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ORIGINAL ARTICLE

Comparison of Severity of Disease and ICU Stay among Vaccinated and Non-Vaccinated Covid 19 Patients

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ABSTRACT

Objective: The purpose of this study is to examine the severity of illness and length of ICU stay in covid-19 patients who have received vaccination vs those who have not received vaccination.

Study Design: A Retrospective/ Comparative study

Place and Duration: King Salman Armed Forces Hospital Tabuk KSA. Nov 2021-July 2021

Methods: This research included 160 individuals of both sexes who had coronavirus illness. Patients were between the ages of 18 and 75. After obtaining informed written permission, demographic data on patients, such as age, gender, BMI, place of residence were gathered. It was determined that the coronavirus was present in all instances by RT-PCR. Two sets of patients were admitted to COVID 19 ward, and they were subsequently separated. Both groups were underwent for X-ray of chest. Two groups were formed: one with 80 vaccinated patients and the other with 80 unvaccinated individuals. In both groups, the prevalence of co-morbidities was evaluated. Both groups' recovery and results were assessed by looking at things like mortality and the severity of the condition. Complete data was analzsed using SPSS 22.0.

Results: Among 160 cases, 100 (62.5%) were males and 60 (37.5%) females in this study. There was no any significantly difference between both groups related to age and body mass index. We found severity of disease among non-vaccinated patients was significantly high with p value <0.05.Diabetes mellitus and hypertension were the most common comorbidities among all cases. Frequency of interstitial infiltrates was found in 55 (68.8%) in group I and 60 (75%) in group II. In both groups, fever, cough, and dyspnea were the most prevalent symptoms. Frequency of discharged patients in group I was greater 66 (82.5%) as compared to non-vaccinated 29 (36.3%). ICU stay and mortality was significantly higher in group II 16 (20%),24 (30%) as compared to group I with p value <0.05.

Conclusion: This research found that immunization against coronavirus illness is both effective and useful in lowering the severity of the condition. However, vaccination may lower the incidence of bad outcomes (ICU stay) and people should be made aware of the necessity of being vaccinated immediately.

Keywords: Mortality, COVID 19, Vaccination, ICU stay

INTRODUCTION

International health systems have been overwhelmed by the speed and depth of the pandemic's spread, with numerous nations reporting excessive death, both directly associated with COVID-19 and collaterally associated with other diseases. [2,3] Individuals over the age of 60 and those with other co-morbid diseases have been the majority of those who have died as a result of COVID-19 infection, with the infection thought to be a trigger for the events that led to death. [1-6]

WHO said vaccines for COVID-19 will be widely available starting in December 2020 in various parts of the world. Worldwide, a total of 13 vaccines are now in use. These vaccines are dispersed among four different platforms. It is estimated that there are 150 other vaccines in various stages of development or efficacy testing in addition to these seven widely used vaccines. [4] As part of a cooperation between AstraZeneca and Oxford University, the Serum Institute of India (SII) has created the COVISHIELD[2], which is extensively used in India. The Indian Council of Medical Research (ICMR) and Bharat Biotech collaborated on the development of COVAXIN(3), which is produced by the Serum Institute of India (SII). As opposed to COVAXIN, which was created for use with COVAXIN, the SARS-CoV-2 spike (S) glycoprotein was used in the production of Covishield, an adenovirus vector obtained from genetically engineered human embryonic kidneys (HEK) 293 cells that was replication defective. [6]

A complete understanding of the protective advantages of COVID-19 vaccinations must take into consideration protection against SARS-CoV-2 infection as well as protection against the development of disease severity following a breakthrough infection with the virus.[7,8]Since their introduction in 2004, clinical trials for COVID-19 vaccines have mostly focused on the prevention of symptomatic infection and hospitalization.[9]

Inpatients with COVID-19 are at greater risk of having a more serious disease, including respiratory failure and death, than outpatients with the virus. It is possible for people who have been previously vaccinated against SARS-CoV-2 to acquire memory antibody and cellular responses, which might reduce the progression of the disease and even prevent life-threatening organ failure and death. [10] On the other hand, the association between previous vaccinations and the development of the most severe forms of COVID-19 is not fully understood.

Though it's predicted some vaccinated persons may still become sick [11-13], those individuals are likely to have fewer severe forms of illness, less frequent hospitalizations, and less intensive care unit (ICU) admissions as a result of their immunization. Through the potential of vaccinations to create immunological memory responses, the body's immune response to infection may

be accelerated by vaccines.[14] Numerous investigations of post-immunization cases of COVID-19 have confirmed that this is actually the case. There was an 87% success rate in a case-control study [15] in preventing hospitalization after the second dose of vaccine, and a prospective cohort analysis indicated that patients who received the COVID-19 vaccine had shorter illness duration and a lower likelihood of developing febrile symptoms. Research on post-vaccination COVID-19 patients in the ICU, on mechanical ventilation, and in death estimates the severity of the cases [11], the bulk of which is based on their hospitalization.

The purpose of this study is to examine the severity of illness and length of ICU stay in covid-19 patients who have received vaccination vs those who have not received vaccination.

MATERIAL AND METHODS

This retrospective/comparative study was conducted at King Salman Armed Forces Hospital Tabuk KSA and comprised of 160 patients of COVID-19. After obtaining informed written permission, we collected detailed demographic information on each patient, including age, gender, and BMI. This research did not include any women who were pregnant or who had not provided written permission.

Patients ranged in age from 18 to 75. There were 80 vaccinated and 80 unvaccinated patients in group I and group II, respectively It was done for both groups. There were many SARS-CoV-2 PCR tests conducted at each of the participating centres, and the cycle threshold (Ct) values were reported for each of the targeted genes, but they were also compared to the lowest Ct value of any target gene selected as a proxy for viral load. Both the Liaison SARS-CoV-2-S1/S2-IgG and the Architect Advise Dx SARS-CoV-2-IgG-II had positive cut-offs of >15 units/mL and >50 units/mL respectively for local anti-Spike antibody testing. Gene sequencing was performed on available samples in order to identify viral genome variants of concern (wild-type, B.1.1.7 or B.1.351, for example). There were two categories: those who received vaccines before the date of their symptoms beginning; and those who received vaccines before the four days before their admittance to the hospital for those who did not. If a participant had not gotten any vaccine doses 14 days before to the reference date, they were considered unvaccinated. If they had had two or more mRNA vaccination doses, they were considered fully vaccinated.

In both groups, the prevalence of co-morbidities was evaluated. Results were based on length of hospital stay, death, and improvement in illness severity for both groups. SPSS 22.0 version was used to analyse all of the data. Categorical variables were analyzed using frequency and percentages.

RESULTS

Among 160 cases, 100 (62.5%) were males and 60 (37.5%) females in this study. In group I mean age was 44.5±7.54 years with mean BMI 29.34±7.44 kg/m^2 and in group II mean age was 44.8±8.66 years with mean BMI 30.6±13.53 kg/m^2. In group I 48 (60%) patients were literate and in group II 37 (46.3%) patients were educated. Patient illnesses were most often brought on by travel and outdoor employment.(table 1)

Table 1: Details of the cases that have been enrolled

Characteristics	Vaccinated	Non-Vaccinated
Mean age (years)	44.5±7.54	44.8±8.66
Mean BMI (kg/m^2)	29.34±7.44	30.6±13.53
Gender		
Male	50 (62.5%)	50 (62.5%)
Female	30 (37.5%)	30 (37.5%)
Education Status		
Yes	48 (60%)	37 (46.3%)
No	32 (40%)	43 (53.7%)
Cause of Disease		
Travel	43 (53.8%)	38 (47.5%)
Outdoor Employment	25 (31.3%)	28 (35%)
Family Functions	12 (15%)	14 (17.5%)

We found severity of disease among non-vaccinated patients 61 (76.3%) was significantly high as compared to group I 24 (30%) with p value <0.05.(fig-1)

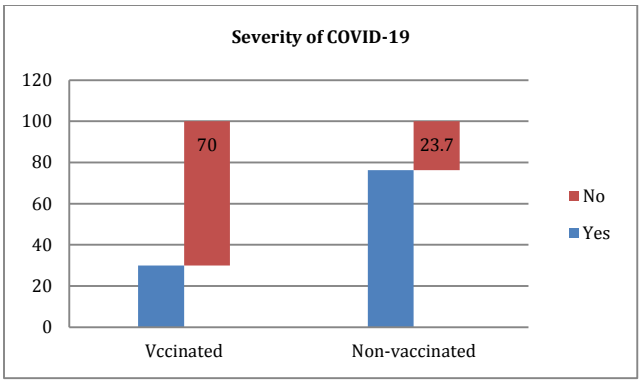

Figure 1: Comparison of severity of disease among both groups

Diabetes mellitus and hypertension were the most common comorbidities among all cases. (table 2)

Table 2: Association of comorbidities among both groups

Characteristics	Vaccinated (n=80)	Non-Vaccinated (n=80)
Co-morbidities		
Diabetes Mellitus DM	31 (38.8%)	40 (50%)
Hypertension HTN	22 (27.5%)	18 (22.5%)
Ischaemic heart disease (IHD)	17 (21.3%)	17 (21.3%)
Chronic lung disease (CLD)	10 (12.5%)	5 (6.3%)

Frequency of interstitial infiltrates was found in 55 (68.8%) in group I and 60 (75%) in group II. In both groups, fever, cough, and dyspnea were the most prevalent symptoms. (table 3)

Table 3: X-ray results among enrolled cases

Characteristics	Vaccinated	Non-Vaccinated
X-ray Results		
Interstitial infiltrates	55 (68.8%)	60 (75%)
Bilateral Infiltrates	42 (52.5%)	47 (58.8%)
Consolidation	11 (13.8%)	14 (17.5%)
Unilateral infiltrates	4 (5%)	7 (8.8%)

Frequency of discharged patients in group I was greater 66 (82.5%) as compared to non-vaccinated 29 (36.3%). ICU stay and mortality was significantly higher in group II 16 (20%),24 (30%) as compared to group I with p value <0.05. (table 4)

Table 4: Comparison of outcomes among both groups

Outcomes	Vaccinated	Non-Vaccinated
Discharged Patients		
Yes	66 (82.5%)	29 (36.3%)
No	14 (27.5%)	51 (63.7%)
ICU stay	7 (8.8%)	16 (20%)
Mortality	5 (6.3%)	24 (30%)
Hospitalization	2 (2.5%)	11 (13.8%)

DISCUSSION

Significant morbidity and mortality has been caused by the COVID-19 outbreaks, as well as a decrease in personal and social well-being. SARS-CoV-2 infection has claimed the lives of many individuals, yet the vast majority of the population remains at risk of infection. Vaccine development has long been seen as an essential objective because of this fact. Immunizations are now widely accessible, thanks to a flurry of recent research that has moved at a blisteringly fast pace. [16,17]

In our study 160 cases of both sexes had coronavirus disease were included. Among 160 cases, 100 (62.5%) were males and 60 (37.5%) females in this study. Patients were separated in two groups vaccinated and non-vaccinated. In group I mean age was 44.5±7.54 years with mean BMI 29.34±7.44 kg/m^2 and in group II mean age was 44.8±8.66 years with mean BMI 30.6±13.53 kg/m^2. Our results were in line with those of earlier research. [18,19]. In group I 48 (60%) patients were literate and in group II 37 (46.3%) patients were educated. Travel and outdoor work were the most common causes of sickness among patients. Our study found the same outcomes as earlier studies on this pandemic sickness. [20] A p value of 0.05 indicated that the severity of illness was substantially higher in non-vaccinated individuals (76.3 percent) than in group I (30 percent). Patients with diabetes and high blood pressure were the most prevalent comorbidities among all patients. Patients with co-morbid conditions may have lower vaccination efficacy or an increased risk of worsening of a co-morbid condition after a breakthrough infection. [21,22] A total of 55 (68.8%) of the subjects in group I and 60 (75%) of the subjects in group II had interstitial infiltrates. The most common symptoms in both groups were fever, cough, and dyspnea. [23]

Frequency of discharged patients in group I was greater 66 (82.5%) as compared to non-vaccinated 29 (36.3%). Vaccination against pandemic disease was shown to be efficacious and beneficial in these studies. Non-pharmaceutical measures may be required to reduce the pandemic and improve the efficacy of vaccine initiatives, according to our findings.[24] Researchers that used various modelling approaches have come to the same conclusion: vaccines that reduce infection risk are more effective than those that alter the pathogen. [25] ICU stay and mortality was significantly higher in group II 16 (20%),24 (30%) as compared to group I with p value <0.05. [26]

Vaccination against COVID-19 is essential to reducing disease burden and future outbreaks. [27] A vaccine may help reduce the number of hospitalizations and fatalities caused by severe COVID-19 in patients with comorbid conditions or risk factors. As part of its first 100 days in office, the incoming administration must employ public health resources to administer 100 million shots to Americans [28]. Understanding a vaccination's effectiveness profile is critical, even if the efficacy profiles seem to be identical in clinical studies. It will need a larger and faster vaccination deployment to get the same population benefit from vaccines that reduce the risk of SARS-CoV-2 infection and hence shift symptoms to non-symptomatic sickness, which will demand a larger and faster vaccination rollout. [29]

CONCLUSION

This research found that immunization against coronavirus illness is both effective and useful in lowering the severity of the condition. However, vaccination may lower the incidence of bad outcomes (ICU stay) and people should be made aware of the necessity of being vaccinated immediately.

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