

# Engaging African Diaspora in the Fight against Vaccine Hesitancy

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**Abstract** Vaccination acceptance is important for health security. In order to improve on the acceptance of any successful COVID-19 vaccine, factors that might influence vaccine hesitancy have to be addressed. Vaccine hesitancy could describe someone who does not have a fully formed opinion about vaccination. They may refuse some vaccines and take others. They may delay the schedule, but eventually fully vaccinate their children. Vaccine hesitant individuals are the most likely to be swayed by anti-vaccine sentiments. These sentiments have the potential to significantly increase the severity of an outbreak. If enough hesitant individuals opt out of a new COVID-19 vaccine, this could undermine efforts to control the outbreak globally, and keep the disease in wide circulation. This article is intended to emphasize on the role of African diaspora as Influencers. The African diaspora, through remittance, influence economic and healthcare decision of the recipient families in their countries of origin. We hereby make a case for why it is important to analyze the perception of African Diasporas towards the COVID-19 vaccine and engage with them within a framework of health promotion and civic literacy, with the objective of generating demand for COVID-19 immunization, bearing in mind that there is no single strategy can address all of the different dimensions of hesitancy.

**Keywords:** African Diaspora, remittance, vaccine hesitancy

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## 1. Introduction

The United Nations International Organization for Migration in its Glossary on Migration defines diasporas as “people or ethnic population that leave their traditional ethnic homelands, being dispersed throughout other parts of the world [1]. Among the Diasporas, the African community forms a major part of the migrants who are scattered worldwide. They play a significant role in shaping the global economy.

The African Union convened an expert meeting for member states in April 2005 to prepare a definition of the “African Diaspora”. They adopted definition is: “The African Diaspora consists of peoples of African origin living outside the continent, irrespective of their citizenship and nationality, and who are willing to contribute to the development of the continent and the building of the African Union” [2]. This broad definition calls attention to a number of significant policy points: a continental instead of national belonging (i.e. a non-national diaspora definition) and highly symbolic and political facets. Voluntarily belonging to the “African Diaspora” is intrinsically related to the willingness to contribute to the development and support of the African Union. This definition therefore

relates voluntary contributions to belonging to a collective entity. Furthermore, this definition demonstrates a symbolic and political aspect regarding the African Diasporas. They play very important role in promoting the economy as well as the healthcare systems of African communities [3].

## 2. Financial Remittance and Its Importance

Remittance serves as a support system to many African families. It provides a sustainable source of income and is one of the sources of livelihood in a lot of poor families, extended families and local community groups. The family organization in Africa includes extended family networks rather than small, nuclear families as seen in Western countries. The families are closely knitted even though they have a large number of family members and they have a collective approach in contrast to the self-reliance characteristic of Western society. This collective solidarity encourages the African family members to help each another whenever one needs a support. This sense of providing help and support to the family is the main factor that obliges an African in the Diaspora to contribute and send money to their families, whether it is more or less is shared among the extended families [4].

In Africa there is no successful government system that can help the marginalized families therefore, this remittance becomes a much needed and reliable source of income. It gives the families a sense of safety and security as seen in many natural disasters situations where the financial contributions from the African Diaspora helped their families and local communities to cope with the crisis effectively. In the African countries, most of the poor people rely on the remittance as it provides direct and quick benefits. The key role played by the African Diaspora in providing financial support to their families also helps in building a sense of attachment among them. This not only helps in improving the family's condition but also provides economic stability in many poor countries in Africa. Evidence has shown that remittance serves as a *pro-poor finance* and plays a crucial role in reducing poverty [5]. Remittance are used for different purposes. Some of the remittance funds are used by the family members to pay their children's school fees, hospital bills etc. The support provided by the African Diaspora is directed at ensuring proper health care and education in their respective homelands. Remittances are also used as a capital to start new family business with the aim to help in building their family income. The African Diaspora also helps in the growth of small and medium enterprises in Africa by assisting in export of materials, products and equipment that are needed for them to start their business. Therefore, the Diaspora helps at different social and economic levels. However, their contribution is largely ignored by both the governmental and non-governmental agencies [6].

### 3. Diaspora and Their Impact on Health Decisions

The most important feature that has impacted the process of globalization is the increase in these migrants around the world. Due to mass migration, a lot of people have drifted from the south to the developed nations of the west leading to a rise in the African Diaspora in the 21st century. Even though they form a huge number in the western countries but rarely any significant research or study has focused on their behaviors and activities. They have their own unique history, cultural and societal background, a distributed genome and beliefs associated with their health and fitness. They are the key decision makers in their families and therefore, whether it is economic, social or health related decision, the family members approach them for all important subjects. The success of COVID-19 vaccine in different African regions will be largely determined by the view and perspective of the diaspora. In order to maximize the reach of the vaccines to the African communities we need to understand what is the current attitude and belief of the African diaspora with regard to the future COVID-19 vaccine that is still in the developmental stage. In the current pandemic, it is very important to demonstrate the factors associated with vaccine hesitancy and how we can overcome them to fight against this crisis situation together irrespective of our race and culture [5]. A clear understanding will help us to approach the African population and build a sense of trust and confidence

among them for accepting the vaccine whenever it is made available to them. Therefore, in this article we aim to elaborate the role of African diaspora that will significantly impact the outcome of the vaccination program as well its acceptance in their families in the wake of COVID-19 pandemic.

## 4. Vaccine Hesitancy in African Diaspora

According to the World Health Organization (WHO), vaccine hesitancy is defined as any delay caused in acceptance of the vaccine or refusal of the vaccines even though the service of getting vaccination is provided. It involves a complex interplay of factors associated with culture, race, ethnicity, geographical location and people's own attitudes and beliefs [18].

Vaccines have been widely used to combat infectious diseases [6]. The successful outcome of vaccination can be obtained if sufficient amount of people receive vaccines which in result will lead to herd immunity. However, in recent times it is observed that people tend to refuse receiving vaccination which has led to a wide research as to what causes this attitude. A new concept has emerged in the field of immunization known as vaccine hesitancy [7]. It was observed that Africans were less interested to be immunized when given the option of vaccination for seasonal influenza as compared to the Americans [8]. Additionally, the Centers for Disease Control and Prevention reported that 37% and 45% of the Africans and Americans, respectively were vaccinated during the 2015-16 flu season. It is also interesting to note that even when the immunization rates of influenza was increased, the Africans were much less immunized in comparison with the Americans [9]. This article aims to understand and evaluate the factors associated with vaccine hesitancy and also explore the attitudes and impact caused by the persistent racial disparities.

### 4.1. Importance of Vaccination

The pandemic (COVID-19) has infected millions of people worldwide and led to deaths of many [10]. In the U.S around 250 million people have been infected and over 125,000 have died as reported on June 2020 [11]. The Centers for Disease Control and Prevention (CDC) expressed its concern as according to their recent reports the impact of COVID-19 has been majorly observed among racial and ethnic minority communities [11]. Therefore, it is very important to understand that development of a successful vaccine is the best hope that can help to create a balance globally.

Several infections and deadly diseases such as rabies, typhoid, polio and plague were managed successfully with the development of vaccines. Vaccines will help in controlling the increasing mortality rates. According to Bill and Melinda Gates Foundation, it was shared that after following immunization process the mortality rate of under-five declined by 55% between the years 1990 and 2017 [12]. The US Centers for Disease Control and Prevention has highlighted that in the twentieth century the drastic improvement in public health is a result of global immunization [11]. This has in turn created new

health policies and processes that helped the developing nations. The white house reports of the past few decades have included vaccine development as a priority based on the pandemic preparedness [13,14].

An important aspect in the immunization process will involve sharing of the vaccine equitably once it is prepared [15]. The chaos caused due to the pandemic has reduced the sense of optimism when it comes to dealing with the problem of vaccine hesitancy. There is an on-going conversation on the social media that are concerned what will be the outcome if people who deny the routine immunization also hesitate to undergo vaccination for COVID-19. Numerous health experts have mentioned that based on the data obtained from global disease tracking there has been a rise in the number of infectious diseases such as measles that were under control previously [16]. One of the most important factor that has led to the rise in disease as observed by the CDC is due to reduced vaccination [17]. Even though the vaccines are completely free and ensured that they are available everywhere but a reduced response among African populations has created lot of health disparity. In 2019, the CDC estimated that more than half of the US population did not receive a vaccine for seasonal influenza [11]. The WHO has mentioned that one of the reasons that has deteriorated the health of individuals globally is due to "Vaccine hesitancy" [14]. The COVID-19 crisis demands a collective effort where all the factors that cause vaccine hesitancy among the African diaspora should be assessed.

## 4.2. Factors Causing Vaccine Hesitancy

The concept of vaccine hesitancy came into existence after the Strategic Advisory Group of Experts in Immunization (SAGE), a selected group of people working for WHO examined the rising trends associated with the vaccination process [19]. The WHO has mentioned three factors (the three C's) that play a critical role when it comes to vaccine hesitancy [7]: (1) Complacency refers to the perception of risks, complications and value related to vaccines. (2) Convenience refers to the affordability, accessibility and availability of the vaccine and how different factors are associated with it. (3) Confidence refers to the effectiveness and safety of vaccines, a trust on the government and the sectors that provide the vaccines. It implies that individuals perceive the benefits of the vaccines and have faith in the health services and health professionals [20].

WHO has emphasized that the attitude what leads to vaccine hesitancy is context specific. It is observed that individuals can refuse one specific vaccine whereas continue to receive others [7]. According to SAGE working group, the vaccine hesitancy depends on few specific factors such as: Cultural background, ethnicity, racial history, economic condition, individual's attitude and beliefs, family's perception, environmental, and political factors, personal experience, and Vaccine specific issues. A broader understanding is required to evaluate the social, historical, and cultural impact that gives rise to hesitancy [21,22].

### 4.2.1. Vaccine Distrust

Less trust and lack of confidence was seen to be directly linked with the vaccine itself. The majority of the

African diaspora who were not interested to get vaccination shared few reasons for the same such as fear of side effects, distrust due to lack of vaccine efficiency, a fear of needles and a belief that vaccines could transfer the virus to the body. People justified that the risk of the disease is outweighed by the side-effects or bad reactions demonstrated after vaccination. People who lacked trust considered vaccine less effective and more harmful due to their own assumed reasons and views. African diaspora has shown a high distrust in getting vaccines based on the lack of trust for the government and policy makers related with the vaccination services. They also believed that the needles could be contaminated and would unnecessarily get them exposed to some disease [23].

### 4.2.2. Organizational and Governmental Distrust

Many Africans have low trust and confidence for the organizations, pharmaceutical companies and government that are associate with the vaccines. They believe that all these public health agencies have their own personal motives and a profit-oriented mindset. Due to the racial discrimination, injustice, and involvement of Africans in numerous unethical research studies, people have lost their faith in the system leading to vaccine hesitancy. Policy makers and organizations should ensure that the trust is regained, and no further harm or injustice should be done [23].

## 4.3. Difficulty in Vaccine Acceptance

The non-takers of the diaspora believe that the vaccine shot is unnecessary. They consider their own immune system to be strong enough to fight any foreign body or infection. They also believe that following different behaviors and procedures will help them to combat any infection therefore, vaccines do not help in any specific way. The African people strongly believe that their body can fight any bacteria on its own and makes the immune system stronger. Hence, vaccines intake will make the body weak if they go for a shot. Many do not understand the reason behind taking a vaccine. They justify their belief that if one is not sick then what is the need to get a vaccination. The lack of complete understanding of why vaccines are important has created a huge gap between the American and African diaspora in vaccine acceptance. Additionally, they associate vaccine with getting a painful injection and have concerns regarding the contamination.

Majority of the African diaspora expressed their distrust for the government as they believed that the policy makers who are involved in creating the vaccines have their own personal motives. They considered vaccine distribution to be an experiment where the African community is used as a "guinea pigs". They also believe that for them the vaccines used were impure and diluted. This is due to the impact created by the Tuskegee Syphilis Study where their trust was broken by the government and health professionals by conducting unethical experiments among these communities. Therefore, it is very hard for the African diaspora to follow and believe the health system. They do not find it easy to accept vaccine. The vaccine hesitancy among the Africans is also a result of their family traditions. Older generation is greatly impacted by the previous customs and beliefs. As many families had a

tradition of not receiving a vaccine shot therefore, the same ritual is also followed by the newer generations. This is a cumulative effect of the distrust in the vaccine, fear of the injections, a history of betrayal by the medical authorities in the past and a socially reinforced avoidance of vaccine that has created distrust among the African diaspora [23]. The Americans showed a higher level of trust in accepting the vaccine as compared to the Africans. They considered vaccination to be of lower risk and had a degree of disease risk perception that developed a sense for accepting the vaccine process. The Americans believe that majority of the people of their race gets vaccination. However, the response was entirely different for the African diaspora. They believe that people of their own community tend to have a low vaccination rate as compared to the general population. The racial disparity in receiving vaccination highlights the difference in the perception, attitude and beliefs between the Americans and African diaspora.

The African diaspora are overall more hesitant and resistant to receive vaccines such as they will find some excuses, report more barriers and justify some form of substitute for getting vaccinated (such as conspiracy theories and naturalism) [24]. This overall negative perspective towards vaccination process will influence their decisions when it comes to receiving COVID-19 vaccines among their family members as they are the ones who take the health-related decisions.

#### **4.4. Importance of Building Trust among Africans**

The WHO's Strategic Advisory Group of Experts (SAGE) has assessed the significant role of public trust in providing vaccination globally. It is clearly believed that trust is a critical aspect for increasing vaccine acceptance. However, there is no specific guideline or measurable factor that can quantify the trust, which aspect of trust is most important and how to improve the relationship between the policy makers, health professionals and people so that a wider vaccine confidence is attained. The issue of trust is not particularly specific to vaccines but a rather generalized notion that impacts the outcome of all kinds of government efforts [25].

The African diaspora have struggled a lot in the past and also continue to fight for their rights and values in the present. They have experienced a history of slavery and racial discrimination that has created hatred and distrust towards the government. On the other hand, the Americans did not go through similar kinds of discrimination. Moreover, their experience with the health care system is mostly positive and were provided with a supportive environment therefore, it makes sense that they do not question the government. Therefore, the Africans have less trust in the institution, pharmaceutical company and other government agencies than the Americans. According to the SAGE, the societal and historical factors have created a lasting impression on the African community so now they find it difficult to grasp that vaccines are for their own benefits. They do not regard the health system as a service provider and tend to avoid getting vaccination [20]. It is seen that the younger African diaspora are still hopeful and trust the health care

system. They are more willing to obtain vaccines as compared to the older generation.

In the present crisis, until the vaccination program involves people of all the races no amount of vaccine will be helpful. The government should ensure that all efforts are taken to build a sense of trustworthiness among the African diaspora as it will impact their decision of vaccine acceptance at their homeland. The legacies that had continued for them cannot be changed by the health professionals or the pharmaceutical companies. But they should try all possible strategies to regain the trust and confidence in the system. Instead of collecting evidence for factors that caused distrust, institutions and organizations should plan strategies to create "trustworthiness". Parameters should be used by all health institutions where they are assessed whether all measures were taken in order to earn the trust of African diaspora [25]. As FDA is believed to be under the influence of large pharmaceutical companies, the FDA can increase its trustworthiness by providing more detailed information on the progress of COVID-19 vaccine, the approval process and its process of manufacturing as well as distribution. The CDC should justify the importance of the vaccine, its effectiveness in providing a safer environment globally. This will help the people to acknowledge that it is for the benefit of the general public and affect their level of trust.

## **5. COVID-19 Vaccines**

The first human cases of COVID-19, the disease caused by the novel coronavirus causing COVID-19, subsequently named Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) were first reported by officials in Wuhan City, China, in December 2019 [26]. SARS-CoV-2 was identified in early January and its genetic sequence shared publicly on 11-12 January [27]. The coronavirus attacks the respiratory system and has led to few major outbreaks in the past few years including the severe acute respiratory syndrome coronavirus (SARS-CoV) and Middle East respiratory syndrome coronavirus (MERS-CoV). Till date, several measures have been taken to develop vaccines against SARS and MERS but no licensed vaccine has been developed yet. In addition, few other strains of coronaviruses have been detected HCoV2-229E, -HKU1, and -NL63 resulting in mild form of cold and cough [28].

The development of vaccine against this various has been a very challenging task historically. Coronavirus consist of a large Ribonucleic acid (RNA) genome that is protected by a helical nucleocapsid (N) and an outer layer of envelope. This envelope consists of three different proteins namely matrix protein (M), envelope protein (E) and spike proteins (S) [29]. The vaccine development target has been the S protein as it has demonstrated a neutralizing effect on the antibody [30,31]. In the animal models when the trial vaccines were used it was observed that the response was not adequate. The vaccines were not able to successfully prevent the disease [32]. There is also a concern regarding the absence of attainment of long-term immunity with vaccination. And there is a probability of getting re-infection [33]. Considering all the other factors, vaccines are still the best option to spread the progression of disease.

## 5.1. Development of Covid-19 Vaccines

The vaccine production takes a decade's time usually to follow the entire process of pre-clinical testing and trials, mass production and distribution in the required area. However, in a pandemic the production has to speed up and a decade long process has to be covered in a year or as soon as possible. This creates a lot of risks and financial strain on the global economy [34]. In the past, we have seen that any delay in the vaccine distribution increases the mortality and morbidity. In the Ebola epidemic that occurred in West Africa in 2013-2014, more than 11,000 people died [35]. Not only it had an impact on the health system, but it also affected the economy [36]. Presently, to fight the COVID-19 there is no vaccine available. However, many nations are trying their best by involving the researchers, health professionals and pharmaceutical companies to provide a vaccine [36,38]. Every effort is directed to produce an effective vaccine that can be distributed among everyone [11,40]. There has been lot of trials where serum from the person who has recovered from COVID-19 were used to provide an immediate therapy for patients affected with COVID-19 [40]. Few vaccines have reached the final stage of assessment, INO-4800 by Inovio pharmaceuticals (NASDAQ:INO), Messenger Ribonucleic acid (mRNA)-based vaccine (mRNA-1273) by Moderna (NASDAQ: MRNA), and by other pharmaceutical companies such as CanSino Biologics and Johnson & Johnson (Clinical Trials, 2020). The Oxford University and Rocky Mountain Laboratories are working together to design a new chimpanzee adenovirus vectored vaccine (ChAdOx1) (2020). The advantage of the ChAdOx1 is that it can elicit a strong immune response and fight the SARS-CoV-2 virus, provide better immunization to high risk population such as the elderly, children and individuals with compromised immunity [42,43]. The INO-4800 vaccine, a DNA plasmid-based vaccine targets the S protein of the SARS-CoV-2 and is believed to activate immune cells [43]. The Moderna Therapeutics is also in the final stage of completing the clinical trials [41].

The majority of the vaccines are targeting the S protein of the COVID-19 virus by using the mRNA vaccine platform technology. The main reason of using the spike protein as target for vaccines development is their property of inducing potential neutralizing antibodies. They will play an important part in host receptor binding and pathogenesis [44,45]. Some researchers also believe that the spike glycoprotein of SARS-CoV-2 can also be a target for vaccine development [36]. The valuable options include the DNA vaccines, chimeric viral vaccines, and membrane vesicle-vaccines [39]. Antibody-based vaccines are under development and produced by Eli Lilly and AbCellera. A pandemic vaccine adjuvant that can be used in all the COVID-19 vaccine candidates has been created by GlaxoSmithKline. Sanofi in collaboration with GlaxoSmith- Kline (GSK) have developed recombinant DNA vaccines by bringing into use the adjuvant prepared by GSK. The vaccine has initiated its first clinical phase in September 2020 [46]. Even though a lot of vaccines are under development but none of them have reached a commercial level. Most of them have reached a pre-clinical testing stage.

## 5.2. Vaccine Candidates

Development of vaccine will involve the selection of protective antigen/peptide from SARS-CoV-2 [39]. As the genome sequence of the virus is already revealed which is proving helpful for the subunit vaccine development. The various structural proteins such as the envelope (E), membrane (M) and spike (S) are targeted as antigens for the vaccine development [47]. In a recent research by Ahmed et al. [38], the T and B cell epitopes from two of the structural proteins of the SARS-CoV-2, the Spike (S) and nucleocapsid (N) proteins were found to demonstrate identical mapping to the virus. Additionally, no genomic mutation was detected in the 120 genome sequences making them appropriate candidate for vaccine development.

## 5.3. COVID-19 Vaccine Trials in Africa

Recently, the COVID-19 vaccine trials are being evaluated in South Africa. The main intention is to evaluate how the vaccines work there and assess the response in the African population. The Novavax clinical trial is managed in Africa under the guidance of several chief investigators. It is strongly suggested that African population genome consists of varieties of genomic variation and therefore until and unless the African countries are included in the vaccine trial the effectiveness of the COVID-19 vaccines cannot be completely determined. The response of the trial will help in making proper decisions, and execution of an effective strategy to promote global distribution of the vaccine. The NVX-CoV2373 vaccine and few other COVID-19 vaccines are assessed for their safety and effectiveness in the African regions. The South African Medical Research Council Vaccines and Infectious Diseases Analytics (VIDA) have shown positive response and interest in continuing the vaccine trial.

The first clinical vaccine trial was conducted in June 2020 followed by the second trial and third trial in September 2020 where COV2-S, a Johnson & Johnson product was used for the study. The first trial was conducted with the joint effort of Oxford University and the Jenner Institute with Ox1Cov-19 vaccine. A vaccine research is underway in Africa to promote faster production and clinical testing. Clinical trials that are in the final stage of clearance will be performed in Kenya under the guidance of Oxford University. Additionally, in December 2020 under the collaboration of Uganda's Vaccine Research Institute and Imperial College London will be conducting the clinical trial [48]

The African Academy of Sciences (AAS) based in South Africa along with the African Union Development Agency (formerly known as NEPAD) decided to prioritize the research trials for COVID-19 in Africa. More than 600 health professionals, researchers and policy makers understood that African population needs to be an integral part of the research focusing on the development of vaccine for COVID-19 in Africa. The African population is dealing with the impact of COVID-19 in a similar way as the other parts of the world. However, the healthcare system in Africa is fragile and lacks the basic necessities to ensure proper health coverage of all. The government as well as the people are doing their best to limit the social

transmission of the virus, but it is creating a lot of financial burden on them largely affecting the vulnerable populations. Therefore, vaccines once developed and distributed among all will improve their overall condition physically as well as financially [48]

In the past, during any epidemic outbreak, generally vaccines were screened, tested and developed in other parts of the world and Africa used to be a passive recipient of vaccines. But, in the fight of developing vaccine for COVID-19, the African scientists, researchers, health professionals and policy makers are trying to develop vaccines in Africa itself. The researchers want to make their contribution in the international effort to develop vaccines. The vaccines will be easily tested among the population if they are developed in Africa as reported by one of the researchers to the Lancet Respiratory Medicine. The coordinator for Immunization and Vaccine Development at the WHO Africa Regional Office mentioned that it is important to include the African continent in the clinical testing of vaccines as it will help in the collection of relevant data related with the safety and effectiveness of the vaccine. Once the information is attained the mass enrollment of the vaccine can be conducted. Previously also the trials for few serious conditions were conducted in Africa such as the trial involving the vaccine for conjugate meningitis A conducted in 2010. It helped to provide immunity to more than 300 million people. The spread of Ebola virus was timely managed by the distribution of Ebola vaccine that helped to put an end to the largest Ebola outbreak seen in Democratic Republic of the Congo. The vaccine trial in the sub-Saharan Africa should be conducted after thorough assessment of the disease, and extent of its severity. All the biological, economic, and sociopolitical factors should be considered before initiating a clinical trial [48].

In July 2020, the African Union (AU) in an effort to provide appropriate vaccines to African people created a new Consortium with the global vaccine developers, international pharmaceutical companies, policy makers and organizations that conduct clinical trials in Africa: The Africa Centers for Disease Control and Prevention (CDC) Consortium for COVID-19 Vaccine Clinical Trial (CONCVACT) which has been assigned the role to assess all the possible outcomes, safety and efficacy measures of vaccines candidate tested within the African populations. By the end of August, more than 1 million cases of COVID-19 were reported in Africa. Based on the previous reports, the AAS clinical trials community highlighted that including the African nations and the WHO Africa Regions, only 2% of the clinical trials happens there for all kinds of vaccines. As African population contributes to a large section of the world's population the vaccines should be tested on a much larger scale. The WHO (August 2020) reported that out of the 33 COVID-19 vaccine candidates under clinical evaluation, two are in Africa [48].

#### **5.4. Covid-19 Vaccination Program Implementation**

The solution to deal with the crisis situation that we are presently dealing due to the COVID-19 demands an approach where a safe vaccination program is implemented.

It will not only bring a positive outcome when it comes to improving the health but also an overall well-being involving the economy and socioeconomic benefits. In total there are 8 vaccines that are currently going through the phase 1 trial. It is expected that by 2021, the COVID-19 vaccine will be available globally [49]. Researchers and scientists have learned from the prior pandemics that the mass vaccination programs need to be planned out strategically. Additionally, the general population should be made aware of the necessity to receive the vaccine in order to have the desired results. The timely distribution of the vaccine will help in reducing the morbidity and mortality that has impacted the entire world.

The purpose of vaccination program is to engage as many individuals as possible to get the vaccine. Just the mere distribution of the vaccination will not serve the purpose. Therefore, the mass immunological protection can be attained only if we build a sense of trust and confidence among the national and regional health communities and the general public. The most common barrier that prevents the public to get vaccines and achieve the herd immunity is vaccine hesitancy. It is reported that in order to target the approach for herd immunity for COVID-19, the threshold will range between 55% and 82% of the population [50]. Another thing to consider is the fact that there will be few people who will be ineligible to receive COVID-19 vaccines due to the age factor, underlying medical condition, immunocompromised state. The impact of this will lead to an increased refusal rate and if it is more than 10% it will create a great hurdle in achieving the goal of mass immunity.

According to recent surveys, it is suggested that out of 4 people only 3 will be opting to get vaccinated whenever the vaccine is made available. Also, once the vaccine is distributed and made available to health service providers, only 30% of the population will get the vaccination immediately after its availability [51]. Apart from the vaccine hesitancy, the lack of confidence in vaccination program is also one of the important factors creating the distrust among different racial background. The attitude of parents will also impact the outcome. Parents who are hesitant about the childhood vaccine that are routinely given are more likely to avoid the COVID-19 vaccines. In a research conducted by Edwards and Hackell, parents tend to prevent their children from getting vaccinated due to three main reasons: a) the significance of vaccines, b) the safety and effectiveness of vaccines, c) the freedom of choice [52]. It is very crucial to educate, build trust and make the people understand the importance of the future COVID-19 vaccine. The African population, the older generation, and children should be the target population who are required to be made aware regarding the role of COVID-19 vaccine.

#### **5.5. Educational Campaign**

Strong campaigns that focuses on public health and include people from diverse cultural background, ethnicity and nationality should be conducted. The social media will help in reaching out to audience in no time. The technology can be used for human welfare. The government and policy makers should make sure that no

false information regarding the vaccine is propagated. All types of anti-COVID propaganda should be handled by the health authorities and immediate action should be taken. This will help to curb the false notion related to vaccines and prevent any harmful ideas to be implanted among the common people. According to a survey conducted by the nonprofit Public Good Projects, there is a lot of misinformation on the social media regarding the future COVID-19 vaccine. Some believe that the vaccination should not be made mandatory as it interferes with their freedom of choice. Few of them consider it to be a part of conspiracy theory where the government will track their activities by using a small chip in the vaccine shot.

The kind of information we get on social media platform will directly or indirectly shape our decisions. It is need of the hour that all the misinformation should be investigated by the authorities. All types of beliefs and opinions associated with COVID-19 vaccine can be changed if the public is directed towards the correct information by using an evidence-based approach [53]. The dangerous outcome of the myths and false notion should be nipped in the bud. The public health campaigns should associate with the social media to monitor the related news linked with the vaccine. The frontline healthcare professionals should develop an encouraging attitude among the general population towards the vaccine. During any patient and doctor's interaction, a positive approach will influence the decision of the former. Physicians can share the benefits of vaccines and how they are provided in the interest of public. People who are vaccine hesitant will be more engaged if they are approached by someone, they trust such as their family physicians [54].

The healthcare providers should be given the vaccination so that not only they are capable of treating the COVID-19 infected people but also allows the medical professionals to share the positive impact of the vaccines with their patients. This will have a great effect in changing the opinion of the African population who believed that they were used as a guinea pig to check the safety of any new treatment modality. Additionally, the nurses and the other allied health professionals will also influence the patients' attitude related to the vaccination programs. It is the joint effort of the healthcare professionals, the social media authorities and people who run the campaigns for public health to provide a message of strong evidence that COVID-19 vaccine is for the betterment of the society as a whole [55].

## 5.6. Engaging African Diaspora in Vaccination Programs

There is no "one-size-fits-all" model for governments or Institutions working to engage the diasporas more effectively. Each diaspora has a unique set of needs and capabilities based on its historical experience and the present realities of its countries of origin and destination, and government/Institution approaches must reflect these complexities. The International organization for Migration processes a four-stage roadmap for engagement with Diaspora: (1) Identify goals in undertaking this pursuit and to define the internal tools and mechanisms

(administrative, financial, etc.) required for the task. (2) Know your Diaspora; This involves serious, comprehensive data collection (through a migrant/diaspora census, for example); mapping the location of the diaspora; compiling inventories of diaspora skills and experience; and engaging a wide range of diaspora members in listening exercises to understand what the diaspora has to offer, what it is willing to offer, and what it expects from the government in turn [56]. (3) Building trust is therefore a necessary third element of the diaspora engagement strategy. (4) Mobilize the Diaspora for Development: With trust established between governments and diasporas, the characteristics of diasporas well understood, and the objectives of diaspora engagement clearly articulated, partnerships for development involving diasporas can be more successfully mobilized [57,58].

A joint effort is required to bridge the gap related to their political, social and mental well-being. A support system or authority that focuses on recognizing their initiatives, collaboration between their home and residential countries, and collaboration with different regional association that are specifically designed to meet the needs of diaspora. All these policies will play a key role in making diasporas partners in the country's development. The importance of vaccination and other public health issues in this time of COVID-19 will be taken care in a much better way if the African diaspora is approached in a broader perspective [3].

## 6. Recommendation

Future implications of COVID-19 and vaccine acceptance

### 6.1. Understand Public Expectations and Create Awareness about the Importance of Vaccination

The entire world is dealing with the crisis situation. The diverse culture and population of U.S have their own beliefs, opinions, fears and hope regarding the future of SARS-CoV-2 vaccines. However, there are some concerning issues that are currently trending. The general public is quite optimistic regarding the development of COVID-19 vaccine that has led them into believing a faster manufacturing process, quick distribution and immediate clinical trials will end up in compromising the quality of the vaccines. On the other hand, some believe that initially the vaccine will be distributed to communities where the future subject of experimentation will be identified. If these myths are not looked into by the authorities then there is a high probability that the future demand of the vaccine will be compromised.

People should be regularly made aware regarding the risks and complications associated with the coronavirus. Before conducting the SARS-CoV-2 vaccine distribution, the health agencies should strategically plan and execute national campaigns, and engage diverse populations in making them understand about the health benefits, allocation and availability. The CDC should join hands with the local health departments and provide sufficient funds to create awareness even at the grassroots-level regarding the COVID-19 vaccination program [3].

## 6.2. Build Public's Confidence by Ensuring Even Vaccine Allocation

The worldwide focus of all healthcare departments is to ensure an affordable COVID-19 vaccine to all. The pharmaceutical companies are still working towards the development of the vaccine. Before the vaccine is commercialized, government should communicate to the public regarding the progress of the development. People should also be informed that vaccine once developed will be evenly distributed irrespective of the economic and social disparities. In the current situation when already a racially biased health system is present, people's beliefs and perceptions can be easily modified. Therefore, they should be ensured regarding a fair system where everyone will have the opportunity to avail the COVID-19 vaccine. No special preference will be given during vaccine allocation based on particular cultural background, race, ethnicity or community. This approach will show the transparency and evenness on behalf of the government as well as healthcare system. The US government should effectively communicate that vaccine will be made available to everybody based on one simple fact that whoever wants a COVID-19 vaccine will be given a COVID-19 vaccine [3].

The CDC and US Department of Health and Human Services (HHS) should collaborate with the local authorities to design a strategy in building confidence that vaccine will be distributed fairly among all. Definite guidelines and framework that keeps a track of the distribution will help to effectively allocate the COVID-19 vaccine [3].

## 6.3. COVID-19 Vaccine should be Made Available in a Convenient and Safe Environment

As soon as SARS-CoV-2 vaccines will be produced, they will be required to be made easily available to the general public. In order to ensure accessibility to everyone, the local vaccination capacities needs to be assessed. In case of any inadequacies and loopholes, sufficient measures should be taken by the regional healthcare authorities. The community workers, local healthcare professionals, members of the marginalized communities should establish sites for the vaccination program that makes them feel safe. During the entire vaccination process, the authorities will be required to provide information regarding the vaccination opportunities in order to engage the population.

The CDC and other healthcare organizations should conduct surveys and address what has worked well in the past with regard to vaccine distribution. Evidence should be collected from the state and local public health departments in creating a planned approach to make the vaccine widely acceptable and accessible [3].

## 6.4. Take Adequate Measures to Prevent the Spread of Misinformation Associated with COVID-19 Vaccines

In today's world we are immensely dependent on social media. Every decision, action or plan related with the

pandemic is covered. However, even though we are months away from developing the first successful vaccine but still a lot of myths and fake news are being spread. The topic of vaccination is looked into with great interests among all the countries. Apart from managing the economic, social and health situation the policy makers and government are facing another challenge of creating a sense of adequate knowledge and information among people who are tied to their own beliefs and perspective [3].

The government should make platforms where before publishing any irrelevant news, a research based evidence is provided especially related to the vaccination. It will help to curb any negativity and track the communities who are against the COVID-19 vaccines. Accordingly, the regional and local authorities can communicate and find ways to engage such individuals. In communities, individuals who are trusted should be given a role to help in the spread of vaccination importance along with the healthcare professionals. This will help in bringing out a positive change in the people's mentality towards COVID-19 vaccines and vaccination operations [3].

## 7. Conclusion

Engaging African diaspora is crucial in bringing out an effective outcome of herd immunity and will directly impact the decision of vaccine acceptance among their family members in African countries. The efforts directed towards COVID-19 vaccine acceptance should be planned strategically before the vaccine is commercialized and distributed. The government, pharmaceutical companies, healthcare professionals, and researchers should direct all their energy in building a momentum to encourage vaccine uptake whenever it becomes available. The vaccine should be accessible to people of all the countries particularly targeting nations where the spread is rapid and severe complications have occurred. People who are hesitant towards the vaccine should be engaged in the educational campaigns providing them a clear understanding of its efficacy and safety. The joint effort of all the countries will surely provide us the first COVID-19 vaccine in the coming months. It is the people's perspective, attitude, and negligence that will decide the success of the vaccines. So, let's support the vaccination program after all it is the only hope that will help us to combat the pandemic.

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