



VACCINATION STATUS AMONG COVID-19-POSITIVE CASES ADMITTED IN ISOLATION CENTERS

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ABSTRACT

This study aimed to study the vaccination status among Coronavirus disease 2019 (COVID-19)-positive cases admitted in isolation centers in Sudan. This is an analytical, cross-sectional, hospital-based study. It was conducted in isolation centers from January to June 2022. An organized, structured, and pretested questionnaire was used in this study (n = 297). The majority of the study participants were aged more than 60 years (71%), most of the study participants were males (58.7%), and the majority of the participants were residents in rural areas (52.7%). Most participants had COVID-19 symptoms for 1 to 2 weeks (81.7%), and only 7 (2.3%) were vaccinated. This study found that those vaccinated were more likely to be improved and discharged. In addition, this study found that lack of oxygen and mechanical ventilation was associated with deaths. Vaccination is considered an important tool to reduce the risk of many infectious diseases. The current study found that vaccination against COVID-19 is effective and can reduce the risk of COVID-19 infection. Based on that, more people should consider taking the vaccine.

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Introduction

The coronavirus disease 19 global pandemic has caused over 216 million cases and 4,50 million deaths as of 30 August 2021. The severe acute respiratory syndrome (SARS) coronavirus 2 belongs to the family Coronaviridae. It is known to be responsible for the outbreak of acute atypical respiratory infections that can be fatal in vulnerable individuals. Infection is transmitted through the inhalation of droplets and interaction with contaminated surfaces [1].

Several coronavirus vaccines have been fast-tracked to control the pandemic. The usage of immune adjuvants that can boost immunological memory has come to the surface. This is important given the rate of failure of seroconversion and reinfection after COVID-19 infection, which could make vaccine rate and response debatable. Vaccines can stop most people from getting sick with covid 19, but not everyone [2].

An efficacious vaccine is essential to prevent further morbidity and mortality. Vaccination can be regarded as one of the most effective weapons to eliminate the pandemic, but the impact of the vaccine on daily COVID-19 new cases and deaths is unclear. Scientists have claimed that the development of effective vaccines and rapid vaccination programs are the foremost measures to manage the COVID-19 pandemic [3].

The goal of the vaccine is to protect humans against severe COVID-19 infection and death. It offers strong protection, but that protection takes time to build.

All required doses of the vaccine must be taken to build full immunity, and it takes 2_3 weeks from the final vaccination to be fully effective. Even after someone takes all of the recommended doses and waits a few weeks for immunity to build up, there is still a chance they can get infected [3].

This study aimed to evaluate the correlation between the vaccine and newly confirmed cases and deaths of COVID-19 in the

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Materials and Methods

Study Design

This is an analytical, cross-sectional, hospital-based study.

Study Area

The study was conducted in isolation centers at River Nile State hospitals.

Study Duration

Data were collected over a month from January to June 2022.

Study Population

The study population of this study was the COVID-19 patients who were admitted to an isolation center in a hospital in the River Nile state.

Inclusion Criteria

- Patients who are 18 years and older
- Confirmed to have COVID-19 infection
- Admitted within the study period
- Accept participation in a study

Exclusion Criteria

Patients who were admitted to isolation centers outside the River Nile state.

Sampling

The total coverage method was used in this study.

Data Collection

An organized, structured, and pretested questionnaire was used in this study. Data were collected by the researcher. Adult patients who confirmed COVID-19 infection were included in the study; a structured questionnaire.

Data Analysis

Data were reviewed, ordered, and then entered into an Excel spreadsheet. Data were analyzed using Statistical Package for Social Sciences (SPSS) Windows version 26. The appropriate statistical tests were used (t-test or One-Way ANOVA). Descriptive data were presented in tables and/or figures.

Ethical Consideration

Ethical approval was obtained from the Sudan Medical Specialization Board (SMSB), the ethical committee at the research unit EDC, the Ministry of Health, and the administration of the targeted hospitals.

Written informed consent was taken from administrators of the hospital and all patients before participating in the study.

Results and Discussion

Comorbidities

Hypertension was the most common comorbid condition (96, 32%), followed by DM (69, 23%) and others (**Table 1**).

Table 1. Comorbid conditions among the study participants.

Comorbidities		Number	Percentage
Asthma	Yes	12	4.0
	No	288	96.0
Hypertension (HTN)	Yes	96	32.0
	No	204	68.0
Diabetes mellitus (DM)	Yes	69	23.0
	No	231	77.0
Ischemic heart disease (IHD)	Yes	15	5.0
	No	285	95.0

Vaccination Status

In this study, only 7 (2.3%) of the participants were vaccinated. Out of 7 vaccinated participants, 3 received Johnson and Johnson vaccination (**Table 2**).

Table 2. Vaccination status of the study participants.

Vaccination status		Number	Percentage
Vaccination status	Vaccinated	7	2.3
	Not vaccinated	293	97.7
Type of vaccine	Not mentioned	2	28.6
	AstraZeneca	1	14.3
	Johnson	3	42.9
	Astrazeneca andJohnson	1	14.3
Number of doses	One	4	57.1
	Two	3	42.9
Duration since last dose	1-2wees	4	57.1
	>2weeks	3	42.9

Complications

In this study, 76 (25%) of the participants developed complications (**Figure 1**). The complications found were not associated with vaccinations, and they were due to hypertension and diabetes mellitus.

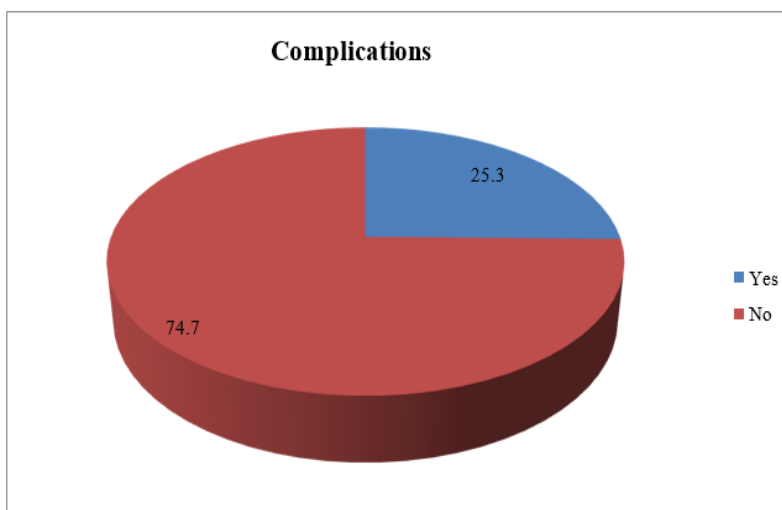


Figure 1. Presence of complications among the study participants.

Associations

Association Between Vaccination Status and Presence of Complications

This study found no association between vaccination status and the presence of complications (**Table 3**).

Table 3. Association between vaccination status and the presence of complications among the study participants.

Vaccination	Complications	
	Yes	No
vaccinationstatus	Yes	5
	No	219
P-value	0.842	

This study found an association between vaccination status and the outcome of COVID-19, where those vaccinated are more likely to be improved and discharged (P-value = 0.021)

Association Between the Need for Oxygen Therapy and the Outcome

This study found that the need for oxygen is associated with death (p-value =0.039) (**Table 4**).

Table 4. Association between the need for oxygen and outcome of COVID-19 among the study participants.

Need for oxygen	Outcome	
	Improved and discharged	Death
Yes	165	109
No	21	5
P-value	0.039	

Association Between the Need for Mechanical Ventilation and the Outcome

This study demonstrated that the need for mechanical ventilation is associated with death (p-value = 0.004) (Table 5).

Table 5. Association between the need for mechanical ventilation and outcome of COVID-19 among the study participants.

mechanical ventilation	Outcome	
	Improved and discharged	Death
Yes	0	5
No	186	109
P-value	0.004	

This study aims to study the vaccination status among COVID-19-positive cases admitted in isolation centers in River Nile State. Most participants had COVID-19 symptoms for 1 to 2 weeks (81.7%), 15% reported a history of a similar condition, and 91.7% did not report a family history of a similar condition. In this study, only 7 (2.3%) of the participants were vaccinated. Out of 7 vaccinated participants, 3 received Johnson and Johnson vaccination. Most of the participants required oxygen (91%), and only 5 (1.7%) required mechanical ventilation. This study found an association between vaccination status and the outcome of COVID-19, where those vaccinated are significantly more likely to be improved and discharged. In addition, this study found that an altered consciousness level, and need for oxygen or mechanical ventilation are significantly associated with death. The complications found were not associated with vaccinations. They were due to hypertension and diabetes mellitus. The main symptoms of COVID-19 among participants of this study were cough, breathlessness, fever, undue fatigue, headache, nausea and vomiting.

Hypertension was the most common comorbid condition (96, 32%) in this study, followed by DM (69, 23%) and others. In this study, only 7 (2.3%) of the participants were vaccinated. This finding is different from a study conducted by J. Muthukrishnan *et al.* among patients of COVID-19 in India, in which 39% of the participants were vaccinated [4]. This difference could be due to the socio-demographic characteristics of participants in each study, and due to the difference in the economic status of each country.

This study found no association between vaccination status and the presence of complications. This finding differs from another study conducted by Nick Andrews *et al.* which found that COVID-19 vaccinations effectively reduce the risk of COVID-19-related complications [5].

This study found an association between the conscious state and the outcome of COVID-19, in which having an altered conscious state is associated with death (p-value <0.001). This finding is comparable to another study conducted by Boehme *et al.* found that impaired consciousness, such as coma, is frequent in patients suffering from severe COVID-19 disease [6].

This study found an association between vaccination status and the outcome of COVID-19, where those vaccinated are more likely to be improved and discharged (P-value = 0.021). This finding is consistent with another study conducted by Moghadas *et al.* which found that COVID-19 vaccination can reduce ICU admission and the overall mortality rate of COVID-19 [7]. Moreover, this finding is similar to another study by Bernal *et al.* where there is a 51% lower risk of death compared to unvaccinated people [8]. These findings emphasize the importance of COVID-19 vaccination and point toward the coverage of a larger population with the vaccine.

This study found a significant association between the need for mechanical ventilation and outcome, where the need for mechanical ventilation is associated with death (p-value = 0.004). Using mechanical ventilators among COVID-19 patients is associated with severe disease. Data suggest that patients with COVID-19-associated respiratory failure often require prolonged mechanical ventilation for two weeks or longer [9].

Regarding the limitations of this study, due to the limited time and resources, the sample size was limited. Furthermore, there are not enough vaccinated patients included in this study. Also, the study did not assess the reason beyond taking or refusing vaccines, so it is highly important to investigate this in the future.

Conclusion

Vaccination is considered an important tool to reduce the risk of many infectious diseases. Global vaccine development efforts have been accelerated in response to the devastating COVID-19 pandemic. This study found that vaccination against COVID-19 is effective and can lead to positive outcomes. In addition, this study found that an altered consciousness level and the need for oxygen or mechanical ventilation are significantly associated with death.

Recommendations

According to the results of this study, it is important to ensure vaccine availability around the country to cover more people.

- To raise awareness among the general population regarding the importance of vaccination against COVID-19.
- To conduct further studies with a larger sample size to determine the vaccination status among COVID-19-positive cases admitted in isolation centers.

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Conflict of interest: None

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Ethics statement: Ethical approval was obtained from the Sudan Medical Specialization Board (SMSB) (NO, 45/2022), the ethical committee at the research unit EDC, the Ministry of Health, and the administration of the targeted hospitals.

Written informed consent was taken from administrators of the hospital and all patients before participating in the study.

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