

# Acceptance and Hesitancy Towards Covid-19 Vaccination Among Dialysis Patients in a Dialysis Center in Khartoum in 2022

Ayah Isam Abdalla, Amna Mutasim Elazrag , Siralkhatim Mohammed, Hassan Hassan

Faculty of Medicine, University of Khartoum, Khartoum, Sudan

Correspondence: Amna Mutasim Elazrag, University of Khartoum, Faculty of Medicine, Al-Qasr Avenue, Box 11111, Khartoum, Sudan, Tel +249999566300, Email amna.elazrag@gmail.com

**Background:** COVID-19, a highly infectious virus, poses significant risks, particularly for immuno-compromised individuals. Vaccination remains a key preventive measure, yet acceptance rates vary among populations globally.

**Objective:** This study aims to assess COVID-19 vaccine acceptance and hesitancy among dialysis patients at Dr. Salma Center for Dialysis in 2022, highlighting the primary reasons for hesitancy within this vulnerable group.

**Methods:** A descriptive cross-sectional study was conducted at Dr. Salma Center in Khartoum, Sudan, in 2022. A systematic random sampling method was employed to select participants, who were interviewed using a structured questionnaire.

**Results:** Of a sample of 137 patients, 125 completed the questionnaire with 91.2% response rate. Approximately half of the respondents reported vaccine hesitancy 50%, with 77% acknowledging the severity of COVID-19 but only 53% advised vaccination among their peers. Primary concerns included vaccine side effects 24.8% and mistrust of production companies 10.4%. No significant associations were found between vaccine hesitancy and demographic factors.

**Conclusion:** The study reveals a notable prevalence of COVID-19 vaccine hesitancy among dialysis patients at Dr. Salma Center in Khartoum, 2022. Addressing this hesitancy requires concerted efforts to bridge the trust gap between patients and healthcare systems, coupled with targeted awareness campaigns to correct misinformation and reinforce confidence in vaccines.

**Keywords:** covid-19, SARS-COV-2, vaccine hesitancy, dialysis, ESKD

## Introduction

In Sudan the first COVID-19 case was reported on March 13th 2020.<sup>1</sup> At the time of the study (October 2022) over 624 million confirmed cases and over 6.5 million deaths have been reported worldwide by the WHO.<sup>2</sup> COVID-19 can infect people of all ages; however, people over 60 years and those with comorbidities are at a higher risk of severe infection.<sup>3</sup> Numerous epidemiological studies worldwide have shown that patients with chronic kidney disease are more likely to develop severe COVID-19 infection,<sup>4</sup> chronic renal failure is common in Sudan; the estimated incidence of new cases is about 70–140/million inhabitants/year.<sup>5</sup>

As there is no cure for the disease, strict compliance with preventive measures is very crucial.<sup>6</sup> Immunization is the most cost-effective and successful health intervention to prevent infectious diseases; therefore, vaccines against COVID-19 are of great importance for controlling the global pandemic.<sup>7</sup>

Vaccine hesitancy (VH), defined as “the reluctance or refusal to vaccinate despite vaccine availability” has been considered by the WHO as one of the top ten threats to global health, as it increases the failure of vaccination programs worldwide.<sup>8</sup> Factors that increase vaccine hesitancy include a lack of knowledge and awareness, concerns about the side effects of vaccination, and cultural misgivings.<sup>9</sup> Previous studies on vaccine acceptance have identified several factors that influence pandemic vaccine uptake, including perception of vaccine efficacy and safety, disease risk, past vaccination history, and general vaccination attitude.<sup>10</sup>

Antivaccination movements, including concerns about safety and effectiveness, have spread widely through social media.<sup>11</sup> Health promotion programs such as mobile applications have been developed to address vaccine hesitancy in the form of educational messages.<sup>12</sup> Most of these programs have focused on correcting misinformation and changing attitudes and behaviors toward vaccines.<sup>13</sup>

Although great progress has been made, there are still big challenges regarding COVID-19 immunization, one of which is the public acceptance of COVID-19 vaccines. Chronic Kidney patients are from the immunologically weak category and are highly vulnerable to the serious complications of coronavirus disease; however, until October 13, 2021, only 1.3% of Sudanese had been fully vaccinated against COVID-19.<sup>14</sup>

Few studies have been conducted on the prevalence and causes of vaccination hesitancy among dialysis patients, particularly in Sudan. This research will help elucidate the prevalence of covid-19 vaccination among dialysis patients in Dr. Salma Center for Dialysis and Transplantation, their knowledge and acceptance of receiving covid-19 vaccination, and the most common reasons for vaccination refusal. This will help us to design effective targeted educational campaigns and posters to correct misconceptions and misinformation. This research will also provide literature for future researchers interested in this subject.

## Materials and Methods

This observational cross-sectional, facility-based study was conducted at Dr. Salma Center for Dialysis and Transplantation, in Khartoum state. It's one of the most popular centers in Sudan that aims to provide localized kidney examination and treatment and establishing a model center for dialysis and kidney transplantation. The center currently accommodate 211 patient per week.

For sample size calculation, 137 patients were estimated; all dialysis patients who were above 18 years of age who agreed to complete the questionnaire were included, and those with mental disability or poor communication and who refused to participate in the study were excluded.

Data were collected using a structured, closed-ended, self-administered questionnaire using a systematic random sample. This included the socio-demographic characteristics of the patients, their source of knowledge about covid-19 vaccination, whether they were vaccinated, and the most common reasons that made patients get the vaccine or hesitant about getting vaccinated.

Data were analyzed using Statistical Package for Social Science (SPSS) software, version 25, and simple descriptive statistics (frequencies and percentages) were displayed, using a 95% confidence interval (CI) and a p-value of <0.05 for statistical significance, while associations between variables were tested using Pearson's chi-square test, Fischer exact test, and odds ratios (ORs) for categorical data and the *t*-test for numerical data.

## Results

### Socio-Demographic Characteristics

This study was conducted among 125 patients with chronic kidney disease at Dr. Salma Center for Dialysis from October to 9–16 2022 with a response rate of 91.2%. The participants had a mean age of 51.1 (14.7); among them, 51.2% were females and 48.8% were male. The vast majority of participants were unemployed (74.4%), although most were university graduates (35.2%). More details are presented in (Table 1) below.

### Knowledge, Attitude and Practice

More than half of the patients believed that they were at risk of having Covid-19 (52%), meanwhile (76.8%) agreed that it was a serious disease. Surprisingly (100%) of the participants had heard of Covid-19 vaccination, but only half of them thought it was beneficial (54.4%). When asked whether they were safe or not (53.6%) agreed that it was safe.

Moreover (49.6%) of the participants took the vaccine, but only (36.8%) completed the doses; among them, only (40%) recommended it to their families and friends. The most prevalent driver to take the vaccine among them was protection from covid-19 infection with (36%), followed by doctor advice (20%). The barriers to taking the vaccine

**Table 1** Socio-Demographic Characteristic of the Study Participant

Variable	Count	Percent
<b>Age mean (SD)</b>	51.15 (14.73)	
<b>Gender</b>		
Female	61	48.8%
Male	64	51.2%
<b>Education level</b>		
Illiterate	6	4.8%
Primary school	28	22.4%
Secondary school	39	31.2%
University	44	35.2%
Higher education	8	6.4%
<b>Occupation</b>		
Unemployed	93	74.4%
Medical field	3	2.4%
NON Medical employee	29	23.2%

varied as well, but the most common causes were fear of side effects and drug safety (31%, 22% respectively). Further details are explained in Tables 2 and 3.

## Association Between Variables and Vaccination

Age, sex, occupation and educational level were not statistically significant factors with regard to vaccination. Further details are presented in Tables 4 and 5.

## Discussion

This study examined the acceptance and hesitancy of dialysis patients in a Khartoum 2022 dialysis center regarding the COVID-19 vaccination.

**Table 2** Knowledge Attitude and Practice of the Study Participants Toward Covid-19 Vaccination

Variable	No	I did not take the vaccine	Yes
Did you complete the vaccine doses?	16 (12.8%)	63 (50.4%)	46 (36.8%)
	No	I do not know	Yes
Do you think you are at risk population?	32 (25.6%)	28 (22.4%)	65 (52.0%)
Do you think Covid-19 is a serious disease?	16 (12.8%)	13 (10.4%)	96 (76.8%)
Do you think covid-19 vaccination is effective?	19 (15.2%)	38 (30.4%)	68 (54.4%)
Do you think covid-19 vaccine is safe?	19 (15.2%)	39 (31.2%)	67 (53.6%)
Do you think the vaccine has side effects?	27 (21.6%)	20 (16.0%)	78 (62.45%)
Do you advise your friends and family to take the vaccine?	66 (52.8%)	9 (7.2%)	50 (40.0%)

**Table 3** Sources of Knowledge and Reasons for Taking the Vaccine Among the Study Participants

<b>From Where did you Hear About the Vaccine</b>	<b>Count</b>	<b>Percent</b>
Television	59	47.2%
From doctor or dialysis team	72	57.6%
Social Media	44	35.2%
Newspaper and magazine	12	9.6%
People around	36	28.8%
<b>Reasons for taking the vaccine</b>		
Protect him self	36	28.8%
Protect his family	4	3.2%
Doctor advised	20	16%
High risk patient	17	13.6%
Free and available	4	3.2%
Travelling	5	4%
WHO and other agencies confirmed it's safety	0	0%
<b>Reasons for not taking the vaccine</b>		
Afraid of needles	2	1.6%
Had a bad experience from previous vaccination	1	0.8%
Concerned about its side effects	31	24.8%
Far away from residence	14	11.2%
Not convinced it is protective and effective	10	8%
Covid-19 is not dangerous and there is no big risk	8	6.4%
Do not know where to get vaccinated	3	2.4%
I think it is not safe	22	17.6%
You do not have enough information about it	10	8%
I do not trust the companies	13	10.4%
It is biological weapons for the producing company	1	0.8%
Traditions	1	0.8%

Nearly half of the patients (50.4%) were hesitant to take the vaccine, which is very high compared to a study conducted in African American dialysis patients who were only (34%) hesitant.<sup>15</sup> Furthermore, in a study done by Sunil Bhandari, the hesitancy rate was (3%),<sup>16</sup> While in a nationwide survey, vaccine hesitancy among dialysis patients was (29%).<sup>17</sup> Furthermore, in a study conducted in a general American household population, only 1 in 10 did not intend to be vaccinated.<sup>18</sup> Additionally, another study conducted in low- and middle-income countries, showed that only (36.2%) were hesitant.<sup>19</sup> In contrast, vaccine hesitancy was much higher (84.6%) among Cameroonians.<sup>20</sup> The hesitancy rate was higher in females (59%), unemployed (51.6%) and those with education level till primary school (57.1%). In the study conducted in low- and middle-income countries, the rate was also higher in females (39.9%) and homemaker (48.6%).<sup>19</sup>

**Table 4** Associations Between Taking the Vaccine and Socio-Demographic Characteristics of the Study Participants

Variables	Got Vaccinated		Frequency	P-value	OD
	Yes	No			
Gender					
Males	37	27	64	0.074	0.507
Females	25	36	61		
<b>Occupation</b>					
Un-employed	45	48	93	0.691	-
Medical field	1	2	3		
No-medical field	16	13	29		
<b>Education level</b>					
Illiterate	3	3	6	0.906	-
Primary school	12	16	28		
Secondary school	20	19	39		
University	22	22	44		
Higher education	5	3	8		

**Table 5** Association Between the Participants Age and Taking Covid-19 Vaccination

variable	Mean(SD)		Difference(95% CI)	p-value
	No(N=63)	Yes(n=62)		
Age	48.4(14.9)	53.9(14.3)	0.042(-10.8_ 0.42)	0.838

**Abbreviations:** ESKD, end-stage kidney disease; WHO, World Health Organization; VH, vaccine hesitancy; SPSS, Statistical Package for Social Science; CI, confidence interval; USA, United States of America.

In our study, (54.4%) of the participants believe that the COVID-19 vaccine is effective, similar to an international study were (44.55%)<sup>21</sup> believed that the vaccine will protect them from COVID-19,<sup>21</sup> and another study in Oman were (52%) stated the same.<sup>22</sup> About half of the participants (53.6%) stated that the vaccine is safe, same as an international study in six countries were more than half shared the same belief (60.1%).<sup>21</sup>

Regarding the side effects majority of the participants agreed that the vaccine could cause side effects (62.45%), contrary to a study in Oman were only a quarter knew about them (26%),<sup>22</sup> although, in a Saudi study the vast majority of the participants agreed with the statement (90%).<sup>23</sup>

Moreover, the patients had unfavorable practice toward COVID-19 vaccination with only (36.8%) that completed the doses of the vaccine. In contrast to an international study and a study on Saudi Mothers were most of them are fully vaccinated (80.41%)<sup>21</sup> and (53.6%)<sup>23</sup> respectively. Only (40%) of the participants would advise a friend/family member to get vaccinated, contrary to studies conducted in Oman and Saudi Arabia were most of the participants would advise the vaccination (59.3%)<sup>22</sup> and (69%)<sup>23</sup> respectively.

## Limitations

The study population was confined to patients in Dr. Salma Center, which is not truly representative of the general population; hence, the ability to generalize the Results is limited to dialysis patients.

Questions about specific information or factors that might increase vaccination acceptance were not included.

## Conclusion

This study revealed a very high prevalence of vaccine hesitancy among dialysis patients in Dr. Salma Center in 2022. Most of the patients were hesitant because they were concerned about the side effects of the vaccine, (77%) of the dialysis patients think corona was a serious disease, and (52%) of them know that they were at risk of being infected because of their renal disease. Dialysis staff were the main source of knowledge about the vaccine for the patients. No association was found between the socio-demographic data and vaccine hesitancy. These findings suggest poor information about the vaccine and mistrust between patients and the health care system.

## Recommendations

1. Dedicated prospective COVID-19 vaccine studies involving patients with advanced stages of kidney disease and kidney transplant recipients are needed.
2. Further studies on the population's general knowledge of the coronavirus vaccine and hesitancy are important to improve public acceptance and decrease vaccine hesitancy in confronting the disease.
3. Patients should be counseled about the importance of practicing safety measures such as social distancing and using personal protective equipment.
4. Public health practitioners should work with clinicians and community partners to build confidence in the vaccine and ensure equitable access.

## Ethical Considerations

The study complies with the Declaration of Helsinki and that all participants provided informed consent.

Ethical clearance was obtained from the Department of Community Medicine, Faculty of Medicine, University of Khartoum, and Dr. Salma Center.

## Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

## Disclosure

The Authors report no conflicts of interest in this work.

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