COVID-19 Vaccine Uptake: Is it the Key to Normalcy?

Jenifer Wothaya Wambugu1,* and Dorothy Kyalo2

ABSTRACT

The WHO declared COVID-19 a Public Health Emergency on January 30, 2020, and a pandemic on March 11, 2020. Kenya confirmed its first case on March 12, 2020. The WHO's call for equitable global vaccine access led to Kenya receiving 1.02 million doses of the AstraZeneca-Oxford vaccine via the COVAX facility on March 3, 2021. Kenya's phased vaccine rollout targeted front-line workers, individuals over 50, those with co-morbidities, and other vulnerable groups. Nakuru County Department of Health, with World Relief's SCOPE COVID project, reviewed patient data from March 2020 to July 2021. COVID-19 cases were distributed across age groups, with more cases in adults. By July 2021, 68,692 people had received the first vaccine dose and 40,985 the second dose. Healthcare workers, security officers, teachers, and individuals over 58 showed significant vaccine uptake. The elderly had the highest vaccine uptake, with 3.18% of Nakuru's population receiving the first dose and 1.9% the second by July 2021. Front-line workers and vulnerable groups had the highest vaccination rates. Continued advocacy and government efforts are essential for increasing vaccine uptake and returning to normalcy.

Keywords: COVID-19, normalcy, vaccine uptake.

1. INTRODUCTION

The coronavirus disease 2019 (COVID-19) is a respiratory and communicable disease caused by a new strain of coronavirus. This virus is caused by a novel coronavirus named SARS-CoV-2; it is an ailment that can affect the lungs and airways. On January 12, 2020, WHO confirmed that respiratory illness was caused by a novel coronavirus in Wuhan City, Hubei Province, China, which was reported to the WHO on December 31, 2019. Word has it that China had this challenge as early as August 2019, though it chose to be quiet in dealing with this issue. Compared to the SARS of 2003, the ratio of fatality for COVID-19 has been much more significant, with a remarkable percentage of death (WHO, 2020a, 2020b).


Different non-pharmaceutical interventions (NPIs) have been put in place at various periods to reduce the spread of the pandemic that health facilities can manage. These are the closure of bars, places of worship, and restaurants, closure of schools and institutions, restriction of movement in and out of places with high rates of infections, dawn-to-dusk curfew, mandatory wearing of masks, and physical distancing guidelines. Have been implemented at different periods to slow down the spread of the virus so that health (Barasa et al., 2021; Orangi et al., 2021). However, the NPIs serve to disrupt normalcy. For instance, the cessation of movement into and out of specific regions and curfews tumultuously affected the Kenyan macro-economic environment. Even though, contrary to people in developed
nations. Kenyans are in positions to change from city jobs to rural jobs to get food, many Kenyans have borne the brunt of having reduced incomes or loss of livelihoods (Odhiambo, 2020).

Thus, the remedy for the resumption of normalcy is pharmaceutical interventions. The WHO declaration made global scientists put their efforts towards vaccine development. WHO gave its emergency order on the 31st, emphasizing the need for equitable global access and encouraging many countries to develop more vaccine brands (Aschwanden, 2021).

Different pharmaceutical interventions have been used for its treatment, and various are studied. These include biological therapeutics, anti-viral treatments, and corticosteroids (Alvi et al., 2020; Bokharee et al., 2021; Chakraborty & Parvez, 2020; D’Souza et al., 2021; Khalili et al., 2020; Kim et al., 2020; Ostuzzi et al., 2020; WHO, 2022b). There are eight vaccines approved so far for emergency use by WHO (2021b), five of which are available in Kenya as of December 2021 (Ministry of Health, 2021). Their efficacies range from 66.7% to 95% (Deplanque & Launay, 2021; IHME, 2022) with all demonstrating high degrees of protection from severe disease or death CDC (2023).

Kenya is among the countries qualified to access subsidized vaccines via the COVID-19 Vaccines Global Access Facility (COVAX, n.d.). Kenya received 1.02 million doses of the Astra Zeneca-Oxford COVID-19 vaccine on March 3, 2021, as part of the COVAX facility. The Ministry of Health issued guidelines on the utilization of the vaccines and established a vaccine rollout plan in three phases. In phase one, the country focused on rapidly reaching the targeted critical populations identified as the front-line Health Care Workers and Critical/ Essential Workers. The second phase targeted populations considered to be most vulnerable to severe disease and death: persons >50 years and those >18 years with co-morbidities. In comparison, the third phase focused on ensuring equitable vaccination of other vulnerable groups. The priority groups are persons >18 years old in congregate settings, hospitality, and the tourism industry. To control this pandemic in Kenya sustainably, vaccinations should be available to the entire population (Ministry of Health, 2021).

By December 2021, the government intends to vaccinate 10 million people, representing 38% of the population above 18 years, and by December 2022, 26 million people (99%) (Ministry of Health, 2021).

2. Literature Review

To achieve maximum effectiveness, uptake of COVID-19 in large quantities is required within the population. Current studies indicate the importance of taking the vaccine as it causes a decrease in COVID-19 hospitalizations (WHO, 2022a).

This vaccination is now giving a proper way to curb this pandemic. Without this, most researchers believe herd immunity would not have been enough to bring back normalcy and be more deadly. This has been encouraged and emphasized by health bodies such as WHO; strict behavioral measures may have to remain for a long time when there is no vaccine. This will most definitely disrupt societal normalcy (Aschwanden, 2021).

Studies have found that the Moderna and the mRNA-based Pfizer vaccines are 94%–95% effective; even in trial studies, the figures have proven that the elderly are at high risk. This high effectiveness implies that people with the vaccine have a 95% lower risk than the control group. Thus, it is estimated that 1% of the population is at risk, which decreases to 0.05% with the vaccine. Thus, this will allow people to go back to normalcy and the restriction to be stopped (Aschwanden, 2021).

Every country’s underlying ambition over the 2021–2022 period is to apply vaccination as a strategy to get a “new normal,” with activities relating to economic and social life resumed to the greatest extent possible while reducing undesirable health effects and building capacity, which includes stronger health systems. Since the movement to more “normal” social and economic activity settings imply greater transmission potential, higher vaccination coverage targets are required to achieve and maintain health goals at the same level. At the same time, countries reduce PHSM (public health and social measures). How far and how high vaccine coverage must go and be maintained to return societies to a normal state without risking surges in cases remains unknown; as a result, the ultimate vaccine goal is to extend vaccination as far as is needed as swiftly as possible (WHO, n.d.).

Declines in household consumption spending have driven the COVID-19 economic crisis. Vaccination will allow households to return to their normal consumption patterns and release savings. Increased household consumption further translates into economic growth and additional tax revenues, which may offset all or partial costs of vaccination (Cavallo et al., 2013).
3. Method

This part highlights the study procedures that were used. These are study strategy, target populace, size of the sample, techniques of sampling, research equipment, methods of collecting data, and techniques of analyzing the data. The demographic features of the population sampled were represented through computing descriptive statistics.

3.1. Target Population

The target population in this research was all the individuals tested for COVID-19 in Nakuru County. The other cross-section of the population was the strata of all the vulnerable groups to COVID-19 infection in Nakuru County. The vulnerable groups to COVID-19 infections were essential service providers (ESPs) or front-line workers, such as healthcare workers, security personnel, and teachers. Other vulnerable groups were the elderly, intersex, and transgender. A census was applied since all populations were examined and samples were not derived.

3.2. Data Collection Procedures

Vaccination and infection data was obtained from the Kenya Ministry of Health (MoH) daily vaccination bulletins and the Nakuru County Department of Health. The total population in Nakuru County was obtained from the Kenya National Bureau of Statistics (KNBS) 2019 census. An in-depth desk review of patient data by gender, vaccination status, and age was done to identify the group that suffered severe disease and death. The data reviewed included a cumulative number of patients tested from March 2020 to July 2021. Vaccination data was collected for the vulnerable groups to COVID-19 infections, including ESPs or front-line workers like health care workers, security and teachers, and other vulnerable groups, which included the elderly, intersex, and transgender.

3.3. Data Analysis Techniques

This SCOPE COVID project generated quantitative data to analyze the COVID-19 vaccine uptake. The Covid-19 vaccine uptake can lead to a resumption of normalcy. The data was analyzed through (SPSS) Version 25. The descriptive statistics included sums and percentages. This was then illustrated through frequency distribution tables and graphs for better understanding using graphs and frequency distribution tables for easier understanding. Microsoft Excel was utilized to develop the graphs.

4. Results

The SCOPE COVID project generally sought to determine the COVID-19 vaccine uptake and whether the uptake could lead to a resumption of normacy. Descriptive statistics were applied utilizing SPSS Version 25. Sums and percentages were analyzed, and the results were presented using graphs and frequency distribution tables.

The SCOPE COVID project sought to determine the demographics of the COVID-19-positive cases in Nakuru County of patients tested from March 2020 to July 2021. The results are displayed in Fig. 1.

The findings highlight that age 0–15 had 325 males and 256 females; age 16–30 had 1,203 males and 1,017 females; age between 31–45 had 2,047 males and 1,147 females; age between 46–60 had 1381 males and 853 females, while the age above 60 had 690 male and 460 female Covid-19 infections. In total, there were 5,646 male and 3,733 female COVID-19 infections. The findings show that male infections and the total statistics are higher in each age category. It was also evident in the findings that the infections increased in the ages of 16 to 30 and peaked at 31 to 45, decreased slightly in the ages of 46 to 60, and dropped in the age cohort of over 60.

Fig. 1. Distribution of the COVID-19-positive cases by demographics.
The SCOPE COVID project also sought to determine the vaccination of the ESPs or front-line workers like health care workers, security, teachers, and other vulnerable groups, which included the elderly, intersex, and transgender as of July 2021. The results are displayed in Fig. 2.

The findings showcased that Health Care workers vaccinated for the first dose were 10,782 while those vaccinated with the second dose were 6,775; the second dose vaccinations accounted for 63% of the first dose vaccinations. Security Officers vaccinated for the first dose were 6,235, while those vaccinated with the second dose were 3361, accounting for the second dose vaccinations accounted for 54% of the first dose vaccinations. Teachers vaccinated for the first dose were 11,671, while those vaccinated with the second dose were 6,503; the second dose vaccinations accounted for 56% of the first dose vaccinations. The number of people above 58 vaccinated for the first dose was 24,518, while those vaccinated with the second dose was 15,303; the second dose vaccinations accounted for 62% of the first dose vaccinations. Intersex vaccinations with the first dose were 55, while those vaccinated with the second dose were 26; the second dose vaccinations accounted for 47% of the first dose vaccinations. Lastly, the transgender people vaccinated for the first dose were 10, while four were vaccinated with the second dose; the second dose vaccinations accounted for 40% of the first dose vaccinations. Other individuals vaccinated with the first dose were 15,486, while those vaccinated with the second dose were 9,143; the second dose vaccinations accounted for 59% of the first dose vaccinations.

In summary, as of July 2021, the county had vaccinated 68,692 for the first dose and 40,985 for the second dose; the second dose vaccinations accounted for 60% of the first dose vaccinations (see Fig. 3). According to the 2019 Census by the KNBS, the population of Nakuru County was 2.162 million. A comparison of the number of individuals vaccinated for COVID-19 in Nakuru County as of July 2021 for both the first and second doses, with the total population, is done in Table I.

The vaccination uptake in Nakuru County was low as of July 2021, with 3.18% of the population receiving the first dose and 1.9% of the whole population receiving the second dose.

Further findings indicated that individuals above 60 years, deemed vulnerable due to co-morbidities and low immunity, had the highest vaccine uptake, accounting for 36% for the first dose and 37% for...
the second dose (see Fig. 4). In the age cohort, 24,730 individuals had received the first dose, while 15,168 had received the second dose as of July 2021.

The final findings were that the ESPs or front-line workers like health care workers, security, teachers, and other vulnerable groups, which included the elderly, intersex, and transgender, had the highest proportion of vaccinations in Nakuru County as of July 2021.

5. Discussion

The SCOPE COVID project findings show that male infections are higher in each age category and the total statistics. According to Bwire (2020), various results of epidemiology reported all over the globe showed higher mortality and morbidity in males compared to females. Several possible factors can account for this, such as higher expression of angiotensin-converting enzyme-2 (ACE 2; receptors for coronavirus) in males than females, sex-based immunological differences driven by sex hormones, and X chromosomes. Furthermore, a large part of this disparity between infections in males and females might be caused by gender behavior (lifestyle), such as higher levels of smoking and drinking among men compared to women. Additionally, various research has indicated that men are less responsible towards COVID-19 measures than women in undertaking preventive measures, such as washing hands frequently, staying at home and wearing face masks, and staying-at-home orders.

The SCOPE COVID project findings further revealed that the infections increased in the ages of 16 to 30 and peaked at 31 to 45, decreased slightly in the ages of 46 to 60, and dropped in the age cohort of over 60 years. This finding resonates with that of Monod et al. (2021) that COVID-19 infections are primarily prevalent in adults aged 20 to 49. This is because working adults need to support themselves and their families. Additionally, it states that adults aged 20 to 34 and those aged 35 to 49 are the only age groups that have sustained SARS-CoV-2 transmission, with transmission rates consistently above one.

The SCOPE COVID project findings showcase that the second dose vaccinations accounted for 63% of the first dose vaccination for healthcare workers, 54% for security officers, 56% of teachers, 62% for those aged above 58 years, 47% of the intersex individuals, 40% of the transgender individuals, and 59% of the rest of the population. Overall, the second dose vaccinations accounted for 60% of the first dose vaccinations in Nakuru County.

The COVID-19 vaccine is administered using “prime-boosting,” where the immune system is primed with vaccination that comes before the body’s immune system has had time to correspond; it is again challenged. Protection against symptomatic COVID-19 12 weeks after the first dose was established to be 52% with the Pfizer/BioNTech vaccine. Also, after the second dose, it increased to 95%. Further, protection against symptomatic COVID-19 after the first dose from 22 days was found to be 76%. After 12 weeks, when the second dose was administered, protection rose to 81% (Aschwanden, 2021).

The COVID-19 uptake in Nakuru County is up to par with the national uptake. As of July 2021, the national second-dose vaccinations accounted for 62% of the first-dose vaccinations (Ministry of Health, 2021). However, the second COVID-19 dose in Nakuru is relatively low compared to global

<table>
<thead>
<tr>
<th>Item</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total population</td>
<td>2,162,000</td>
</tr>
<tr>
<td>First dose vaccinations</td>
<td>68,692</td>
</tr>
<tr>
<td>Proportion to total population</td>
<td>3.18%</td>
</tr>
<tr>
<td>Second dose vaccination</td>
<td>40,985</td>
</tr>
<tr>
<td>Proportion to total population</td>
<td>1.90%</td>
</tr>
</tbody>
</table>
uptake. 97.5% of individuals in the United Kingdom (UK) who have had a first dose have also undertaken their second dose as of July 2021 (Aschwanden, 2021).

The SCOPE COVID project findings displayed that vaccination uptake in Nakuru County was low as of July 2021, with 3.18% of the total population receiving the first dose and 1.9% of the whole population receiving the second dose. Additionally, individuals above 60 years, deemed vulnerable due to co-morbidities and low immunity, had an uptake of the vaccine accounting for 36% for the first dose and 37% for the second dose. In the national arena, 2.04% of the population as of July 2021 had received the first dose, while 1.27% had received their second dose (Ministry of Health, 2021).

These rates are relatively low as compared to global averages. Kirzinger et al. (2021) established that as of July 2021, 67% of United States (US) adults had received at least one dose of a COVID-19 vaccine.

Finally, the SCOPE COVID project findings revealed that the ESPs or front-line workers like health care workers, security, teachers, and other vulnerable groups, which included the elderly, intersex, and transgender, had the highest proportion of vaccinations in Nakuru County, as of July 2021. The findings are aligned with the Ministry of Health’s guidelines on the utilization of vaccines, which established a vaccine rollout plan in three phases. In phase one, the country focused on rapidly reaching the targeted critical populations identified as the front-line Health Care Workers and Critical/Essential Workers. The second phase targeted populations considered to be most vulnerable to severe disease and death: persons >50 years and those >18 years with co-morbidities, and the third phase focusing on ensuring equitable vaccination of other vulnerable groups. This is because the Essential Service Providers (ESPs) or front-line workers like health care workers, security, teachers, and other vulnerable groups, which included the elderly, intersex, and transgender, had the highest proportion of vaccinations in Nakuru County as of July 2021.

The SCOPE COVID project also concludes that the uptake of the COVID-19 vaccine in Nakuru County is at par with the national uptake as of July 2021 but is significantly lower than the uptake in various global jurisdictions.

In summary, the SCOPE COVID project concludes that the COVID-19 vaccine offers a good chance to curb COVID-19 and maybe to bring back hope to normal life.

Recommendations are made to the Nakuru County Department of Health and, by extension, the MoH to focus more on vaccination of the male gender. This is because there is higher mortality and morbidity in males than females from Covid-19. This can account for several possible factors, such as higher expression of angiotensin-converting enzyme-2 (ACE 2; receptors for coronavirus) in males than females, sex-based immunological differences driven by sex hormones, and X chromosome. Also, a huge part of this difference between infection in females and males might be due to lifestyle or gender behavior, such as drinking and smoking at higher levels among men. Additionally, men have irresponsible attitudes, unlike women, whose behaviors showed they had responsible attitudes towards the measures of COVID-19, like staying at home, handwashing, and wearing face masks.

Additional recommendations are also made to the Nakuru County Department of Health and, by extension, the MoH to focus on the productive age groups and the elderly. This is because the project findings revealed that the infections increased in the ages of 16 to 30 and peaked at 31 to 45, decreased slightly in the ages of 46 to 60, and dropped in the age cohort of over 60 years. This is supported by Monod et al. (2021) that COVID-19 infections are mostly prevalent in adults aged 20 to 49. This is because they are working adults who should support their families and themselves; the only age group that has sustained SARS-CoV-2 transmission with rates of transmission consistently above one are groups aged 20 to 34 and 35 to 49.

Final recommendations are made to the Nakuru County Department of Health and, by extension, the MoH to increase the sensitization about the COVID-19 vaccine due to the low uptake, lower than in other global jurisdictions. Additionally, they should also sensitize the uptake of the second dose. The uptake of the second dose is also low compared to other global jurisdictions.

This is crucial because the COVID-19 vaccine is administered using “prime-boosting,” where the immune system is primed with previous vaccinations. After the body’s immune system has had enough time to correspond, it is again challenged. The protection against this pandemic was established to be

6. Conclusion

The SCOPE COVID project concludes that the administration of the Covid-19 vaccine in Nakuru County is following the MoH-issued guidelines on the utilization of the vaccines, which established a vaccine rollout plan in three phases; the first phase focusing on rapidly reaching the targeted critical populations who were identified as the front line Health Care Workers and Critical/Essential Workers, the second phase targeting populations considered to be most vulnerable to severe disease and death that includes persons >50 years and those >18 years with co-morbidities, and the third phase focusing on ensuring equitable vaccination of other vulnerable groups. This is because the Essential Service Providers (ESPs) or front-line workers like health care workers, security, teachers, and other vulnerable groups, which included the elderly, intersex, and transgender, had the highest proportion of vaccinations in Nakuru County as of July 2021.
52% with Pfizer/BioNTech, which then increased to 95% after administering the second dose. Also, using the Oxford/AstraZeneca vaccine, protection from 22 days after the first dose was assessed to be 76% and 81% after the second dose 12 weeks after the first dose (Kirzinger et al., 2021).

In summary, the SCOPE COVID project recommends that the MoH provide more vaccines as it offers the hope of returning to normalcy.

**Conflict of Interest**

The authors declare that they do not have any conflict of interest.

**References**


