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## Research Article

### The Impact of COVID-19 Vaccination On The COVID-19 Outbreak in Nangarhar University Teaching Hospital

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#### Abstract:

**Background:** It is easy for COVID-19 disease to transfer from one person to another because it is a contagious viral illness. It easily spreads from an infected person to a healthy person and can result in severe symptoms, sickness, and ultimately death if prevention efforts are not made in time. So the world is trying to reduce the disease pandemic by producing a vaccine. The COVID-19 sampling facility at Nangarhar University Teaching Hospital is present; therefore, we assess the effect of COVID-19 vaccination on the COVID-19 outbreak in patients with unvaccinated patients and vaccinated patients.

**Materials And Methods:** We are doing this research to test the effectiveness of the vaccine to prevent COVID-19 and to see how effective the vaccine is. We are doing this research on people who are older than 18 years old, and we are weighing both men and those who are more exposed to COVID-19. We made a questionnaire for patients (occurrence of COVID-19 in unvaccinated and vaccinated individuals) to come to the COVID-19 sampling collection center from 2021–2022 as a cross-sectional method in Nangarhar University Teaching Hospital. In this period, 1019 suspected cases were recruited: 147 cases were positive, 855 cases were negative, 11 cases were rejected, and 6 cases were pending. Vaccinated individuals were vaccinated with one dose Janssen American vaccine, Sanofi two-dose China vaccine, and Coovax two-dose Indian vaccine. 129 cases were positive in non-vaccinated individuals, and 18 cases were positive in vaccinated individuals. Excel and SPSS-IBM version-26 were used to examine the research data.

**Results:** In this research, 1019 suspected cases were recruited, of which 14.42% (147) were positive, 83.90% (855) were negative, 1.07% (11) were rejected, and 0.5% (6) were pending. All patients were over 18 years of age. 12.65% (129) cases were positive in non-vaccinated individuals, and 1.76% (18) cases were positive in vaccinated individuals. The attack rate of COVID-19 in an unvaccinated individual was 12.659%, and the attack rate of COVID-19 in a vaccinated individual was 1.766%. The total prevalence of COVID-19 in the community was decreased by vaccination. In those who had not received the vaccine, the incidence rate of COVID-19 was 12,659, while it was 1.766 in those who had. As a result, vaccination significantly decreased mortality, ICU hospitalizations, and both non-ICU and ICU hospitalizations.

**Conclusions:** Our findings showed that the occurrence of COVID-19 cases was decreased in vaccinated patients compared to unvaccinated patients. Therefore, to decrease the prevalence of COVID-19, it is necessary to vaccinate the community against COVID-19.

**Keywords:** COVID-19, Vaccines, Outbreak, Incidence rate, vaccinated individual and unvaccinated individual.

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## 1. Introduction:

Because COVID-19 disease is a contagious viral disease, it spreads easily from one person to another. If you do not prevent it from spreading in time, it can easily spread from an infected person to a healthy person and cause severe symptoms, illness, and eventually death. The best way to prevent travel restrictions, to avoid close contact, to take social distance, observe isolation rules, stay at home, and be vaccinated. Therefore, we are trying to find out how much the spread of the coronavirus is in unvaccinated and vaccinated people. Because today in the whole world and in Afghanistan, the spread of the coronavirus is increasing and causing deaths and fatal diseases, I know it is necessary to discuss the effectiveness of the coronavirus vaccine so that people are encouraged to get it. Despite the fact that travel has decreased in all countries, social isolation laws are being followed, and people are not leaving their homes, the deaths and diseases of Covid-19 are still increasing, and it is a serious threat to the people of the world. It is necessary to increase the effectiveness of the vaccine. The vaccine reduces the spread of Covid-19 in society. (Seyed Moghadas, 2020). On December 31, 2020, the effectiveness and safety of several vaccines were achieved. The effectiveness of the vaccines against the deadly symptoms and disease of Coronavirus (Pfizer, BioNTech, and Moderna) was over 90%. The effectiveness of the vaccine has been accepted by the WHO and FDA. (Seyed Moghadas, 2021)<sup>[1]</sup>. Now, the immunity against Covid-19 for people at risk and medical personnel is being urgently implemented so that society is protected from the transmission and complications of Covid-19. They made a diagnosis and assessment to identify and immunize people who were at high risk. People at serious risk are healthy people. People who are 65 years old or older and have co-morbidities are very favorable for Covid-19. Co-morbidities include diabetes, high blood pressure, for which these people are 2-4 times more susceptible to develop severe disease than COVID-19 patients without comorbidities are, supports this priority. The severity of the covid-19 disease and its deaths are high. Elderly people are under the severity of the disease and death is high. (Moghadas, 2021)<sup>[1]</sup>. The representative of UNICEF<sup>[2]</sup> in Afghanistan states that more than 1.4 million doses of Johnson & Johnson's COVID-19 vaccination were transferred to Afghanistan. (Hervé Ludovic De Lys, 2021). Under the COVAX Facility's dose-sharing system, the United States supplied 1,484,900 doses to the Government of Afghanistan (Hervé Ludovic De Lys, 2021). This was the first of two vaccine sets that were delivered this month; around 3.3 million doses were donated. "These vaccines arrived for Afghanistan at a crucial time as the country was dealing with inspiring stream of COVID-19 infections (Hervé Ludovic De Lys, 2021). It was difficult to distribute the coronavirus vaccine in many areas of Afghanistan, but the dose-sharing mechanism speeded up this work, and it was distributed to the deserving people in the first step. This work was of vital

value in Afghanistan because Afghanistan was in a state of war on the one hand and fighting against the coronavirus on the other hand, and thanks to the UNICEF administration, this work was possible. It was appreciated. In Afghanistan, the government in order to protect them from danger and distribute vaccines regularly should do more work. (Hervé Ludovic, 2021). The total number of people infected with coronavirus in Afghanistan was 131,586, of whom 5,561 died between April 2020 and July 8, 2021. In addition, the number of cases was increasing day by day because the third wave of Corona started in June 2021, when almost 2000 new cases were found and 100 people died every day. (Hervé Ludovic, 2021). To name just a few of the several pharmacological approaches that could be used to treat COVID-19, there are small-molecule drugs, interferon therapies, vaccines, oligonucleotides, peptides, and monoclonal antibodies. 63.1% of the world's population has received a COVID-19 immunization at least once. (Ita, 2021). There have been 10.77 billion doses administered worldwide, and there are now 24.77 million doses administered daily. Just 12.9% of people in low-income countries have received at least one dose. (Edouard Mathieu and Hannah Ritchie, 2021)<sup>[4]</sup>. There have been 10.77 billion doses administered globally, and there are now 24.77 million doses administered every day. Just 12.9% of adults in low-income nations have received at least one dose. (Edouard Mathieu and Hannah Ritchie, 2021)<sup>[4]</sup>. Despite fatality rates in disease peaks substantially dropping as vaccination rates increased, the Omicron, a variant of concern, caused mortality rates to increase once more, making the virus the second biggest cause of death in the United States in January 2022. (Ahmad Shahabad, 2022). The coronavirus is a very contagious virus that causes diseases and death, and it is considered the second leading cause of death in the world. In January 2021, the death rate in America was between the ages of 25 and 44. The main reason for this death was the lack of vaccines. (Seyed Ahmad Seyed Ali November 17, 2021). The COVID-19 vaccination dataset from Our World in Data provides data on the scope and speed of the deployment of vaccines around the world. (Mathieu, 2021)<sup>[4]</sup>. We forecast the health and financial impacts of several vaccination scenarios in Sindh Province, Pakistan, to close the knowledge gap in vaccination prioritization. (Pearson, 2021)<sup>[5,6]</sup> Our objective is to ascertain how the COVID-19 vaccination affected the outbreak of the disease at Nangarhar University Teaching Hospital.

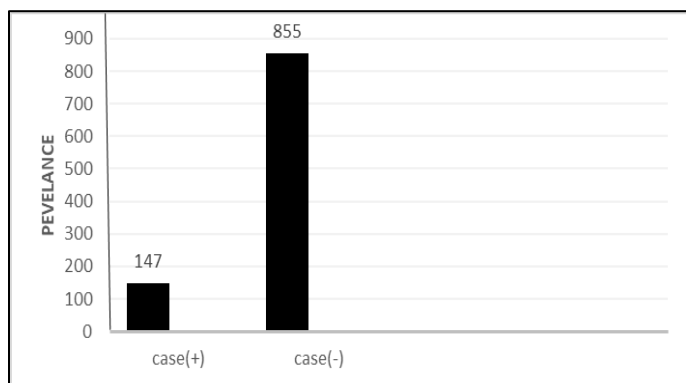
## 2. Materials and Methods

In order to assess the vaccine's ability to prevent COVID-19 and determine its efficacy, we are conducting this study. We are conducting this study on adults older than 18, and we are giving equal weight to men and to individuals who have had greater exposure to COVID-19. As a cross-sectional technique in Nangarhar University Teaching Hospital, we created a questioner for patients (presence of COVID-19 in unvaccinated

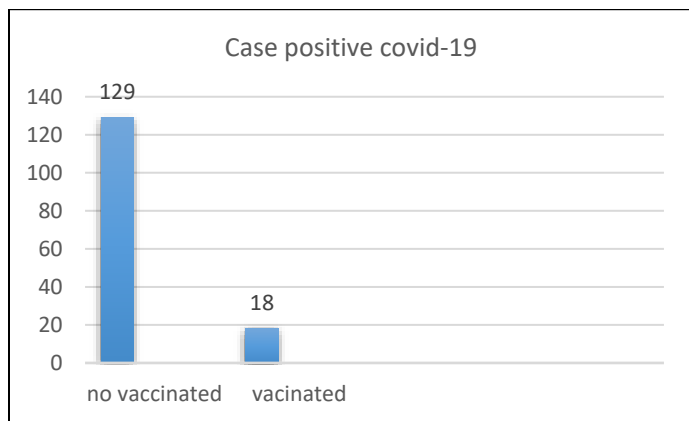
and vaccinated individuals) to come to the COVID-19 sampling collection facility from 2021–2022. 1019-suspected cases were recruited during this time, of which 147 were positive, 855 were negative, 11 were rejected, and six were still waiting. Individuals who received vaccinations received one dosage of the American vaccine Janssen, two doses of the vaccine from China's Sanofarm, and two doses of the Indian vaccine Coeshild. 18 cases among those who had received vaccinations and 129 cases among those who had not were positive. The research data were examined using Excel and SPSS-IBM version 26.

### 3. Results

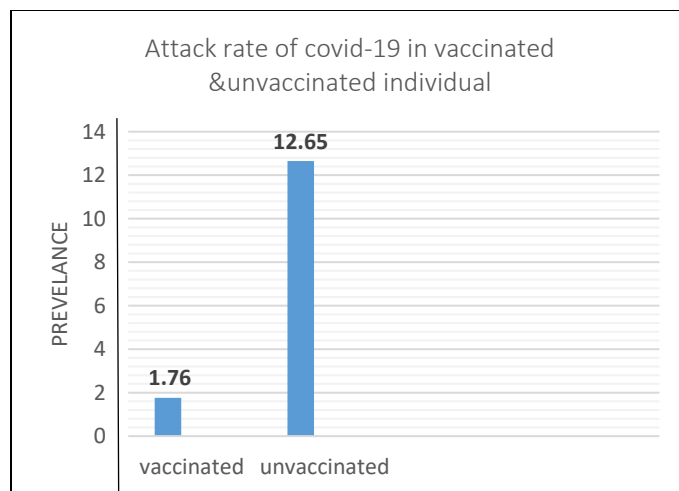
In this research 1019-suspected case were recruited, there were 14.42% (147) case positive, 83.90% (855) case was negative **Fig. 1**. All patients were over 18 years of age. 12.65 % (129) case positive was in no vaccinated individual and 18(1.76%) case was positive in vaccinated individual **Fig. 2**. The total prevalence of COVID-19 in the community was decreased by vaccination. Covid-19 attacks occurred at an incidence of 12.659% in unvaccinated people and 1.766% in those who had received the vaccine **Fig. 3**. As a result, vaccination significantly decreased mortality, ICU hospitalizations, and both non-ICU and ICU hospitalizations.



**Fig. 1:** Covid-19 cases in Nangarhar University Teaching Hospital. (+) Positive cases, (-) Negative cases. The prevalence of positive cases was 147(14.42%).



**Fig. 2:** Positive cases of Covid-19 in Nangarhar University Teaching Hospital.



**Fig. 3:** Prevalence of Covid-19 in Vaccinated and unvaccinated people at Nangarhar University Teaching Hospital. The prevalence of Unvaccinated was higher as compared to Vaccinated.

### 4. Discussion

In this research 1019 suspected case were included, there were 147(14.42%) case positive ,855(83.90%) case was negative. 129(12.65%) case positive was in no vaccinated individual and 18(1.76%) case was positive in vaccinated individual. The prevalence of COVID-19 in the population has substantially declined because of vaccination. It is still essential to be vaccinated in order to reduce the disease burden and prevent outbreaks in the future, especially for people who have COVID-19 risk factors and concomitant conditions. Continued public health initiatives and attention to other components of infection, such as masking, hand cleanliness, testing, contact tracing, and isolation of infected cases, are necessary for prevention. The importance of this research is that the more people's understanding of the prevention and vaccine of the Corona virus increases, the more occurrences of the Corona virus will decrease. The Corona virus vaccine is safe. There was no limitations data collection and analysis in this research. Over a 300-day period, immunization decreased the total assault rate from 9.0% to 4.6%. (Seyed Moghadas, 2021). General, immunization to lower-COVID risks or probabilities, and preliminary data suggests that two doses are more effective than one dose. (Notarte and Catahay, 2022)<sup>[8]</sup>. COVID-19 vaccination prevents the extinction of human life. (Watson and Barnsley, 2022)<sup>[9]</sup>. Vaccination reduces the incidence of COVID-19, reduces the death caused by COVID-19, and reduces the hospitalization of COVID-19 patients. (Albani and Loria, 2021)<sup>[10]</sup>. with a daily vaccination capability of 0.25 percent of the local population, this is based on the assumption that 50% of the population is inoculated. (Alagoz and Sethi, 2021)<sup>[11]</sup>. A COVID-19-free Jakarta could be achieved through vaccination and infection detection (Aldila, and amiadji, 2021)<sup>[12]</sup>. The number of COVID-19 cases and hospitalizations overall has grown much more slowly in the US because to vaccination.

(Chen and Huang, 2022). Hospitalizations and increase in vaccination coverage decline the frequency of infections. (Tonnara, and Piselli, 2022).

## 5. Conclusion

Our results demonstrate that immunization, even with a minimal level of infection protection, can drastically lower COVID-19 outbreaks. According to our research, vaccinated patients experienced fewer COVID-19 cases than unvaccinated patients did. Therefore, vaccination of the population against COVID-19 is required to reduce its prevalence. Hands should be cleaned with alcohol paste and soap; the mouth should be covered with a mask; the nose should be covered with a mask; and people should be met outside. The government should make a national effort to reduce the incidence of coronavirus; the vaccine should be distributed free of charge; the tests for coronavirus should be carried out free; and the treatment of coronavirus patients should be free of charge.

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**Conflict of Interest:** All the researchers in this research were of the same opinion, and there were no conflicting opinions.

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**Authors Contributions:** Dr. Saifullah did the analysis, selection, the collection of data and writing of the research.

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