Journal Homepage: -www.journalijar.com

INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI:10.21474/IJAR01/13961
DOI URL: http://dx.doi.org/10.21474/IJAR01/13961

RESEARCH ARTICLE

AGE AND GENDER RELATED MORTALITY AND OUTCOME OF COVID 19 POSITIVE PATIENTS

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Manuscript Info

Manuscript History
Received: 20 October 2021
Final Accepted: 24 November 2021
Published: December 2021

Key words:-
Age, Gender, COVID-19 Positive Patients, Mortality

Abstract

Background: This study was aimed to evaluate the age and gender related mortality and outcome of covid 19 positive patients in order to further strengthen the management of covid 19 patients as the insights from these data will be useful in determining preventive measures and treatment policies of covid 19 patients.

Methodology: This was a retrospective observational study done in adult covid positive patients admitted in Tertiary Care Hospital from first May 2020 to 30 June 2021.The age related mortality and outcome in these patients was analyzed.

Results: A total of 816 adult covid -19 positive patients were admitted in a Tertiary care hospital,GMC Anantnag from May 2020 to June 2021. Among the patients, 53.55 % were males and 46.44 % were females. The mean of the age involved was 57.96 years. The most common presenting symptom was fever (85%) followed by cough (70%) and shortness of breath (40%). Approximately 20% of patients presented with nonspecific complaints (including generalized aches, pains, body aches, myalgias etc). All age groups were affected equally (29% in 15-50yr, 37% in 51-65yr, 33% in 66-100yr). Maximum patients (70%) affected were more than 50 yr of age. About 73.4% were discharged, 6% were reffered, 20% expired. So, overall hospital mortality was 20%. Further, Maximum (86%) of covid positive patients expired in age group of above 50 yrs. Further, Male and Female Mortality was also same in covid positive patients.

Conclusion: Males and females were affected equally by Covid -19 disease with no sex predilection.. Fever was the main presenting symptom. All age groups were affected equally but mortality was more in elderly age group. Further, mortality is same in male and female covid positive patients with no gender predilection.

Introduction:-

Coronavirus disease-2019 (COVID-19) emerged in China in December 2019 and engulfed the whole world in a very short period of time. COVID-19 announced in March 2020 as a pandemic by the World Health Organization (WHO). Worldwide till now around 95 million patients have been infected with more than 2 million deaths. It has infected more than 10 million people in India with 1.5 lakh deaths[1,2,3]

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The novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is the causative agent of COVID-19. SARS-CoV-2 spreads from person to person through respiratory particles during coughing, sneezing or speaking. Because both larger particles (droplets) and smaller particles (aerosols) are concentrated within a short distance , the likelihood of transmission decreases with increased ventilation and physical distancing [4,5,6]

Cough, fever, fatigue, headache, myalgias and diarrhea are the common intial symptoms of coronavirus disease 2019 (covid-19).. The most common symptom of severe disease is dyspnea and is often accompanied by hypoxemia. Severe illness usually begins approximately 1 week after the onset of symptoms [7,8]. Soon after the onset of dyspnea and hypoxemia in severe covid -19, progressive respiratory failure develops in many patients . These patients commonly meet the criteria for the acute respiratory distress syndrome (ARDS). ARDS is defined as the acute onset of bilateral infiltrates, severe hypoxemia, and lung edema that is not fully explained by cardiac failure or fluid overload[9]. Older age, cardiovascular disease, chronic lung disease, diabetes, and obesity are risk factors for complications of covid-19 [10,11,12,13,14]

On the basis of a suggestive clinical history and the detection of SARS-CoV-2 RNA in respiratory secretions, Diagnosis of Covid-19 can be established. Chest radiography should be performed and bilateral consolidations or ground-glass opacities are commonly seen.[15]

The Definition for Epidemiologic purposes in Severe Covid-19 in adults is dyspnea, a respiratory rate of 30 or more breaths per minute, a blood oxygen saturation of 93% or less, a ratio of the partial pressure of arterial oxygen to the fraction of inspired oxygen (Pao2:Fio2) of less than 300 mm Hg, or infiltrates in more than 50% of the lung field[16] Renal failure and thrombosis are well-recognized complications of severe Covid-19. Dexamethasones, Remdesivir, Endotraceal intubation have a role in Management[4]

In patients with covid-19 disease, the prevalence of mortality among hospitalized patients varies from 6.3 to 26.85% in different parts of the world[17.] For Critical conditions, early identification of risk factors is urgently needed, not only to identify the defining epidemiological and clinical characteristics with greater precision, but also to provide and facilitate the appropriate supportive care and prompt access to the intensive care unit (ICU) if needed. For higher severity and mortality in patients with COVID-19, gender is a risk factor independent of age and susceptibility[18]

However, the age-related pattern of COVID-19 fatality is different from that of other respiratory viral infections. As in covid-19 positive patients, the severity pattern is often described as a U-shaped curve;the morbidity and mortality are concentrated at extreme age groups (younger children and the elderly). Population-based studies of seasonal influenza have typically shown this type of mortality distribution according to age[19]

During the pandemic, one of the most critical issues dealt by public health and clinical professionals is the spectrum of illness severity. This really affects the triage, diagnostic decision making, therapeutic decision making and prognostic expectations. Therefore, understanding COVID- 19 associated morbidity and mortality with relation to age is important[20] As there is paucity of studies regarding gender and age related mortality in covid positive patients, so we conducted this study to provide data to further strenghthen the management of covid-19 positive patients.

Methodology:-

This was an observational retrospective study of covid 19 positive patients. It included patients who were admitted in the Tertiary Care Hospital, GMC Anantnag from ist May 2020 to 30 June 2021. The data was collected from online portal which was maintained by computer section of Department of Medicine. The data was updated each day regarding outcome of the admitted patients. The data was analysed by statistician. All the patients admitted were moderate to severe confirmed COVID-19 patients whose real-time reverse-transcription polymerase chain reaction assay findings for nasal or pharyngeal swab specimens were positive.

Moderate Illness: Clinical or radiographic evidence of lower respiratory tract disease; oxygen saturation ≥94%. Diagnostic testing[21].

Severe Illness: Oxygen saturation <94%; respiratory rate ≥30 breaths/min; lung infiltrates >50%. Diagnostic ≥testing[21]

Data related to age related mortality and outcome of all the patients who were admitted during the study period was collected from their electronic medical records, daily progress charts, nursing notes of the patients. Patients' age, sex, complaints at the time of presentation was noted and analyzed. Total of 816 covid-19 positive patients were admitted. Adult patients were further divided into age-groups of 15 to 50, 51 to 65, and 66-100 and their age related mortality and outcome was seen. Mortality was calculated until patients were hospitalised or discharged from the hospital. This study did not include post discharge mortality in long covid syndrome patients.

Results:-

Table 1:- Gender distribution among covid positive patients.

Gender	N	Percentage
Male	437	53.55
Female	379	46.44
Total	816	

In table 1, Total of 816covid-19 positive patients were admitted. Out of w**h**ic**h** about **h**alf 437(53%) were males and about half 379(46%) were females wit**h** no sex prediliction. The mean of the age involved was 57.96 years.

Table 2:- Age specific distribution among covid positive patients.

Age	**N**	Percentage
15-50	238	29.16
51-65	304	37.25
66-100	274	33.57

Table 2 suggests t**h**at out of 816 patients admitted, about 238 (29%) were in age roup of 15-50 yrs. Maximum of patients about 578 (70%) were above 50 years of age.

Table3:- Patient outcome among covid positive patients.

Covid positive patients	N	Percentage
Discharged	599	73.40
Referred	52	6.37
Expired	165	20.22

Table 3 suggests t**h**at t**h**e mortality among 816 admitted covid positive patients was about 20% (165). Maximum 599 (73%)of patients were discharged. Only 52 (6.37%) were reffered.

Table 4:- Age specific distribution among expired covid positive patients.

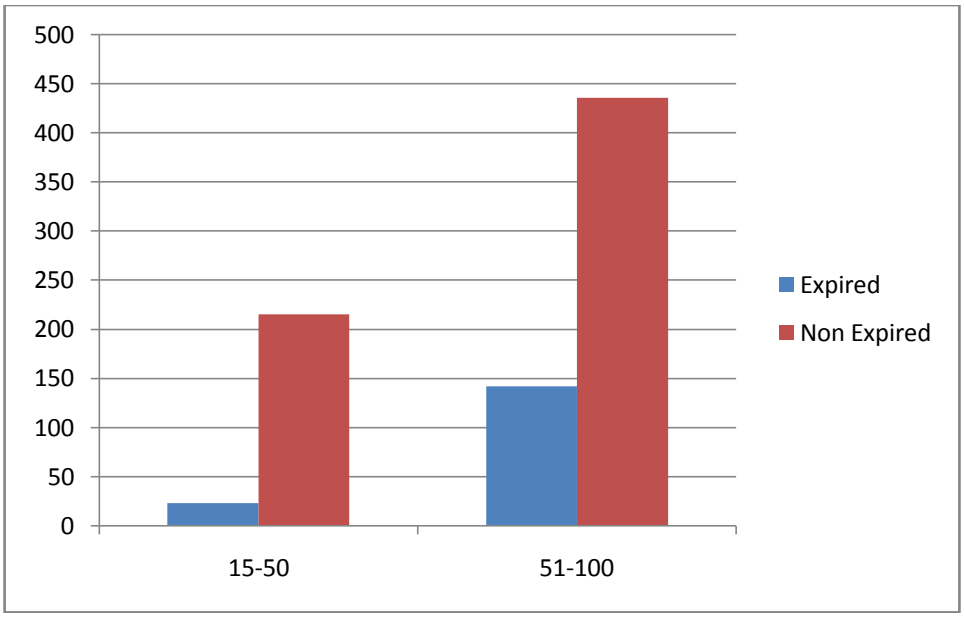
covid positive patients (n**)**	Expired	**percentage**
15-50	23	13.93
51-100	142	86.06

Table 4suggests thatmaximum 142 (86%) of covid positive patients expired in age group of above 50 yrs. About 23(13%) expired in age group of 15-50 yr.

Table 5:- Association between Age and Mortality in covid positive patients.

Age group (Covid positive patients)	Expired	Non-Expired	
15-50	23	215	
51-100	142	436	P value <.05

Table 5 shows mortality is higher in elderly age group and the results are highly significant (p valve <0.05).
Statistical Analysis: chi square statistic is 23.21. p value is <0.00001. chisquare statistic with Yates correction is 22.29. pvalue is <0.00001. p<.05



Graphical representation of age and mortality in covid positive patients

Table 6:- Clinical features of covid positive patients.

Clinical features	N	Percentage
Fever	693	85
Cough	571	70
Shortness of breath	362	42
Non specific complaints (generalised pains,bodyaches,myalgias)	163	20

Table 6 depicts that fever was the main presenting symptom (85%) followed by cough (70%). About 42% were having shortness of breath . Approximatekly 20 % of patients were having non specific complaints like generalised pains, bodyaches, myalgias.

Table 7:- Gender specific mortality in covid positive patients.

Covid positive	Expired	Non -Expired	
Males	84	433	
Females	81	298	P >.05
Total	165		

Table 7 depicts mortality is almost same in Males and Females with no gender predilection. The result is gfstatiscally insignificant P>.05.

Discussion:-

Coronavirus is a large family of viruses with range of illnessess from common cold to pueumonia like severe acute respiratory syndrome (SARS) and Middle East Respiratory Syndrome (MERS)[22,23]. The epidemiological features of patients with covid -19 has been recently reported[24,25]. Further, clinical features of patients with COVID-19 have also recently been reported[10,26]. However, little data on the prognostic factors of COVID-19 have been reported. Analyses by gender and sex may help in the development of strategies for prevention for the COVID-19 pandemic [27]

This study retrospectively analysed age and gender related mortality and outcome of covid 19 positive patients Total of 816 confirmed adult COVID-19 patients were admitted in the study period.

In our study, Males and females were of almost equal proportion among admitted covid positive patients. This is in contrast to **study**[3]where 60% of all admitted patients were males and in contrast to other studies where male predisposition was found for this disease across various ethnic and racial groups[28,29,30]

In our study, fever was the main presenting symptom followed by cough , shortness of breath. This is similar to study [16]

In our study, 29.16 % were of age-group of 15–50 years, 37.25% in the age-group 51–65 years and only about 33.57% were above 65 years age-group. This is in contrast to study[3] where 42.1% were of age-group of 18–50 years, 35% in the age-group 51–64 years, and only about 23% were above 65 years age-group. But similar to the studies from other parts of the world where most of the nonsurvivors were also from a much older age-group[29,30,31]

The ICU mortality of COVID-19 patients varies from 8.0 to 66.7% in different studies [32].In **study**[3], the hospital mortality was 18.2% and ICU mortality was 36.1. In our study, the hospital mortality was 20%. Similar mortality rates have been reported in other studies from US, Spain, Italy, and few studies from China[28,29,33]. However, from China, there are other studies which depict lower overall mortality rates[34]

Association between age and mortality in covid positive patients was seen in elderly age group in our study. And the results are highly significant. This is similar to the studies [20,35,36,37,7]. Elderly patients have a higher mortality rate due to high CFR and symptomatic infection rate among covid -19 positive patients[37,7] Several studies have reported old age to be a significant risk factor for COVID-19 mortality [37, 7]. In patients with age of more than 70 yrs and more or equal to 60 yrs in Korea and Italy respectively, approximately 80% and 90% of deaths have occurred in them respectively [35,36] . In an animal study, SARS-CoV-2 infection caused more severe interstitial pneumonia and viral replication in tissues of lungs of old monkeys than in those of young monkeys[38]. Vulnerability to an infection in the elderly is usually explained by immunosenescence and chronic subclinical systemic inflammation also known as inflammaging in immunopathology[39,40]. Some scientists have claimed that there is the biologically plausible pathomechanism that explains the difference in vulnerability to SARS-CoV-2 infection and this is called antibody-dependent enhancement (ADE) [41,42,43,44]. ADE is a well-known cascade of events by which viruses may infect susceptible cells through interactions between virions complexed with antibodies and Fc receptors, where they are more extensively endocytosed and eventually replicated more efficiently[45] The antibodies that bind to virions could be neutralizing or non-neutralizing antibodies, which were previously formed in response to SARS-CoV-2 or other coronaviruses with similar antigenicity to that of SARS-CoV-2. There was also the fact that the seroprevalence of community-acquired coronaviruses among adults was very high (90 – 100%) but not in pediatrics which was further presented as an evidence[46,47].There are several other factors related to aging that could be reasons for higher mortality and morbidity in the elderly in addition to the aging immunity or ADE. Further, The average number of comorbid conditions steadily increased with age. Because of the chronic illnesses and the impact of congregate housing in older adults living in long-term care facilities, they are at the highest risk[48,49]

In our study, mortality is same in covid positive males and females. But this is in contrast to the study done by **JIN JM et al**[18]where male mortality is more as compared to female mortality **and** Men with COVID-19 are more at risk for worse outcomes and death, independent of age.

Conclusion:-

Overall, there was no sex prediliction. Fever was the main presenting symptom. All age groups were affected equally but mortality was more in elderly age group. Further, mortality is same in male and female covid positive patients with no gender predilection. Age was more determinantal factor for mortality than sex. The above study gives an important clue about the triage and management of covid 19 patients. Even mild to moderate covid disease in elderly warrants critical care in ICU admission. It also downcourages the homebased isolation and management of elderlycovid19 patients.

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