DOI: https://doi.org/10.53350/pjmhs211572334

ORIGINAL ARTICLE

Comparison of Severity of Symptoms and Outcome among Vaccinated and Non-Vaccinated Covid 19 Patients in Khyber Pakhtunkhwa, Pakistan

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ABSTRACT

Objective: The aim of this study is to compare the severity of symptoms and outcomes among vaccinated and non-vaccinated COVID 19 patients in Khyber Pakhtunkhwa, Pakistan

Study Design: A Retrospective/ Comparative study

Place and Duration: The study was conducted at Medicine department of Lady Reading Hospital, Peshawar and DHQ Category A Hospital, Batkhela for duration of six months between December 2020 and May 2021.

Methods: Total 170 patients of both genders had coronavirus disease were presented in this study. Patients were aged between 20-80 years. Demographical details of patients including age, sex, body mass index, residency and socio-economic status were recorded after taking informed written consent. Patients were admitted in COVID 19 ward. There were 70 vaccinated patients in group I and 100 non-vaccinated patients in group II. Co-morbidities among both groups were assessed. Effectiveness and outcomes among both groups were calculated in terms of mortality and reduction in severity of disease. Complete data was analyzed by SPSS 19.0 version.

Results: There were 114 (67.1%) patients were males (50 in group I and 64 in group II) and 56 (32.4%) were females (28 in each group). Mean age of the vaccinated patients was 49.16 ±8.55 years with mean BMI 33.16 ±4.64 kg/m^2 and in group II mean age was 47.18 ±4.77 years with mean BMI 31.12±12.73 kg/m^2.Among 70 cases of group I, 40 (57.1%) were fully vaccinated and 30 (42.9%) patients received their first dose. 50 (71.4%) were educated in group I and in group II 46 (46%) patients were literate. Co-morbidities were diabetes mellitus, hypertension, ischaemic heart and chronic lung disease. Effectiveness among patients of group I was greater 55 (78.6%) as compared to non-vaccinated 36 (36%). Frequency of adverse outcomes hospitalization 10 (10%), ICU admission 14 (14%) and mortality 40 (40%) among non-vaccinated patients were significantly higher as compared to vaccinated patients in which hospitalization 3 (4.3%), ICU admission 2 (2.9%) and mortality was found in 10 (14.3%) cases.

Conclusion: We concluded in this study that vaccination against coronavirus disease was effective and helpful for the reduction in severity of the disease. Except this the frequency of adverse outcomes (hospitalization, ICU admission and mortality) can be minimized by vaccination and there is need to give awareness among people to get vaccinated early.

Keywords: COVID 19, Vaccination, Pandemic, Mortality

INTRODUCTION

BNT162b2 from Pfizer/BioNTech and mRNA-1273 from Moderna were both 94%-95% effective in avoiding symptomatic COVID-19 in phase III studies and showed similar efficacy in diverse age groups, including those older than 75 years and those with co-morbidities [1,2]. The cumulative COVID-19 cases and deaths in Israel were 839 162 (9269/100,000) and 6396 (70/100,000), respectively, by 20 May 2021. BNT162b2 was used only in the Israeli immunization campaign that began on December 19, 2020.[3] Up until mid-May 2021, more over 5.4 million people have received two doses, covering roughly 55% of the population, and nearly 88% of persons over the age of fifty. Its real-life vaccination efficacy was comparable to that reported in phase III studies [4,5] and had a considerable influence on the local dynamics of COVID-19 [6], with cases dropping to 30 new cases/week (0.3/100,000) by 20 May 2021. When it comes to vaccinations, elderly adults and those with various co-morbidities have been demonstrated to be less successful [7]. After the second dosage, a case-control study indicated that the vaccine was successful in preventing hospitalization due to COVID-19 by 87 percent [4], and a later comparison of person-time incidence rates from an Israeli national registry found that the vaccine was efficacious by 96 percent. On the other hand, there are findings from the United States showing that any mRNA vaccine is effective at 94% after two doses [8] and from the United Kingdom demonstrating that a single dose of BNT162b2 can prevent hospitalization at a rate of 80-91% [9,10].

There is a lack of information on the nature of COVID-19 vaccine-induced illnesses. After immunization, research participants who were hospitalized with COVID-19 did not have any published data on their clinical features or serological correlates of protection. These pivotal research did not include immunocompromised patients. Immunogenicity of BNT162b2, as measured by recent studies, was found to be lower in kidney and liver transplant recipients [11,12] and in patients with chronic

lymphocytic leukaemia (CLL) [13]. Haemodialysis recipients also showed significantly lower seroconversion and anti-Spike IgG titres than healthy individuals [14,15].

As a result of the COVID-19 pandemic's severe morbidity and death, a number of nations have adopted unprecedented travel restrictions, social distancing measures, and stay-at-home directives. However, the vast majority of the world's population is still susceptible to COVID-19, underscoring the need for a vaccination that is very effective. For COVID-19 to be contained, vaccine development has accelerated to unprecedented levels [18]. To date [19], a number of vaccines have shown safety and efficacy [20], and several others are undergoing Phase III clinical trials.One study (Pfizer - BioNTech) and another (Modera), both of which were major efficacy studies, showed vaccination efficacy of over 90% against symptomatic and severe illness, which is higher than WHO's chosen population-based efficacy standard (FDA).

The aim of this study is to compare the severity of symptoms and outcomes among vaccinated and non-vaccinated COVID 19 patients in Khyber Pakhtunkhwa, Pakistan.

MATERIAL AND METHODS

This retrospective/comparative study was conducted at Medicine department of Lady Reading Hospital, Peshawar and DHQ Category A Hospital, Batkhela for duration of six months between December 2020 and May 2021. The study consisted of 170 patients of corona virus disease. Detailed demographics of cases including age, sex and body mass index were recorded after taking informed written consent. Pregnant women and those did not give written consent were excluded from this study.

Patients were aged between 20-80 years. There were 70 vaccinated patients in group I and 100 non-vaccinated patients in group II. A variety of SARS-CoV-2 PCR tests were used in participating centres, and cycle threshold (Ct) values were reported according to specific gene targets, but were also compared to the lowest Ct value of any gene target chosen as a surrogate for viral load. Local anti-Spike antibody tests were conducted with the help of two commercial kits: the Liaison SARS-CoV-2-S1/S2-IgG (Diasorin, Saluggia, Italy) with a positive cut-off of >15 units/mL, and the Architect Advise Dx SARS-CoV-2-IgG-II (Abbott, Lake Forest, IL, USA) with a positive cut-off of >50 units/mL. In order to detect variations of concern in accessible samples, viral genome sequencing was undertaken, with findings classed as wild-type, B.1.1.7, B.1.351, or other variants of concern.

Co-morbidities among both groups were assessed. Effectiveness and outcomes among both groups were calculated in terms of mortality and reduction in severity of disease. Complete data was analyzed by SPSS 19.0 version. Frequencies and percentages were used for categorical variables.

RESULTS

There were 114 (67.1%) patients were males (50 in group I and 64 in group II) and 56 (32.4%) were females (20 in group I and 36 in group II). Mean age of the vaccinated patients was 49.16 ±8.55 years with mean BMI 33.16 ±4.64 kg/m^2 and in group II mean age was 47.18 ±4.77 years with mean BMI 31.12±12.73 kg/m^2.Among 70 cases of group I, 40 (57.1%) were fully vaccinated and 30 (42.9%) patients received their first dose. 50 (71.4%) were educated in group I and in group II 46 (46%) patients were literate. Travelling and outdoor work was the most common cause of disease among patients.(table 1)

Table 1: Baseline details of enrolled cases

Characteristics	Group I (n=70)	Group II (n=100)
Mean age (years)	49.16 ±8.55	47.18 ±4.77
Mean BMI (kg/m^2)	33.16 ±4.64	31.12±12.73
Gender		
Male	50 (71.4%)	64 (64%)
Female	20 (28.6%)	36 (36%)
Status of Vaccination		
Complete	40 (57.1%)	-
1st doze	30 (42.9%)	-
Literacy		
Yes	50 (71.4%)	46 (46%)
No	20 (28.6%)	54 (54%)
Cause of Disease		
Travelling	35 (50%)	48 (48%)
Outdoor work	20 (28.6%)	36 (36%)
Gathering	15 (21.4%)	16 (16%)

Severity of disease among non-vaccinated patients was high found in 76 (76%) cases as compared to vaccinated cases 22 (31.4%). Co-morbidities were diabetes mellitus, hypertension, ischaemic heart and chronic lung disease. (table 2)

Table 2: Comparison of severity and co-morbidities among patients of both groups

Characteristics	Vaccinated (n=70)	Non-Vaccinated (n=100)
Severity of Diseases		
Yes	22 (31.4%)	76 (76%)
No	48 (68.6%)	24 (24%)
Co-morbidities		
diabetes mellitus	25 (35.7%)	40 (40%)
hypertension	20 (28.6%)	32 (32%)
ischaemic heart disease	15 (21.4%)	20 (20%)
chronic lung disease	10 (14.3%)	8 (8%)

Effectiveness among patients of group I was greater 55 (78.6%) as compared to non-vaccinated 36 (36%). (table 3)

Table 3: Comparison of efficacy among both groups

Characteristics	Vaccinated (n=70)	Non-Vaccinated (n=100)
Effectiveness		
Yes	55 (78.6%)	36 (36%).
No	15 (21.4%)	64 (64%)

Table 4: Comparison of adverse outcomes between both groups

Characteristics	Vaccinated (n=70)	Non-Vaccinated (n=100)
Adverse Outcomes		
Hospitalization	3 (4.3%),	10 (10%),
ICU admission	2 (2.9%)	14 (14%)
Mortality	10 (14.3%)	40 (40%)

Frequency of adverse outcomes hospitalization 10 (10%), ICU admission 14 (14%) and mortality 40 (40%) among non-vaccinated patients were significantly higher as

compared to vaccinated patients in which hospitalization 3 (4.3%), ICU admission 2 (2.9%) and mortality was found in 10 (14.3%) cases.(table 4)

DISCUSSION

COVID-19 outbreaks have resulted in severe morbidity and mortality over the world, as well as a decline in the economic and social well-being of individuals and groups. Although SARS-CoV-2 infection has taken a heavy toll, the majority of the population is still susceptible [21]. As a result, the development of vaccines has been a top priority. Too far, vaccine development has been carried out at a record-breaking pace, and highly protective vaccinations are now available. An analysis of 170 mRNA COVID-19-vaccinated patients who developed a major breakthrough infection that led to hospitalization is reported in this study, which includes a full description.

In this retrospective study 70 vaccinated and 100 non vaccinated patients of both genders were presented. Majority of the patients 114 (67.1%) were males and only 56 (32.9%) cases were females. Mean age of the vaccinated patients was 49.16 ±8.55 years with mean BMI 33.16 ±4.64 kg/m^2 and in group II mean age was 47.18 ±4.77 years with mean BMI 31.12±12.73 kg/m^2. Our findings were comparable to the previous studies.[22,23] Among 70 cases of group I, 40 (57.1%) were fully vaccinated and 30 (42.9%) patients received their first dose. 50 (71.4%) were educated in group I and in group II 46 (46%) patients were literate. Travelling and outdoor work was the most common cause of disease among patients. Different previous researches on this pandemic disease presented same results to our study.[24] Severity of disease among non-vaccinated patients was high found in 76 (76%) cases as compared to vaccinated cases 22 (31.4%). Co-morbidities were diabetes mellitus, hypertension, ischaemic heart and chronic lung disease. In individuals with co-morbidities, vaccine effectiveness may be decreased, or the risk of co-morbidity exacerbation following a breakthrough infection may be higher. [25]

In our study effectiveness among patients of group I was greater 55 (78.6%) as compared to non-vaccinated 36 (36%). These results presented that vaccination against pandemic disease was effective and helpful. According to our findings, non-pharmaceutical approaches may be needed to slow down the pandemic and boost the efficiency of vaccination campaigns.[26,27] A similar result has been reached by other modeling teams: vaccines that reduce susceptibility to infection will have a higher impact than those that modify the disease itself will have. [28,29] To be clear: our study implies that the 78.6% anticipated death reduction with high vaccination coverage (50 percent) can only be achieved if a "susceptibility-reducing" vaccine is introduced promptly in a well-controlled epidemic setting, and not in the middle of an epidemic wave. Other research have also emphasized the need of a rapid vaccine introduction. [30] Frequency of adverse outcomes hospitalization 10 (10%), ICU admission 14 (14%) and mortality 40 (40%) among non-vaccinated patients were significantly higher as compared to vaccinated patients in which hospitalization 3 (4.3%), ICU admission 2 (2.9%) and mortality was found in 10 (14.3%) cases.[31]

To lower disease burden and future outbreaks, immunization is a vital preventative intervention due to the poor population-level immunity against COVID-19 [32]. No doubt, a vaccine could help reduce the frequency, hospitalizations, and deaths related with severe COVID-19 in vulnerable persons with comorbidities and risk factors. In order to meet the aim of distributing 100 million vaccination doses over 100 days to the US population by the incoming administration, public health resources must be mobilized [33].

The results of this analysis reveal that it is vital to properly understand the efficacy profile of the vaccine, since vaccines with varied efficacy profiles may demonstrate equal efficacy in clinical studies, but have a very different impact on the general population. It is important to note, in particular, that vaccines that prevent COVID-19 disease but not SARS-CoV-2 infection, and thus shift symptoms to asymptomatic infections, will prevent fewer infections than those that reduce susceptibility to infection, and will require a larger and faster vaccination rollout to achieve the same population impact as those that reduce susceptibility.

CONCLUSION

We concluded in this study that vaccination against coronavirus disease was effective and helpful for the reduction in severity of the disease. Except this the frequency of adverse outcomes (hospitalization, ICU admission and mortality) can be minimized by vaccination and there is need to give awareness among people to get vaccinated early.

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