ORIGINAL ARTICLE

Impact of co-morbidities in COVID -19 infected patients

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Abstract

Background- During the COVID- 19 pandemic in the first wave, infected patients age was range from 4 weeks to 90 years and those who have more age and with comorbidities are more susceptible to develop serious illness and have high mortality rates. **Objective**-To study the association between survivor vs non survivor on the basis of demographic profile and high risk factors. **Material & methods**: This study was done in the Government Medical College, Kannauj on the COVID-19 patients who were admitted in the isolation wards, from 1st September 2020 to December 31st 2020. **Statistical Analysis**- Analysis was done using SPSS- 23 trial version software. Results: case fatality rate was 2.7% in this study. Most common symptoms was cough (61.0%) and among these admitted patients the most common comorbidities was hypertension (26.7%), followed by diabetes (20.7%), and COPD (14.0%) respectively. Platelets (< 0.02), post prandial blood sugar (PPBS) (< 0.01) have significant role in survivability of COVID- 19 patients. **Conclusion**: This study concludes that those patients who were older in age and with comorbidity especially (hypertension, COPD, high PPBS, High platelets) have poorer prognosis as compare to those without.

Keywords

COVID-19; SARS; MERS; COPD; RT –PCR

Introduction

As we all know that infectious diseases have caused outbreaks worldwide from times immemorial and have been a challenge for medical and public health groups. In the twenty first century we have witnessed three deadly pandemics, so far which are associated with novel coronaviruses: SARS (Severe acute respiratory infection), Middle East respiratory syndrome (MERS), and the most recently emerged COVID-19. All these viruses are not only responsible for causing acute respiratory tract infections (ARTIs) but are also highly contagious in nature and/or have caused high mortalities. From the various studies it was found that the most common age groups for COVID -19 infections range from 4 weeks to 90 years. However, infants and children were affected less (1). Males were more involved. The most people who infected with this virus during the first wave were experienced mild to moderate respiratory illness and these patients recovered without requiring special treatment. Older people and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease and cancer are more likely to develop serious illness and have high mortality rates. So we have conducted this study to study the association between survivor vs non survivor on the basis of age, sex, clinical symptoms, CBC (complete blood count) and high risk factors like diabetes and hypertension etc.

Aims & Objectives

To study association between survivor vs non survivor on the basis of demographic profile and high risk factors.

Material & Methods

This study was conducted in the Govt. Medical College, Kannauj on the patients who were admitted in the isolation wards of the hospital attached to college. During this pandemic around 300 patients were admitted in the isolation wards of the college in peak period of 1st September 2020 to 31st December 2020. All the patients who were coming to our flu- OPD with complaints and with any history of contact were tested for COVID -19 with RT-PCR test (Real-time polymerase chain reaction) test. These patients were also screened for presence of any comorbidity. Those patients, who were RT-PCR positive, were admitted to isolation wards. After the admission, demographic, clinical and treatment, data of these patients was taken from the case records in a pre-structured questionnaire. The outcome data of these patients was also taken from the case record after the discharge of the patients. The study was reviewed and approved by the institutional committee of the college.

Statistical Analysis:-After collection, the data was entered in MS EXCEL spread sheet and analysis was done using SPSS- 23 trial version software. A p value of <0.05 was considered statistically significant. Qualitative variables were compared using Chi-Square test and also applied two sample t- test for quantitative variables

Results

In this study, out of total 300 patients, 292 were survivors (alive) and 8 non-survivor patients (dead) i.e. case fatality rate was 2.7%. (Table 1) showed that, patients who were admitted in the isolation wards have several types of symptoms and out of these most common was cough (61.0%), followed by fever (53.3%), sore throat (46.0%), dyspnea (37.3%), loss of smell (24 .0%), diarrhoea (21.7%) and loss of taste (21.3%) respectively .There was no significant association between the clinical symptoms and survivability of Covid-19 patients.

According to (Table 2), among these patients, hypertension was the most common comorbidities (26.7%), followed by diabetes (20.7%), COPD (14.0%), CAD (10.7%) and kidney diseases (10.3 %). Among these comorbidities hypertension (p< 0.0001) and COPD (p<0.04) have significant role in the survivability of the COVID-19 patients, that means those who have either of the comorbidity had poor prognosis. The result of (Table 3) is obtained by using two sample t- tests. These results showed that age (p< 0.001), platelets count (< 0.02) and post prandial blood sugar (PPBS) (< 0.01) also have significant crucial role in survivability of COVID- 19 patients i.e. the patients who have initially less platelets count and high PPBS had poor prognosis.

Discussion

In this study, patients who were admitted in the isolation wards have several types of symptoms like and most common was cough (61.0%), fever (53.3%), followed by sore throat 46.0%), Dyspnea (37.3%), loss of smell (24 .0%) and diarrhoea (21.7%) loss of taste (21.3%) respectability. Wei-jie Guan et al analyzed data from 1590 laboratory confirmed hospitalized patients from 575 hospitals and in their study they found that, of the 1590 cases, mean age was 48.9 years and the most common symptom was fever on or after hospitalization (88.0%), followed by dry cough (70.2%). Fatigue (42.8%) and productive cough (36.0%) were less common (2). Adekunle Sanyaolu et al done a meta-analysis study of COVID-19 patients and this meta analysis showed that fever (88.8%) was the most common symptom, followed by dry cough (68%) and fatigue (33%). Other symptoms noted were productive cough (28.5%), SOB (17%), muscle pain (14.4%), sore throat (11.4%), and headache (10.2%). The least common symptoms were diarrhea (4.4%), nausea and vomiting (4.1%), rhinorrhea (3.2%), abdominal pain (0.16%),and chest pain(0.11%) respectively (3). Ravi dosi conducted a study in 365 patients and they found that 45.28% of patients were asymptomatic, with fever as the most common symptom (38.29%) and epidemiological contact history was present in 69.90%(4). In the present study the patients who were admitted represent with various types of co-morbidities like hypertension (26.7%), diabetes (20.7%), COPD (14.0%), CAD (10.7%) and kidney diseases (10.3 %). Among them hypertension (p< 0.0001) and COPD (p<0.04) have significant role in survivability of the patients, that means these two co-morbidities play a crucial role in COVID- 19 patients. Similar to the present study, Wei-jie Guan et al also found that, out of total1590 cases, (25.1%) reported having at least one comorbidity and among them most common was hypertension (16.9%),followed by cardiovascular diseases (3.7%) ,cerebrovascular diseases (1.9%), diabetes (8.2%) and at least one comorbidity was seen more commonly in severe cases than in non-severe cases (32.8% versus 10.3%) (2). Adekunle Sanyaolu et al also found in their study that the most common comorbidities were hypertension (15.8%), cardiovascular and cerebrovascular conditions (11.7%), and diabetes (9.4%) (3). Akin Osibogun et al found in their study that , the comorbidities like hypertension (OR: 7.36; 95%CI: 4.55–11.89), diabetes (OR: 10.67; 95%CI: 6.31–18.07), renal disease (OR: 33.28; 95%CI: 7.31–151.56), cancer (OR: 9.69; 95%CI: 1.85–50.81), cardiovascular disease (OR: 6.91; 95%CI: 1.41–33.49) and HIV (OR: 9.69; 95%CI: 1.85–50.81) have an important role in the survivability of the patients. Patients with two or more of these comorbidities were about four times more likely to die than those with one comorbidity. Other identified risk factors for death were older age groups (50–59 years and ≥ 60 years)(5).

Safiya Richardson et al also found in their study that the most common comorbidities were hypertension (56.6%), followed by obesity (41.7%), and diabetes (33.8%) (6). Divya Goel and Sudhir Kumar did a data analysis from the state of Uttarakhand till 2 October 2020 ,which showed that out of 636 reported deaths due to COVID-19, 10.2%

people had diabetes ,(4.1%) had Hypertension and 22 deaths were due to chronic kidney disease . 32 cases have coronary artery disease (CAD). From this data analysis it was also concluded that Maximum deaths was occurred in 51- 70 years age group (7). The result of this study showed that age (p< 0.001) factor, initial platelets count (p<0.02) and post prandial blood sugar level (p<0.01) play a crucial role in COVID- 19 patients. On the basis of all results, we can say that co-morbidity and some initial investigations are more important to other factors. Non Co-morbidity patients have more chance to survive as compared to co-morbidity patients. Similar to our study Ravi dosi found that in, 365 patients the presence of lymphopenia, and comorbid condition were identified as risk factors for requirement of oxygen, mechanical Ventilation and death (7).

Conclusion

Among laboratory confirmed cases of COVID-19, patients with older age, with some comorbidity especially hypertension, COPD, high PPBS, High platelets yielded poorer clinical outcomes than those without these comorbidities.

Recommendation

A thorough assessment of initial recommended investigations and comorbidities may help establish risk stratification of COVID-19 infected patients upon hospital admission.

Limitation of the study

For this study we have taken data from the patient's case record and consider only initial investigations of the patients

Relevance of the study

Regarding COVID-19, very little data was available from India on the association of co- morbidities with mortality. This study provides an insight into the co-morbidities prevalent in the Indian COVID-19 patients that lead to mortality. So this knowledge will be additive to the present literature.

Authors Contribution

All the co- authors helped in planning & designing the study, in data compilation, analysis, and interpretation of data; and also helped in drafting the article.

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Tables

TABLE 1 COMPARISON OF CLINICAL FEATURES BETWEEN SURVIVOR VS NON SURVIVOR

Clinical features	Survival (n=292)	Non-Survival (n=8)	Total	p-value
Fever				
Yes	154 (52.7%)	6 (75.0%)	160 (53.3%)	0.2
No	138 (47.3 %)	2 (25.0%)	140 (46.7%)	
Cough				
Yes	178 (61.0%)	6 (75.0%)	184 (61.3%)	0.4
No	114 (39.0%)	2 (25.0%)	116 (48.7%)	
Sore throat				
Yes	132 (45.2%)	6 (75.0%)	138 (46.0%)	0.09
No	160 (54.8%)	2 (25.0%)	162 (54.0%)	
Dyspnea				
Yes	108 (37.0%)	4 (50.0%)	112 (37.3%)	0.4
No	184 (63.0%)	4 (50.0%)	188 (62.7%)	
Loss of taste				
Yes	61 (20.9%)	3 (37.5%)	64 (21.3%)	0.2
No	231 (79.1%)	5 (62.5%)	236 (78.7%)	
Loss of smell				
Yes	69 (23.6%)	3 (37.5%)	72 (24.0%)	0.3

No	223 (76.4%)	5 (62.5%)	228 (76.0%)	
Diarrhoea				
Yes	64 (21.9%)	1 (14.3%)	65 (21.7%)	0.5
No	228 (78.1%)	7 (85.7%)	235 (78.3%)	

TABLE 2 COMPARISON OF CO -MORBID CONDITIONS BETWEEN SURVIVOR VS NON SURVIVOR

Co -morbid conditions	Survivor (n=292)	Non-Survivor (n=8)	Total	P -value
Hypertension				
Yes	75 (25.7%)	8 (100.0%)	83 (26.7%)	<0.0001*#
No	217 (74.3%)	0 (0.0%)	217(72.3%)	
Diabetes				
Yes	59 (20.2%)	3 (47.5%)	62 (20.7%)	0.2
No	233 (79.8%)	5 (62.5%)	238 (79.3%)	
COPD				
YES	39 (13.4%)	3 (37.5%)	42 (14.0%)	0.04*
No	253 (86.6%)	5 (62.5%)	258 (86.0%)	
Kidney diseases				
Yes	31(10.6%)	0 (0.0%)	31 (10.3%)	0.3
No	261 (89.4%)	8 (100.0%)	269 (89.7%)	
Alcohol consumption				
Yes	64 (21.9%)	2 (25.0%)	66 (22.0%)	0.8
No	228 (78.1%)	6 (75.0%)	234 (78.0%)	
Smoking				
Yes	55 (20.9%)	2 (25.0%)	57 (19.0%)	0.6
No	237 (81.2%)	6 (75.0%)	243 (81.0%)	
Tobacco chewing				
Yes	61 (20.9%)	3 (37.5)	64 (21.3%)	0.2
No	231 (79.1%)	5 (62.5%)	236 (78.7 %)	

TABLE 3 COMPARISON OF INITIAL INVESTIGATION BETWEEN SURVIVOR VS NON SURVIVOR

	Survivor (N=292)		Non-Survivor (N=08)		P-value
Initial investigation	Mean	S. D.	Mean	S. D.	
Age(Years)	44.14	24.69	73.25	9.37	**0.001**
TLC	6933.15	1834.77	7477.12	1897.43	0.40
Lymphocytes	26.76	9.60	29.86	8.03	0.36
Hb (gm%)	11.92	5.47	11.87	1.88	0.97
Platelets	321905.25	146731.33	238701.29	99988.09	**0.02**
FBS	103.90	36.95	111.87	18.50	0.54
PPBS	137.76	35.16	169.75	38.08	**0.01**
Pulse	81.75	10.97	82.00	10.41	0.94