Commentary

The fight against the COVID-19 pandemic: Vaccination challenges in Sudan

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Abstract

The first COVID-19 case in Sudan was announced on March 13th, 2020. 1835 deaths were recorded as of February 7th, 2021. 800,000 doses of the Oxford-AstraZeneca vaccine were allocated to Sudan through COVAX in March 2021. However, multiple challenges exist in vaccinating the Sudanese population, ranging from an inadequate cold chain system to low acceptance rates of COVID-19 vaccination among the Sudanese population. Economic crises, high inflation rates and long-standing economic sanctions have also negatively impacted the healthcare system in Sudan as a result of deprivation of access to research and development funding.

1. Introduction

Sudan announced the first COVID-19 case on March 13, 2020 [1]. On February 7, 2021, a total of 50,003 suspicious cases were recorded in Sudan, with 27,717 (55.4%) testing positive and 1835 deaths [1]. The state of Khartoum accounts for 72.5% of all confirmed cases in Sudan, followed by the state of Gezira at 8.4% [1]. The “20–29.9” age group is the most affected, accounting for 23.0% of confirmed cases, while those aged 60 and over account for 60.0% of deaths [1]. COVID-19 was found in 77.0% of 1023 health workers screened across Sudan. With a positivity rate of 95.3%, Khartoum state accounts for 38.0% of the total tested health personnel [1]. Researchers ended up with 15 authorized vaccines among different countries [2]. Sudan was the first country in the Middle East and North Africa to receive the COVID-19 Vaccines Global Access (COVAX) vaccine [3]. It was supplied by over 800,000 doses of AstraZeneca’s vaccine with an immunization supply chain that consisted of the national store, 18 state stores, 183 locality stores and 2,421 service points [3].

2. Challenges of Sudan cold chain system

Sudan has a descending economy during the transitional period, leading to several challenges with the defective immunization supply chain. By the end of 2021, Sudan is expected to receive a total of 17 million doses from the COVAX facility, covering only 20% of the population [3]. In addition, more than 38 million doses are expected to be procured to cover a minimum of 45% of the Sudanese population, before herd immunity can be achieved [3]. Efficient transport and storage of
the Oxford AstraZeneca vaccine at 2–8° are required for maximum ef
cfficacy [4]. Vaccine transportation is not instated in Expanded Program
on Immunization-Immunization Supply Chain (EPI-ISC) and no clear
budget is allocated for vaccines distribution at a lower level [5].
Furthermore, lack of refrigerated vehicles, inadequate distribution fleets
to match the expansion in EPI services, and poor road infrastructure
make it challenging for good distribution practice [5]. Delay in re-
sources mobilization and procurement of new equipment, slowing the
distribution of COVAX immensely outside of Khartoum [1].

2.1. Distribution of the vaccine

Sudan’s initial emphasis was on direct reductions in morbidity and
mortality, as well as the restoration of the most basic essential services;
however, it soon grew to include reducing the spread of disease and
disruption of social and economic functions [1]. This was accomplished
by immunizing 3% of the population, including frontline healthcare
workers (HCWs) who have direct patient interaction as well as the
elderly with comorbidity. The first wave of COVID vaccines preceded
the goal of 4% of the population [1]. Then, based on the prioritization
exercise, 16% of the population was covered to optimize the gain from
the COVAX facility, which was then expanded to cover 20–60% of the
population using the window of cost-sharing [1].

3. Vaccination phases

3.1. Phase 1: (very limited vaccine availability, 4% of the population)

This phase intends to target frontline healthcare workers working on
Covid-19 Isolation Centers, Hospitals, Primary Healthcare Centers and
out-patient clinics. 500,000 healthcare workers (HCWs) are planned to
be covered, together with over-45s with medical conditions and living in
areas with anticipated high transmission [1].

3.2. Phase 2: (limited vaccine availability, for 3–20% of the population.)

Phase 2 targets over-45s with chronic medical conditions, teachers
and school staff and workers in essential jobs who cannot avoid a high
risk of exposure to COVID-19, such as in centers for public services,
transportation, energy, armed forces and bankers. Also, phase two will
target people aged 16–45 years with medical conditions, over-45s
without comorbidities, and over-16s living and working in crowded
accommodation where self-isolation and social distancing are difficult to
maintain, such as in detention facilities, incarcerated people, refugees
and internally displaced people (IDPs) [1].

3.3. Phase 3 (moderate vaccine availability, for 21–50% of the population)

The third phase targets pregnant women, lactating mothers, people
aged 16–45 years who did not have access to the vaccine in prior phases,
children and adolescents up to 16 years [1].

3.4. Guideline for COVID-19 vaccination for Sudan

The Adverse Events Following Immunization (AEFI) committees
were activated at all levels to ensure demand, community awareness,
and social mobilization plan implementation [1]. In Sudan, the
COVID-19 surveillance system was revised to detect immunization sta-
tus [1]. The Federal Ministry of Health (FMOH) and collaborators
formed COVID vaccine coordination and preparation committees, with
the National Immunization Technical Advisory Group (NITAG) actively
involved in all decision-making processes and supporting implementa-
tion [1]. Also, Information and Communication Technology (ICT) pro-
grams facilitate the preparation, scheduling of vaccines, the tracking,
assessment of the vaccine program’s progress and effectiveness [1].

3.5. Political commitment of the government toward the third phase of
vaccination

Financing the third phase of COVID-19 vaccination needs the will-
ingness of the Sudanese Government to pay for the third phase in the
middle of the economic crisis following recent Democratic change [3].
Besides the lack of internal funding and support, Sudan’s healthcare
system has suffered the consequences of long-standing economic sanc-
tions that lasted for 20 years and ended in 2017 [3]. The Sudanese
government needs to collaborate more with other external organizations
to fund and assist with improving access to vaccines among the citizens.
This is considered the only way to achieve the goal of vaccinating 50% of
the population and without this, the COVID-19 Situation is expected to
get worse in the country.

4. Conclusion

Sudan faces a variety of challenges in adequately vaccinating the
population against the COVID-19 pandemic. Amid a struggling econ-
omy, the cold chain system in Sudan remains under-resourced and
cannot meet the expected increase in capacity required to store addi-
tional doses obtained through COVAX, procure and mobilize new
equipment, thus culminating in an extremely slow vaccine distribution
outside Khartoum State. A call to action for governmental, non-
governmental organizations to implement a multilateral approach to
address financial and logistical vaccination challenges. Moreover, in-
crease awareness among the public and health professionals to address
vaccine hesitancy is needed.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence
the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.
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