly symptomatic in few cases. But 10-20% of cases may progress to severe form. To know the factors responsible for severity of the disease in COVID-19, 50 COVID-19 patients who are admitted in ICU were studied. In our study old age was the commonest risk factor for severe COVID-19 (54%). Other common risk factors we found were Diabetes mellitus (40%), Hypertension (36%) and Obesity (20%). Other risk factors were old CVA (4%), CAD (2%) and CKD (2%). Our study has similar risk factors, when compared to the following other studies for disease progression inCOVID-19 patients. Previous studies reported age to be the most important predictor of death in patients with COVID-19[6,8]. In 2020, some studies evaluating the risk factors of mortality in patients with COVID-19 reported higher death rates with increasing age[8].

Obesity, diabetes mellitus, hypertension were the most common risk factors in young adults. It was stated in previous studies that diseased patients having a median age of 68 years old and were significantly older than recovered patients[9].

Table 2: Overview of risk factors reported by leading institutions

Robert Koch Institute[18]	U.S. CDC[19]	Johns Hopkins Medicine[20]	NHS UK[21]
Higher age (increase from 50–60 years)	Higher age (increase from 65 years)	Higher age (increase from 65 years)	Higher age (increase from 70 years)

Heart diseases	Living in a nursing home or long-term care facility	Diabetes	Organ transplant recipients
Diabetes	Chronic lung disease	Male gender	Lung diseases
Diseases of the respiratory system	Asthma	USA: obesity (BMI ≥ 30)	Blood or bone marrow cancer
Liver diseases	Heart diseases	USA: African American ethnicity	Heart diseases
Renal diseases	Immunosuppression	Comorbidities	Pregnancy
Obesity	Severe obesity (BMI ≥ 40)		Severe obesity (BMI ≥ 40)
Smoking	Diabetes		Chronic kidney diseases
Multimorbidity	Chronic kidney disease undergoing dialysis		Conditions affecting brain or nerves
Immunosuppression	Liver disease		Liver diseases

Advanced age patients have a probably weaker immune response, therefore they are more susceptible to the development of acute respiratory distress syndrome and mortality[10]. It has been reported that males had higher mortality than females[11,12,13].

It was reported that patients with comorbidities were associated with a severe COVID-19 condition[14,15] particularly those with previous cardiovascular, metabolic diseases. More severe disease, ARDS and increased mortality were associated with diabetes mellitus. This might be attributed to an impaired innate immunity which is the first line of defence against SARS-CoV-2, chronic inflammation or increased coagulation activity among the diabetes mellitus patients. It was demonstrated that COVID-19 patients with a history of CVD[16], COPD[17] had high risk of mortality.

CONCLUSION:

In our study we found commonest risk factors were old age, diabetes mellitus, hypertension, obesity and CAD for the disease progression in COVID-19 patients. To prevent morbidity and mortality in COVID-19 patients with risk factors, temperature, oxygen saturation, pulse rate, respiratory rate, blood pressure, blood sugar should be monitored continuously. To achieve these goals COVID-19 patients with risk factors have to be admitted in tertiary care hospitals where there are facilities to treat the patients in intensive care units.

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