

## ORIGINAL ARTICLE

# Comparison of Outcomes between Vaccinated versus Non-Vaccinated Covid-19 Patients

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## ABSTRACT

**Objective:** To compare the outcomes in term of hospital stay and mortality between vaccinated and non-vaccinated covid-19 patients.

**Study Design:** Prospective/Observational

**Place and Duration:** The study was conducted at Medicine department of Fauji Foundation Hospital Rawalpindi and Pak International Medical College Hayatabad Peshawar for six months duration from December 2020 to May 2021.

**Methodology:** One hundred ten patients of either gender with covid-19 disease were enrolled. All the patients were confirmed with RT PCR. Patients were randomly divided into two groups. Group I (vaccinated) comprised of 45 patients and group II (non-vaccinated) comprised of 65 patients. Severity of disease, hospital stay and mortality were compared between both groups. Data was analyzed by SPSS 24.0.

**Results:** There were 74 (67.27%) males while 36 (32.73%) patients were females. Mean age of patients was  $50.54 \pm 12.76$  years. Mean BMI was  $26.23 \pm 2.44$  kg/m<sup>2</sup>. 10 (22.22%) patients in vaccinated group and 40 (61.54%) in nonvaccinated group had severe covid-19 disease, a significant difference was observed regarding severity of disease between both groups with p-value <0.05. Mortality rate and hospital stay were also high in non-vaccinated patients as compared to vaccinated (p-value <0.05).

**Conclusion:** It is concluded that non-vaccinated patients of covid-19 had prolonged hospital stay and high rate of severity of disease and mortality as compared to vaccinated patients.

**Keywords:** Covid-19, Vaccination, Severity, Hospital Stay, Mortality

## INTRODUCTION

After infection, immunity to the SARS-CoV-2 virus that causes COVID-19 has been shown to vary in duration and efficacy [1-2]. There was evidence from clinical trials that vaccines can provide significant immunity in both previously infected and naive subjects, with vaccination success rates ranging from 92% for documented infection to 87% hospitalisation to a staggering 92% severe disease [3-5].

COVID-19 has caused unprecedented levels of morbidity and mortality despite the implementation of movement restrictions, social distance measures, and stay-at-home orders in a number of countries [6-7]. There is still an overwhelming need for an effective COVID-19 vaccine, as the majority of the global population is still susceptible. Vaccine development has accelerated to unprecedented levels to combat the growing threat of COVID-19 [5]. Many vaccine safety and efficacy results have been published as of December 31, 2020, and Phase III clinical trials are underway for a number of other candidates [8-9].

A study found that 12 days after the first dose of the COVID vaccine, individuals in the community showed a significant reduction in infection, which was confirmed in a real world, case-control study conducted in the United Kingdom. Following a 4-month national surveillance period, it was discovered that two doses of BNT162b2 significantly

reduced infections, hospitalizations for COVID-19-related illness, severe disease, and death in Israel [10-11].

There are still people who contract COVID-19 despite vaccination, and new virus variants could emerge as transmission becomes more widespread (as with B.1.1.7 [the alpha variant]). According to early findings from a real-world case-control study, variants of concern had lower levels of neutralisation in vitro, even when compared to the original outbreak variant, and led to higher post-vaccination infection rates [12-13]. The International Severe Acute Respiratory and Emerging Infection Consortium data show a mortality of 27% (400 out of 1482) in people hospitalised with COVID-19 in the UK more than 21 days after vaccination, similar to mortality rates observed during the first wave [14-15].

We conducted present study to compare the outcomes such as severity of disease, hospital stay and mortality between vaccinated and unvaccinated patients of covid-19 disease.

## MATERIALS AND METHODS

This prospective/observational study was conducted at Medicine department of Fauji Foundation Hospital Rawalpindi and Pak International Medical College Hayatabad Peshawar for six months duration from December 2020 to May 2021. Total 110 patients of both genders presented with covid-19 disease were enrolled in

this study. Patients' ages were ranging between 25 to 75 years. Confirmed cases RT PCR were included. After taking written informed consent from all the patients, detailed demographics including age, sex, BMI, sign and symptoms, and vaccination status were recorded. Patients who did not report an RT-PCR or LFAT test and those with no written consent were excluded.

Patients were randomly divided in to two groups. Group I (vaccinated) comprised of 45 patients and group II (non-vaccinated) comprised of 65 patients. Severity of disease, hospital stay and mortality were compared between both groups. All the data was analyzed by SPSS 24.0, Chi-square test was done to compare severity of disease, hospital stay and mortality between both groups. P-value <0.05 was considered as statistically significant.

## RESULTS

Out of 110 patients, 74 (67.27%) were males while 36 (32.73%) patients were females. Mean age of patients was  $50.54 \pm 12.76$  years. Mean BMI was  $26.23 \pm 2.44$  kg/m<sup>2</sup>. Among vaccinated patients 25/45 (55.56%) were completely vaccinated (two doses) while 20 (44.44%) patients were partially vaccinated (one dose). According to the symptoms, 58 (52.73%) patients had fever, 32 (29.09%) patients had cough, dyspnea found in 30 (27.27%) patients, 15 (13.64%) patients had myalgia and 12 (10.91%) patients had vomiting. (Table 1)

Table No 1: Baseline details of all the patients

Variables	Frequency No.	%age
Mean Age (years)	$50.54 \pm 12.76$	-
BMI (kg/m)	$26.23 \pm 2.44$	-
<b>Gender</b>		
Male	74	67.27
Female	36	32.73
<b>Vaccination Status (n=45)</b>		
Partially	20	44.44
Complete	25	55.56
<b>Symptoms</b>		
Fever	58	52.73
Cough	32	29.09
Dyspnea	30	27.27
Myalgia	15	13.64
Vomiting	12	10.91

We found that 10 (22.22%) patients in vaccinated group and 40 (61.54%) in unvaccinated group had severe covid-19 disease and 35 (77.78%) and 25 (38.46%) patients in vaccinated and unvaccinated groups had moderated covid-19 disease, a significant difference was observed regarding severity of disease between both groups with p-value <0.05. (Table 2)

Table No 2: Comparison of severity of disease between both groups

Variables	Group I (vaccinated)	Group II (unvaccinated)	P-value
<b>Disease severity</b>			0.0164
Severe	10 (22.22%)	40 (61.54%)	
Moderate	35 (77.78%)	25 (38.46%)	
<b>Total</b>	<b>45 (100%)</b>	<b>65 (100%)</b>	

We found that hospital stay was prolonged in unvaccinated patients  $18.24 \pm 4.46$  days as compared to vaccinated patients  $10.44 \pm 2.52$  days, a significant difference was

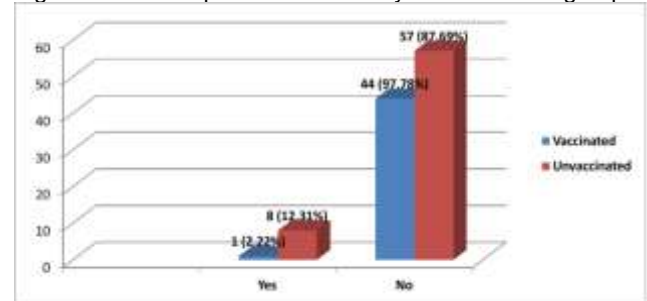
observed between both groups with p-value 0.001. (Table 3)

Table No 3: Comparison of Hospital stay between both groups

Variables	Group I (vaccinated)	Group II (unvaccinated)	P-value
Hospital Stay (days)	$10.44 \pm 2.52$	$18.24 \pm 4.46$	0.001

Mortality rate was also high in unvaccinated group 8 (12.31%) as compared to vaccinated group in 1 (2.22%) patient, a significant difference was observed between both groups with p-value <0.05. (Figure 1)

Figure No 1: Comparison of mortality between both groups



## DISCUSSION

As a result of the COVID-19 outbreaks, individuals and communities have suffered significant morbidity and mortality, as well as economic and social harm. While the death toll from SARS-CoV-2 has risen dramatically, the majority of the population remains at risk [16]. As a result, research and development on vaccines has received significant attention. Vaccine development efforts have reached unprecedented heights of scale and speed, and the first widely available doses of highly protective vaccines are now being distributed. CoVid-19 vaccines with 95 percent efficacy in preventing disease have been found to significantly reduce future attack rates and hospitalizations and deaths, even if they provide only limited protection against infection in healthy individuals.

In present study 110 patients were analyzed among them 45 patients were vaccinated while 65 were unvaccinated. Majority 74 (67.27%) were males while 36 (32.73%) patients were females. Mean age of patients was  $50.54 \pm 12.76$  years. Mean BMI was  $26.23 \pm 2.44$  kg/m<sup>2</sup>. Among vaccinated patients 25/45 (55.56%) were completely vaccinated (two doses) while 20 (44.44%) patients were partially vaccinated (one dose). These results were comparable to many of previous studies in which male patients with covid-19 disease were high in numbers 60% to 75% as compared to females and the average age of patients was 55 years [17-18].

In our study we found that 10 (22.22%) patients in vaccinated group and 40 (61.54%) in unvaccinated group had severe covid-19 disease and 35 (77.78%) and 25 (38.46%) patients in vaccinated and unvaccinated groups had moderated covid-19 disease, a significant difference was observed regarding severity of disease between both groups with p-value <0.05. Studies demonstrated that, patients who are unvaccinated had significantly association

with severe covid-19 disease as compared to vaccinated patients [10, 19].

In present study we found that hospital stay was prolonged in unvaccinated patients  $18.24 \pm 4.46$  days as compared to vaccinated patients  $10.44 \pm 2.52$  days, a significant difference was observed between both groups with p-value 0.001. A study by Moghadas SM et al [20] reported that unvaccinated patients with covid-19 disease had prolonged hospitalization as compared to vaccinated patients.

We found that mortality rate was also high in unvaccinated group 8 (12.31%) as compared to vaccinated group in 1 (2.22%) patient, a significant difference was observed between both groups with p-value <0.05. Study conducted by Muthukrishnan J et al [21] demonstrated that those fully vaccinated, there was 12.5% (23/184) mortality while it was 31.45 % (309/984) among the unvaccinated (OR 0.3, 95% CI 0.2 to 0.5, p<0.0001). In a logistic regression model, complete vaccination status and younger age were found to be associated with survival.

Previous researches stated that vaccination reduces the mortality rate and severity of disease caused by SARS-CoV-2 [21-22]. However, breakthrough cases are now being reported owing to the emergence of SARS-CoV-2 variants. Some of the variants are capable of evading the immune protection induced via vaccination or natural infection.

To date, all the available vaccines have been developed against the spike protein of the original SARS-CoV-2 strain. The evasion of immune responses by the SARS-CoV-2 variants, especially the Delta variant, has questioned the effectiveness of the available COVID-19 vaccines.

## CONCLUSION

We concluded that non-vaccinated patients of covid-19 had prolonged hospital stay and high rate of severity of disease and mortality as compared to vaccinated patients.

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