



## RESEARCH ARTICLE



## COVID-19 vaccines coverage in Afghanistan: A descriptive analysis of secondary data from DHIS2

Hamidullah Matin <sup>1</sup>, Khwaja Mir Islam Saeed <sup>2</sup>, Mir Salamuddin Hakim <sup>2</sup>✉, Shoaib Naeemi <sup>2</sup>

<sup>1</sup> National Expanded Program on Immunization, Ministry of Public Health, Kabul, Afghanistan

<sup>2</sup> Afghanistan Field Epidemiology Training Program, Afghanistan National Public Health Institute, Kabul, Afghanistan

### ARTICLE INFO ABSTRACT

#### Open Access

Received:  
2023-04-22

Accepted:  
2023-09-15

Published:  
2023-11-30

Keywords:  
Afghanistan  
Coverage  
COVID-19  
Vaccination

**Background:** Mass immunization is an economical and effective way to control the pandemic of COVID-19. Afghanistan started its first COVID-19 vaccination campaign at the national level in February 2021. Upon initiation, 10 target groups have been given priority to get vaccinated. This study focuses on a descriptive analysis of COVID-19 vaccination coverage at the national level.

**Methods:** This is a descriptive secondary data analysis of COVID-19 vaccination coverage from all 34 provinces of Afghanistan from February 2021 to June 2022. All data analyzed in this study were extracted from the District Health Information System 2 (DHIS2), National EPI's database for tracking EPI indicators, and analyzed using Epi Info V.7.2.1.

**Results:** Since the start of the COVID-19 vaccination, 33% of the population in Afghanistan has received at least one dose of the COVID-19 vaccine, among which 26% are fully immunized. The coverage accounts for 13% of the total population in the country. Among the immunized population, 48% are female and 52% are male. At the provincial level, Kabul is the top-performing province with 54% of the target population, followed by Kandahar with 43%. Zabul and Nuristan had the lowest vaccination coverage of the target population, with only 5% vaccinated. Among administered vaccines, Johnson & Johnson are administered widely (67%), followed by Sinopharm (18%) and AstraZeneca (15%).

**Conclusion:** Vaccine coverage for all categories is lower than expected, with a higher interest in one-dose regimen vaccines. The low coverage shows a low demand for vaccine uptake. Provinces with lower coverage could undertake extended campaigns to maintain and enhance the coverage of vaccination. There is a demand for interventions to improve public awareness about COVID-19 as well. Furthermore, advocacy for full vaccination is required.



### Introduction

With the emergence of the novel coronavirus, known as severe acute respiratory syndrome coronavirus (SARS-CoV-2), health systems have faced burden of challenges, and the virus has spread all over

the world (1). Among a variety of approaches undertaken, the most effective, reliable, and time-bound method of preventing virus spread has been found to be vaccination (2). Several vaccines, such as

✉ Corresponding Author: Mir Salamuddin Hakim  
Email address: [shakim@emphnet.net](mailto:shakim@emphnet.net)

Cite this article as COVID-19 vaccines coverage in Afghanistan: A descriptive analysis of secondary data from DHIS2. *Razi International Medical Journal*, 3(2). DOI: 10.56101/rimj.v3i2.95

Pfizer/BioNTech, Moderna, Johnson & Johnson, Sinopharm, and AstraZeneca, have caused a dramatic decrease in the number of COVID-19 cases worldwide (3-4).

The Coronavirus Disease (COVID-19) pandemic persists despite reductions in disease severity, hospitalizations, and deaths since the introduction of multiple vaccines that protect against COVID-19 and pharmaceuticals to treat its symptoms. However, vaccine hesitancy and refusal continue to impede the effectiveness of these interventions. Drivers of vaccine hesitancy are context-specific and include lower education, mistrust in science and governments, and misinformation. Around two-thirds, (66.4%) of the world's population have received at least one dose of a COVID-19 vaccine as of 30 June 2022. Still, only 17.4% of people in low-income countries have received a first dose, underscoring unequal access, availability, and delivery (5).

Afghanistan launched the COVID-19 vaccination drive on February 23, 2021. Citizens above the age of 18 were identified as the eligible target population for the available COVID-19 vaccines. The country received the first 468,000 doses of the COVIDSHIELD vaccine through COVAX in March 2021 (6). The second shipment through COVAX, which included 1.48 million doses of the Johnson & Johnson vaccine, was received in July 2021. Apart from this, Afghanistan received 500,000 doses of the AstraZeneca vaccine and 700,000 doses of the Sinopharm vaccine donated by India and China, respectively (7). Based on UN estimates, the total number of target populations for COVID-19 vaccines was 19,267,026 people, accounting for 48% of the total population (8). As per country policy, each person aged 18 and above is expected to receive two doses of the COVID-19 vaccine (except for J&J, which is one dose). Afghanistan aims to fully vaccinate 85% (17,004,237) of the eligible target population by the end of 2023. It is worth mentioning that 53% (10,512,609) of the eligible target population are fully vaccinated as of November 2022. Hence, the target population for COVID-19

vaccination will be 6,491,628 for 2023 for the primary series.

As of February 2023, 12,768,947 people have been fully vaccinated, meaning that they have received at least one dose of the COVID-19 vaccine. This includes 10,039,565 doses of the Janssen vaccine, 1,328,524 doses of the Sinopharm vaccine, 976,229 doses of AstraZeneca, and 424,629 doses of COVAXINE (9). The coverage has been achieved by implementing different strategies, including but not limited to mass centers, fixed sites, outreach, mobile teams, and campaigns. Currently, Afghanistan has 340 fixed sites across 34 provinces and intends to launch a national accelerated COVID-19 campaign aimed at vaccinating 4.8 million people in 30 days. The effort is intended to not only use the available vaccine stock but also immunize more people. This study aims to identify COVID-19 vaccine coverage among the target population at the national level in Afghanistan.

## Materials and Methods

This is a descriptive analysis of secondary data from the District Health Information System-2 (DHIS2) database at the national level. DHIS2 is a global public good that is transforming health information management around the world (10). Globally, DHIS2 started out as a platform for building aggregate data-based HMIS, but over the years, it has included a "Tracker" module, which allows individual-based data processing (11).

The DHIS2 database is part of the Data Warehouse at the Ministry of Public Health of Afghanistan, and it is used as a data collection and extraction tool at the national and provincial levels. Tens of variables around the COVID-19 vaccine absorption in the country are tracked to understand the absorption rate. For example, vaccine doses administered and the number of people fully or partially vaccinated. Please refer to **[Table 1]** for the complete lists of variables tracked through DHIS2. The variables highlighted in the list, are extracted for use in this study.

Table 1. List of variables of the Covid-19 vaccines absorption data

Fully Vaccinated with a two-dose vaccine (Female)	Total COVID-19 Vaccinated Dose 1 Female
Fully Vaccinated with a two-dose vaccine (Male)	Total COVID-19 Vaccinated Dose 1 Male
Fully vaccinated with a single dose (J&J)	Total COVID-19 Vaccinated Dose 2
Fully vaccinated with a single dose (Female)	Total COVID19 Vaccinated Dose 2 Female
Fully vaccinated with a single dose (Male)	Total COVID-19 Vaccinated Dose 2 Male
Fully vaccinated with a two-dose vaccine	Total COVID-19 Vaccinated Female
Government employees working with crowdDose1	Total COVID-19 Vaccinated Male
Government employees working with crowdDose2	Total Covishield Vaccinated Female
Media Dose1	Total Covishield Vaccinated
Media Dose2	Total Covishield Vaccinated Dose 1
Nomadic populationDose1	Total Covishield Vaccinated Dose 2
Nomadic populationDose2	
PrisonersDose1	
PrisonersDose2	Total Covishield Vaccinated Male
People Aged Between 18-50 Dose1	Total Fully Vaccinated (Female)
People Aged Between 18-50 Dose2	Total Fully Vaccinated (Male)
People living in IDP camps aged 30-50 yearsDose1	Total Health Worker (DOSE-1 Female)
People living in IDP camps aged 30-50 yearsDose2	Total Health Worker (DOSE-1 Male)
People living in Urban of big cities olddose1	Total J&J Vaccinated
People living in Urban of big cities olddose2	Total J&J Vaccinated Female
People over age of 50 years oldDose1	Total J&J Vaccinated Male
People over age of 50 years oldDose2	Total Sinopharm Vaccinated
People with comorbiditiesDose1	Total Sinopharm Vaccinated Dose 1
People with comorbiditiesDose2	Total Sinopharm Vaccinated Dose 2
Returnees from neighboring countriesDose1	Total Sinopharm Vaccinated Female
Returnees from neighboring countriesDose2	Total Sinopharm Vaccinated Male
Teachers (DOSE-1 Female)	Total Teachers Dose 1
Teachers (DOSE-1 Male)	Total Teachers Dose2
Total Health Worker Dose1	Total fully vaccinated
Total Health Worker Dose2	Total COVAXIN Vaccinated
Total COVID-19 Vaccinated	Total COVAXIN Vaccinated Dose 1
Total COVID-19 Vaccinated Dose 1	Total COVAXIN Vaccinated Dose 2
Unfortunate events after vaccinationdose1	Total COVAXIN Vaccinated Female
Unfortunate events after vaccinationdose2	Total COVAXIN Vaccinated Male

In this study, the COVID-19 vaccination data from all provinces of the country from February 23, 2021, to June 30, 2022, is extracted, cleaned, and analyzed using MS Excel and Epi Info 7.2.1. The indicators tracking database of the National Expanded Program on Immunization of the MoPH is also used to provide data and evidence for this study. The data has been used to develop coverage indicators and present the current coverage based on fully vaccinated individuals, geographical areas, and descriptions of vaccine recipients.

## Results

Afghanistan has administered 6,459,654 doses of COVID-19 vaccines. These doses include J&J, Sinopharm, COVAXIN, and AstraZeneca vaccines. Unlike J&J, in which only one dose is required to fully vaccinate a recipient, other vaccines have two primary doses. The number of doses administered to the target population has varied across the months since the drive was launched. **[Figure 1]**

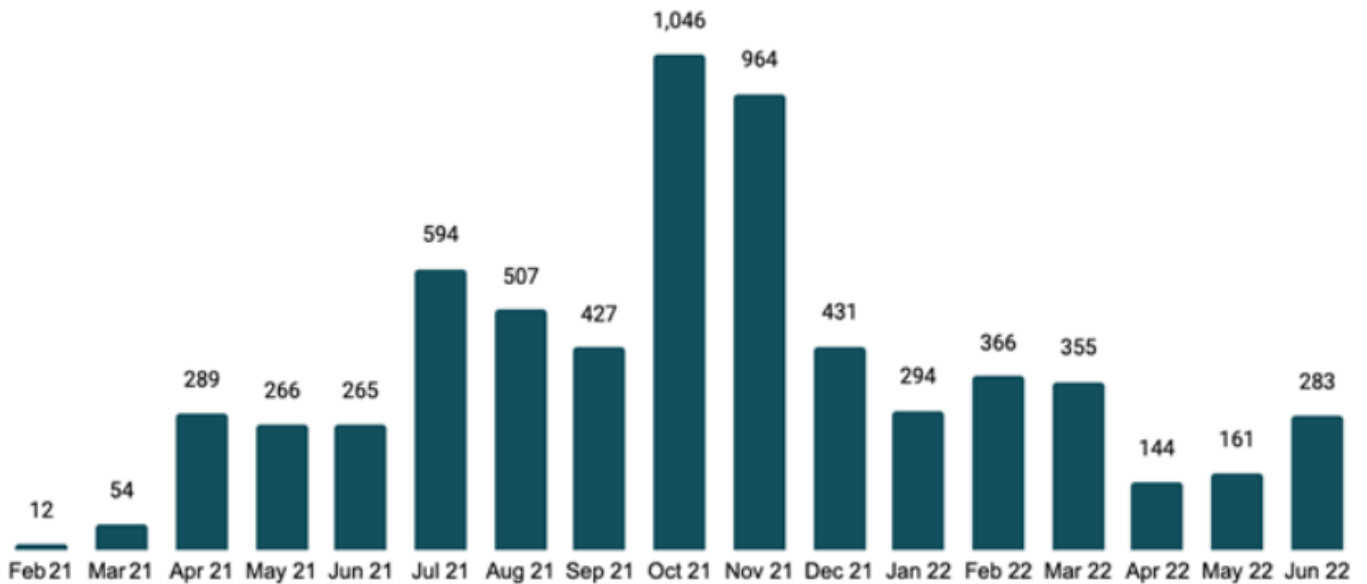


Figure 1. Number of doses administered by month: February 2021 - June 2022

As of June 30, 2022, 33% of the target population has received at least one dose of the primary series of the vaccine. Figure 2 shows the percentage share of the population who received at least one dose monthly since February 2021. Afghanistan has fully vaccinated 26% of its target

population. Those fully vaccinated have received a one-dose J&J vaccine or two-dose Sinopharm, AstraZeneca, and COVAXIN. 26% of the target population equates to 5 million people over the age of 18. [Figure 2]

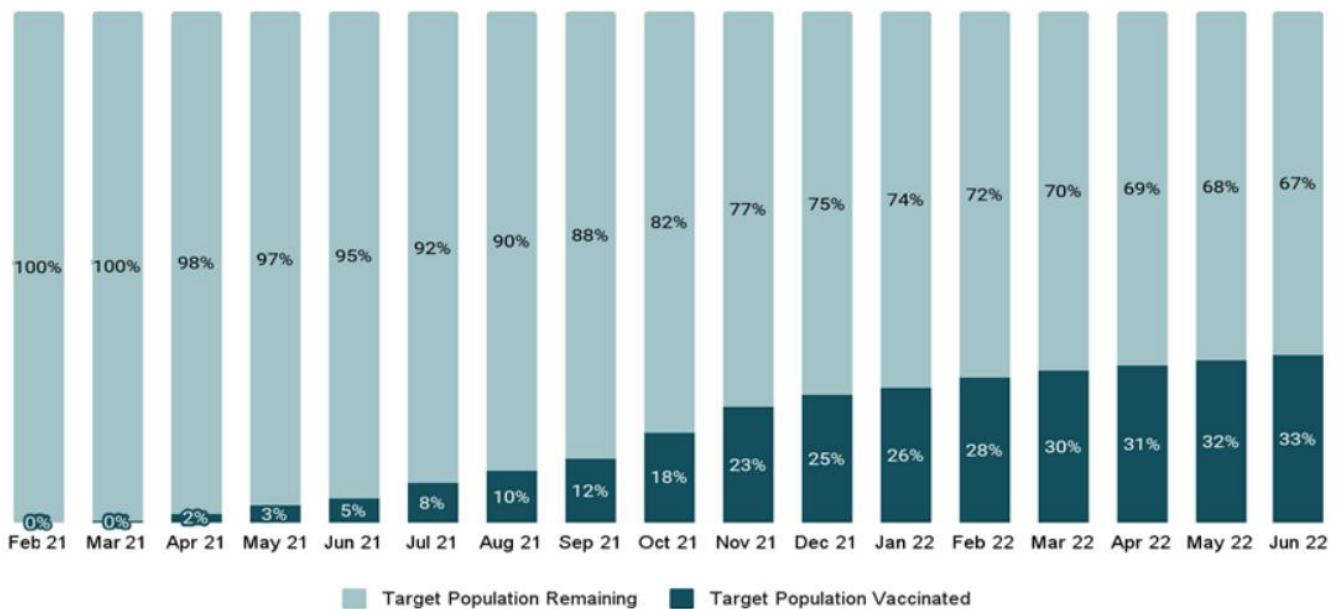


Figure 2. % of target population vaccinated; February 2021 - June 2022

Share of the fully immunized target population, however, varies across provinces. Kabul has managed to fully vaccinate 54% of its target

population, while Nuristan has the most negligible share of the target population vaccinated, which is only 5%. [Table 2]

Table 2. % of the fully vaccinated target population by province; February 2021 - June 2022

No	Province	% Fully Vaccinated	No	Province	% Fully Vaccinated
1	Kabul	54%	18	Kunduz	16%
2	Khost	42%	19	Farah	16%
3	Nimroz	39%	20	Jawzjan	15%
4	Herat	38%	21	Parwan	15%
5	Nangarhar	36%	22	Ghor	15%
6	Kandahar	33%	23	Urozgan	14%
7	Ghazni	30%	24	Panjshir	14%
8	Laghman	27%	25	Badghis	14%
9	Paktya	27%	26	Baghlan	14%
10	Balkh	26%	27	Takhar	14%
11	Sar-e-Pul	24%	28	Paktika	13%
12	Helmand	22%	29	Bamyan	12%
13	Kapisa	20%	30	Dykundi	12%
14	Kunar	20%	31	Wardak	11%
15	Samangan	18%	32	Zabul	9%
16	Logar	17%	33	Faryab	8%
17	Badakhshan	17%	34	Nuristan	5%

The percentage share of one-dose clients is significantly different among provinces. Kabul remains the top-performing province regarding one-dose clients, with approximately 69% of its target population receiving at least one dose. 7% of Nuristan's target population who have received at least one dose is 7%,

which is the top among low-performance provinces. From the administered vaccines, the study found that among all administered doses, 975,339 (15%) were Covishield, 1,140,432 (18%) were Sinopharm, and (67%) were Janssen vaccines. [Table 3]

Table 3. Number of doses administered by vaccine types

No	Vaccine type	Number of doses	Percentage
1	Janssen	4,343,872	67%
2	Sinopharm	1,140,432	18%
3	Covishield (AstraZeneca)	975,339	15%
<b>Total</b>		<b>6,459,643</b>	<b>100%</b>

Vulnerable groups (i.e., health workers, people with comorbidities, and people older than the age of 50) were the target population when Afghanistan had just launched the COVID-19 vaccination drive. Approximately one million people in the above categories have been fully immunized, while 390,000

of the vulnerable population have received the first dose of the vaccines. Table 2.2 show the total number of vulnerable group members who have received at least one dose and are fully vaccinated, respectively. [Table 4]

Table 4. one-dose recipients of vulnerable groups and fully vaccinated vulnerable group

No	Category	# Received one dose	# Fully vaccinated
1	Health Workers	94,256	81,983
2	People over 50 years old	223,525	697,520
3	People with comorbidities	75,627	251,243
<b>Total</b>		<b>393,408</b>	<b>1,030,746</b>

The share of men vaccine recipients was significantly higher in the first months of the COVID-19

immunization drive. Men's share was 74% in the first month of the vaccination but slowly decreased,

reaching 49% in October 2021. On the other hand, after a slight drop in women’s uptake in late 2021 and early 2022, it has kept pace and peaked at around 58% in April 2022.

The cumulative percentage of women clients, however, remains below 50%. **[Figure 3]**

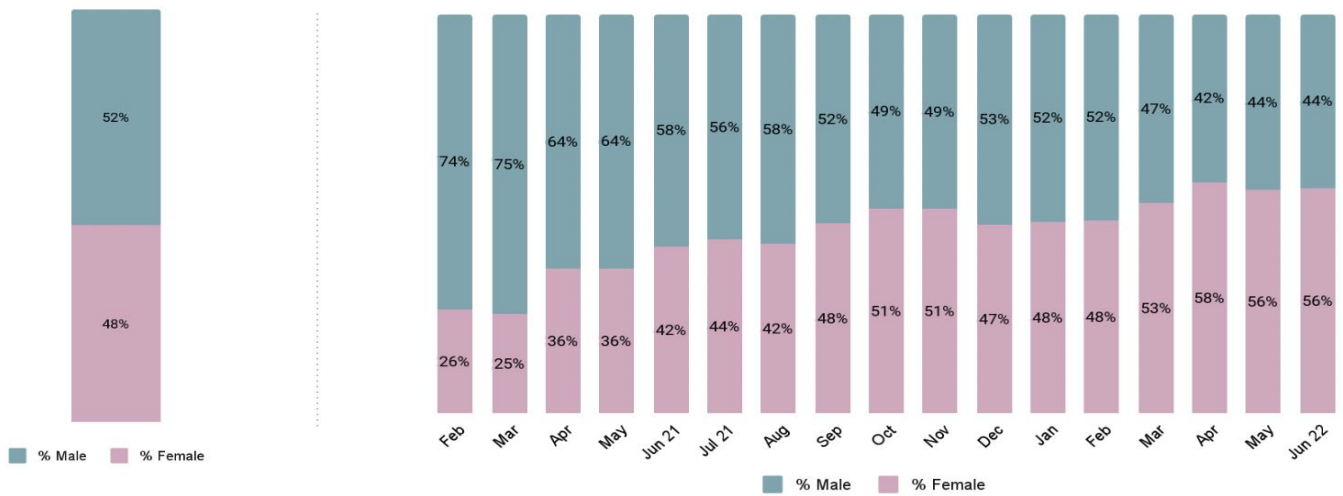


Figure 3. % monthly share of vaccine recipients by gender; February 2021 - June 2022

Since launching the COVID-19 vaccination drive in February 2021, Afghanistan has fully vaccinated 13% of its population. The total population includes the COVID-19 target population (people over

the age of 18) and those who are not deemed eligible for the available vaccines in Afghanistan (people below the age of 18). Both categories constitute 48% and 52% of the total population, respectively. **[Figure 4]**

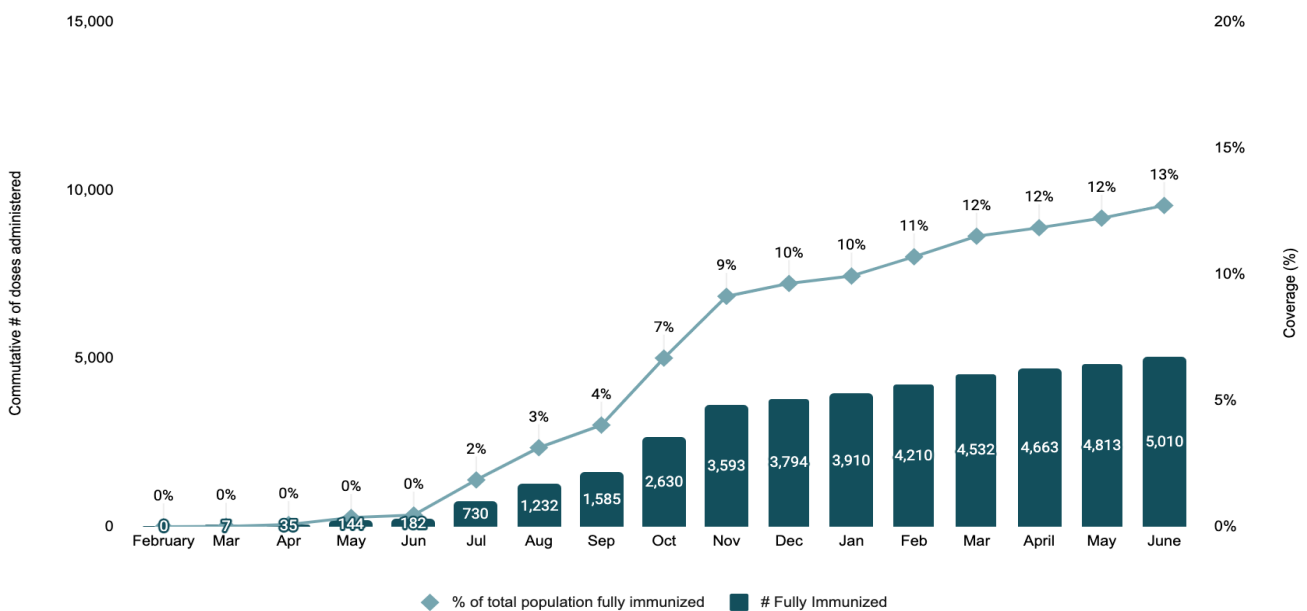


Figure 4. Total number of fully vaccinated clients and percentage share of the total population fully vaccinated by month; February 2021 - June 2022

## Discussion

Since vaccination is the most cost-effective and efficient way of preventing COVID-19, thus, vaccination is the best way to reach herd immunity and control the spread of COVID-19 (12). The findings of this study showed that the coverage of single-dose regimen vaccines is 67% which is higher than other types of vaccines in Afghanistan. In addition, the proportion of male to female regarding vaccination uptake is 52% which shows equality of gender as well.

Afghanistan has fully vaccinated approximately 26% of the target population, compared to Pakistan, fully vaccinated 55%, and Iran which has vaccinated 17% to the end of 2022 (13). The low coverage in the country could be due to multiple factors such as access, service provision, geographical barriers, utilization, insecurity, and conflict (6). On the other hand, the program faces some other challenges such as hesitancy, misinformation, rumors and insufficient community awareness and knowledge about the COVID-19 and its vaccine (6, 12, 14). To address these challenges and increase demand for the COVID-19 vaccination a robust Social and Behavior Change (SBC) interventions that are rooted into community engagement are needed.

Ministry of Public health in collaboration with the partners, should design the demand generation activities to increase awareness raising, managing misinformation and build trust among the communities regarding COVID-19 vaccine. Diverse approaches should be applied to maximize the reach to the target groups. The interventions should be at various settings: communities, schools, health facilities etc. This should include but not limited to: activities engaging key community influencers such as religious leaders, community health workers, youths and health workers, and media platform to enhance the community awareness about the COVID-19 vaccine and encourage the individuals to receive vaccine.

The findings also show that higher vaccination coverages were observed during the campaign months, indicating low demand for people in utilization in the fixed sites. During campaigns, people are encouraged to take the vaccine through different communication channels, and vaccines are available immediately. Moreover, the “comorbidities” at-risk category coverage is lower than expected. Among all

provinces, Kabul had the highest coverage and Nuristan had the lowest. Accessibility and resource availability in Kabul has enabled the province to achieve higher coverage among all provinces. On the other hand, difficulties in access and lack of resources have limited Nuristan’s ability to achieve higher target population coverage.

In the absence of a COVID-19 vaccine, testing, contact tracing, and social restrictions are among the most powerful strategies adopted worldwide to slow down the spread of the pandemic. However, effective vaccines have proven the best solution for controlling the pandemic. Since COVID-19 and its vaccines are novel, most developing countries have challenges regarding coverage and utilization. On the other hand, the decrease in the number of cases has also affected vaccine uptake dramatically (15). Further studies are required to find the exact coverage of COVID-19 vaccines in Afghanistan and their determinants.

## Limitations

Missing and incomplete data in DHIS-2 were the main limitation during conducting this study, however, errors were resolved, and accuracy and validity of data were confirmed at its best.

## Conclusion

Vaccine coverage overall and specifically for at least one at-risk category (Comorbidities) is lower than expected, with a higher interest in a one-dose regimen vaccine. The low coverage shows low demand for vaccine uptake. Although the results are not inclusive, the demand for interventions to improve public awareness about COVID-19 and expanding more sites is much needed. Furthermore, integration of COVID-19 vaccination into routine immunization and advocacy for full vaccination is required.

## Conflict of interest

The authors declare no conflict of interest.

## Funding

None

## References

1. Velavan TP, Meyer CG. The COVID-19 epidemic. *Tropical medicine & international health*. 2020 Mar;25(3): 278. Lipsitch M, Dean NE. Understanding COVID-19 vaccine efficacy. *Science*. 2020 Nov 13;370[6518]:763-5.
2. Lipsitch M, Dean NE. Understanding COVID-19 vaccine efficacy. *Science*. 2020 Nov 13;370[6518]:763-5.
3. World Health Organization (WHO) [Internet]. COVID. [cited 2023Feb2]. Available from: <https://covid19.trackvaccines.org/agency/who/>
4. Machingaidze S, Wiysonge CS. Understanding COVID-19 vaccine hesitancy. *Nature Medicine*. 2021 Aug;27[8]:1338-9.
5. Lazarus, J. V., Wyka, K., White, T. M., Picchio, C. A., Gostin, L. O., Larson, H. J., Rabin, K., Ratzan, S. C., & Kamarulzaman, A. (2023). A survey of COVID-19 vaccine acceptance across 23 countries in 2022. *Nature Medicine*, 29(2), 366-375.
6. Wardak MF, Rahimi A, Ahmadi A, Madadi S, Arif S, Nikbin AM, Nazari GA, Azizi AT, Mousavi SH, Lucero-Prisno DE. COVID-19 Vaccination Efforts: Is Afghanistan Prepared? *Am J Trop Med Hyg*. 2021 Aug 31;105[5]:1137-1140.
7. EMRO W, Afghanistan, receives a second shipment of COVID-19 vaccines through the COVAX facility [Internet]. World Health Organization. World Health Organization; Available from: <https://www.emro.who.int/afg/afghanistan-news/afghanistan-receives-second-shipment-of-COVID-19-vaccines-through-the-covax-facility.html>
8. World population dashboard -Afghanistan [Internet]. United Nations Population Fund. [cited 2023Feb12]. Available from: <https://www.unfpa.org/data/world-population/AF>
9. Moph Data Warehouse. [cited 2023Feb12]. Available from: <https://moph-dw.gov.af/dhis-web-commons/security/login.action>
10. Home [Internet]. DHIS2. 2023 [cited 2023Feb15]. Available from: <https://dhis2.org/>
11. Sahay S, Rashidian A, Doctor HV. Challenges and opportunities of using DHIS2 to strengthen health information systems in the Eastern Mediterranean Region: A regional approach. *The Electronic Journal of Information Systems in Developing Countries*. 2020 Jan;86(1): e12108.
12. Nemat A, Bahez A, Salih M, Raufi N, Noor NA, Essar MY, Ehsan E, Asady A. Public willingness and hesitancy to take the COVID-19 vaccine in Afghanistan. *The American Journal of Tropical Medicine and Hygiene*. 2021 Sep;105(3):713.
13. Nemat A, Yaftali S, Danishmand TJ, Nemat H, Raufi N, Asady A. High rates of COVID-19 vaccine refusal among Afghan pregnant women: A cross-sectional study. *Scientific Reports*. 2022 Aug 18;12(1):14057.
14. Borriello A, Master D, Pellegrini A, Rose JM. Preferences for a COVID-19 vaccine in Australia. *Vaccine*. 2021 Jan 15;39(3):473-9.
15. Holder J. Tracking coronavirus vaccinations around the world [Internet]. *The New York Times*. *The New York Times*; 2021 [cited 2023Apr5]. Available from: <https://www.nytimes.com/interactive/2021/world/covid-vaccinations-tracker.html>