

COVID-19 AND ASSOCIATED CO-MORBIDITIES: KNOWLEDGE YET IN PROGRESS.

Forensic Medicine

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ABSTRACT

Aims and objectives: To compile the number and percentage of associated co-morbidities in COVID-19 patients who expired due to corona virus disease in SMHS hospital from a period of 1 June 2020 to 10 August 2020. **Materials and methods:** Data of COVID-19 death reports was collected and compiled from SMHS hospital during a period of 1 June to 10 August 2020. All the patients who were sick, required hospitalization and who tested positive for SARS-CoV-2 infection on rt-PCR testing of a nasopharyngeal swab sample were included. Patients who expired mostly had co-morbid metabolic illnesses like diabetes mellitus, systemic hypertension, and cardiovascular diseases. Respiratory system diseases like chronic obstructive pulmonary disease associated with and without pneumonias were also found in most patients. A separate category for other illnesses was formulated. **Results:** It was found that in addition to COVID-19, respiratory illnesses were found in 66.9% patients, 19.6% had systemic hypertension, 16% of the total patients had diabetes mellitus, 14.2% had cardiovascular diseases, and 4.46% had kidney diseases and 0.89% had underlying liver diseases. 4.46% of the patients had head injury, assault etc. Overlapping of disorders was found in most patients. Maximum patients had more than one co-morbid condition along with COVID-19 infection. **Conclusion:** More attention should be paid to co-morbid conditions during treatment of COVID-19 patients. Patients eventually die of multiple organ failure, acute respiratory distress syndrome, kidney failure, arrhythmias and or heart failure. Therefore, observing COVID-19 patients for possible multi organ damage to protect and prevent them from deleterious effect of other underlying diseases should be taken care of.

KEYWORDS

SARS-COV-2, COVID-19, Co-morbidities.

INTRODUCTION:

An epidemic of Corona virus Disease 2019 (COVID-19) erupted in China in December 2019 that led to global pandemic within short span of time. In this Public health emergency of international concern numerous cases of unidentified pneumonias emerged in Wuhan, China. Evaluating and examining patients and after laboratory analysis of respiratory samples a novel corona virus was labelled as the causative agent for this disease.¹ This was named Severe Acute Respiratory Syndrome-Coronavirus-2 (SARS-CoV-2), and the disease caused by this was called as COVID-19.^{1,3} The very first case of COVID-19 was found in Kashmir by ending March 2020. The patient had travel history from outside India and was found positive for COVID-19. This led to the start of subsequent pandemic and the increase in number of COVID-19 cases that is accelerating and didn't show much decline till date. Every day proves as addition of cases to corona toll thus increasing the numbers further more.

Corona virus is an enveloped, single-stranded RNA virus that is extensively distributed in humans and in animals globally.¹ Major outbreaks of two beta corona viruses namely severe acute respiratory syndrome corona virus and Middle East respiratory syndrome corona virus led to fatal pneumonias in humans. Emergence of SARS-CoV was in year 2002–2003 and MERS-CoV emerged in year 2012.² According to literature, COVID-19 is characterised by the symptoms of viral pneumonias. These are clinically manifested as high grade fever, fatigue, dry cough and lymphopenia.³⁻⁵ Most human corona virus infections are mild to moderate but may be fatal in some cases. Mortality rates of 10% for SARS-CoV and 36% for MERS-CoV has been found.² First time it was reported by Huang et al. that COVID-19 accelerates the co-morbid conditions in patients who have been tested positive. The clinical features of 41 confirmed patients showed that 32% of them had underlying diseases.¹ These included diseases like hypertension, cardiovascular disease, diabetes mellitus, underlying respiratory illnesses like chronic obstructive pulmonary disease. Afterwards, another study reported by Wang et al. suggested similar findings.⁵ Assessment of the prevalence of these chronic diseases form basis for justifying complications in patients with SARS-CoV-2 infection.

COVID-19 may also damage heart, liver and kidneys. Its deleterious effects on haematological and immune systems and also super add to existing pneumonias.^{3,8} Patients eventually die of multi organ failure, shock and some may have cardiac arrhythmias.^{5,6} Therefore, more attention to prevention of potential multi organ damage is needed during treatment of COVID-19 patients. Co-morbid conditions that already exist at primary diagnosis should be treated well and more

attention is needed for such patients as they are at added risk of damage.

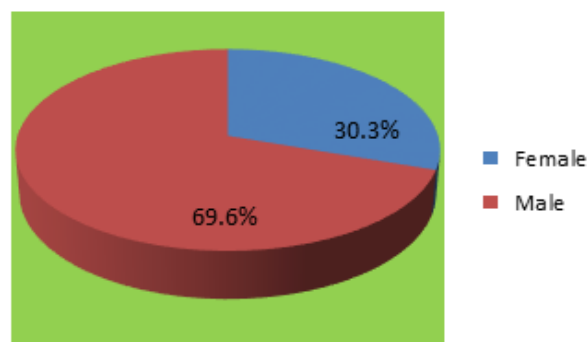
MATERIALS AND METHODS:

The purpose of our study was to evaluate the risk of serious adverse outcomes in patients with COVID-19 by stratification according to the number and type of co-morbidities, thus separating the patients with poorer prognosis.

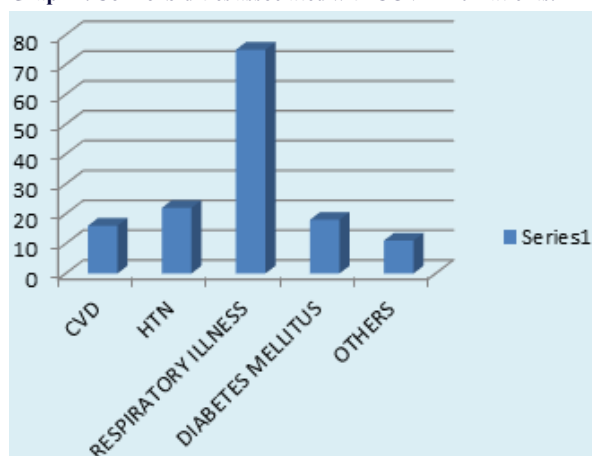
Data source and compilation: This study was done in SMHS Hospital, GMC Srinagar from a period of 1 June to 10 August 2020. Details of patients with COVID-19 admitted were compiled. The clinical data of laboratory confirmed hospitalised cases from 112 patients with COVID-19 were studied. The diagnosis of COVID-19 was made based on the World Health Organization interim guidance and after confirmation by laboratory test using rt-PCR technique. Various diseases like diabetes mellitus, cardiovascular diseases, respiratory illnesses were taken into account in view of each patient. The primary end-point of our study was a combined measure which consisted of the admission to hospital, associated co-morbidities and death.

Results and discussion:

Patients in this study were in the age group of 18 years upto a maximum age of 85 years. Total number of male patients was 78 and females were 34. Maximum patients who expired were males and from elderly age group. Most of these had associated co-morbid conditions.



Graph 1: Gender distribution of Patients Hospitalized With COVID-19

Graph 2: Co-morbidities associated with COVID-19 Patients.

Most of the COVID-19 deaths had associated co-morbidities. These were mainly HTN, DM, and underlying respiratory illnesses. COVID-19 hastens the death process in patients with co-morbidities. Maximum number of patients who died because of COVID-19 had underlying diseases. Highest number of patients had underlying COPD and or Pneumonias. This was followed by a second subset of patients who had underlying systemic hypertension followed by diabetes mellitus and cardiovascular diseases.

Table 1: Co-morbidities found in the COVID-19 Patients:

Co-morbidities	Male	Female	Total number	Total percentage
Cardiovascular disease	10	6	16	14.2%
Hypertension	11	11	22	19.6%
Chronic respiratory disease COPD/Pneumonia	47	28	75	66.9%
Kidney disease	5	0	5	4.46%
Liver disease	1	0	1	0.89%
Diabetes Mellitus	8	10	18	16.0%
Others:	0	2	2	1.7%
Encephalopathy	1	0	1	0.89%
Stroke	2	0	2	1.7%
Assault				

Note: The numbers depicted in Table 1 have been calculated from the total number of COVID-19 patients in this study.

Most of the COVID-19 patients had overlapping metabolic diseases. Some patients had hypertension as well as diabetes mellitus. Whilst others had COPD also. Other diseases like kidney diseases, stroke, encephalopathy and head injuries were also found in these COVID-19 patients. Thus it forms a spectrum of disorders which may have been accelerated by the corona virus infection leading to hastening of death in these patients. From the study results most of the co-morbid conditions were found in elderly age group. DM was present in the age group of 60-77 years. Hypertension and CVD was also seen in 60 to 80 years. Pneumonias with and without COPD was found in 40 to 80 years age group. Therefore, overall deaths due to underlying co-morbidities were present in elderly age group. However, Pneumonias were found in younger patients also.

DISCUSSION:

According to the study results by Wang et al., co-morbidities were present in 46.4% of the 138 patients in the study.⁷ Patients who were admitted to the intensive care units had a higher number of co-morbidities around 72.2% than those who were not admitted to the ICU. This finding suggested that co-morbidities may be risk factors for adverse outcomes. Similarly, in our study old and co-morbid patients often died due to acceleration of their original co-morbid conditions by corona virus infection. More attention should be paid to co-morbid conditions whilst treating COVID-19 patients. According to research, varied clinical manifestations of COVID-19 have been found.¹²⁻¹⁹ Studies have shown that most common co-morbidities on admission were diabetes, hypertension and other cardiovascular and cerebrovascular diseases.^{12, 13} Our study results show that co-morbid illnesses were aggravated in scenario of COVID-19. This led to sepsis

and multi-organ failure in many patients further leading to death of these patients. Therefore, co-morbid illnesses should be considered as danger sign while treating COVID-19 patients and requires more attention and care.

CONCLUSION:

The existing co-morbid conditions tend to aggravate the COVID-19 illness and may lead to death of the patient. It may be recommended to include the people with hypertension, diabetes, respiratory system disease, and cardiovascular diseases firstly in future SARS-CoV-2 vaccination programmes. These patients are more vulnerable than the general population. Adequate research is mandatory to establish link between diabetes mellitus and CVDs with respect to COVID-19. Assessment of co-morbidities meticulously may help in risk stratification of COVID-19 patients upon hospital admission. Impact of genetic predisposition, race, ethnicity and differences in geographical distribution on severity of COVID-19 further requires powered research work.

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