

DIGITAL RESULTS IMPROVE VACCINE
EQUITY AND DEMAND (DRIVE DEMAND)

Behavioral insights from a multicountry qualitative study on vaccine intention





Acknowledgements

We would like to thank The Rockefeller Foundation, PATH, and Digital Square at PATH for their continued support and enthusiasm. Heidi Good in particular provided invaluable guidance. We are grateful to our in-country partners and stakeholders for supporting our research, including Donat Shamba at Ifakara Health Institute.

Lastly, we are grateful to our respondents for their time and for making it possible to do what we do.

FUNDING

This report was made possible with support from The Rockefeller Foundation. The findings and conclusions contained within are those of the authors and do not necessarily reflect positions or policies of The Rockefeller Foundation.

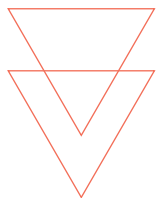




Table of contents

5 SECTION 1: Theoretical background and methodology

6 Background to this research

- 6 The DRIVE Demand project
- 7 Global efforts to promote immunization uptake
- 8 The importance of understanding vaccine hesitancy

9 Steps of our research

- 9 Step 1: Evidence review
- 10 Step 2: Study design
- 11 Step 3: Focus group discussions
- 11 Step 4: Analysis and playbook development

12 SECTION 2: Insights from communities

13 Mali findings

- 14 Respondent group 1: Unvaccinated pregnant people
- 17 Respondent group 2: Unvaccinated adults
- 21 Respondent group 3: Community health workers
- 26 Respondent group 4: Parents of children ages 0 to 23 months

30 Uganda findings

- 31 Respondent group 1: Unvaccinated pregnant people
- 36 Respondent group 2: Unvaccinated adults
- 39 Respondent group 3: Community health workers

44 Tanzania findings

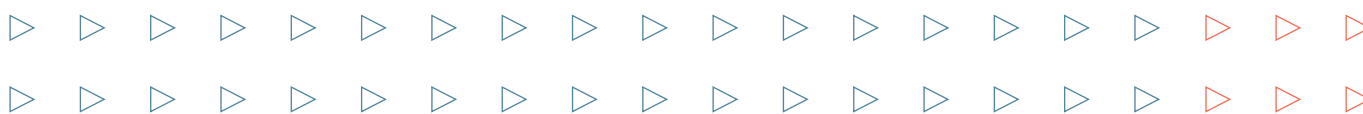
- 45 Respondent group 1: Unvaccinated pregnant people
- 48 Respondent group 2: Unvaccinated adults
- 51 Respondent group 3: Community health workers

54 Zambia findings

- 55 Respondent group 1: Unvaccinated pregnant people
- 57 Respondent group 2: Unvaccinated adults
- 60 Respondent group 3: Community health workers

64 Comparative behavioral analysis by populations of interest

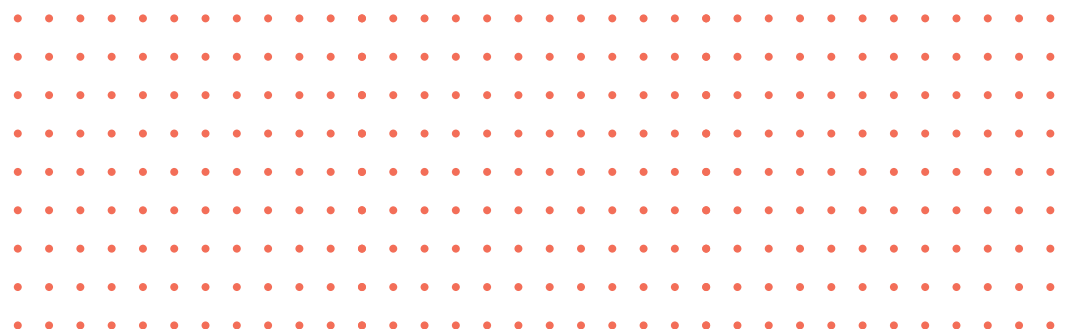
- 65 Respondent group 1: Unvaccinated pregnant people
- 68 Respondent group 2: Unvaccinated adults
- 72 Respondent group 3: Community health workers





List of acronyms

AEFI	adverse events following immunization
CHW	community health worker
COM-B	Capability, Opportunity, Motivation for Behavior model
DMO	district medical officer
DRIVE DEMAND	Digital Results Improve Vaccine Equity and Demand
EPI	Expanded Program on Immunization
FGD	focus group discussion
HPV	human papillomavirus
IRB	institutional review board
LMIC	low- and middle-income country
MOHSD	Ministry of Health and Social Development
NHC	neighborhood health community
RI	routine immunization
SBC	social behavior change
SMS	short message service
VHT	village health team
VPD	vaccine-preventable disease
WHO	World Health Organization



SECTION 1

Theoretical background and methodology

BACKGROUND TO THIS RESEARCH
STEPS OF OUR RESEARCH





Background to this research

The DRIVE Demand project

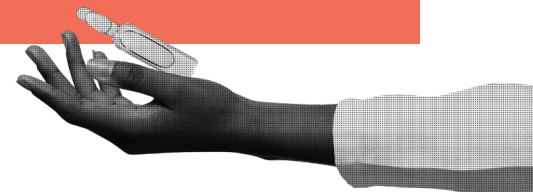
PATH, with support from The Rockefeller Foundation, launched the Digital Results Improve Vaccine Equity and Demand (DRIVE Demand) project, a two-year, US\$5 million partnership with PATH's Digital Square initiative to deploy and expand the use of digital health tools in Honduras, Mali, Tanzania, Thailand, Uganda, and Zambia. Through DRIVE Demand, the partners are aiming to help ministries of health use digital technologies to understand, track, and influence demand for immunizations. Ultimately, it will support target countries' effort to reach national COVID-19 and routine immunization targets, while strengthening data-driven health systems in Asia, the Caribbean, and sub-Saharan Africa.

DRIVE Demand is guided by The Rockefeller Foundation's approach to supporting iterative, country-driven efforts to increase demand for vaccination. This approach simultaneously addresses barriers to vaccination—such as

access, trust, and information—that are often underestimated and misunderstood, while also leveraging digital and data tools to drive more effective and proactive vaccine interventions.

To this end, DRIVE Demand commissioned the Busara Center for Behavioral Economics (Busara) to conduct behavioral research in order to understand the barriers and drivers for routine vaccinations and COVID-19 vaccinations. Busara's research was designed to help inform the development and implementation of innovative and human centered design social behavior change (SBC) messaging optimized for mobile platforms to drive demand for vaccines in the target populations. This study leveraged insights from behavioral science in an attempt to increase the demand and uptake of routine vaccinations and COVID-19 vaccines. Core countries in this study included Mali, Tanzania, Uganda, and Zambia.

US\$5 million
partnership with PATH's Digital Square initiative





Global efforts to promote immunization uptake

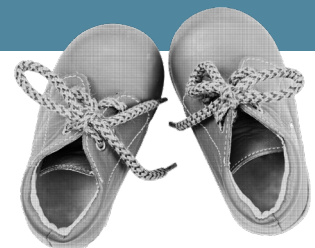
Immunizations are one of the most impactful and cost-effective public health interventions globally and have fundamentally altered our capacity to prevent and control infectious diseases (IHME, 2019; CDC, 2011). Global public health initiatives such as the Expanded Program on Immunization (EPI) by the World Health Organization (WHO) and Gavi, the Vaccine Alliance, have resulted in significant improvements in global life expectancy.

As a result, global incidences of vaccine-preventable diseases (VPDs) have steadily declined throughout the 21st century (IHME, 2019) and an estimated 2.5 million deaths are prevented each year among children under the age of 5 years (CDC, 2011). Despite these improvements, VPDs remain one of the world's most pressing public health challenges due to pervasive vaccine hesitancy and low uptake.

Over the past decade, coverage of routine immunizations for children has plateaued. During COVID-19, nearly 25 million children lost out on lifesaving vaccinations leaving them still unprotected from VPDs today (UNICEF Innocenti, 2023). Almost half of these children live on the African continent (WHO, 2021). Annually, nearly all children who die from VPDs are from low- and middle-income countries (LMICs). In 2018 alone, an estimated 99 percent of the 700,000 children who died from VPDs lived in LMICs (Frenkel, 2021).

2.5 million

deaths prevented each year among children under the age of 5





The importance of understanding vaccine hesitancy

A growing body of research from behavioral science indicates that individuals frequently do not act upon their preferences even if they have strong intentions to do so—and vaccination is no different. Individuals often do not prioritize vaccines because they do not see the long-term benefits and instead focus on the short-term costs and concerns of getting the vaccine. Behavioral science also indicates that it can be challenging to commit to doing something, and we often forget to do things we plan.

Low uptake of the human papillomavirus (HPV) vaccine in parts of Africa is a pronounced example of this issue, wherein social cues and community beliefs prevent people from getting the vaccine in fear of what others might say. Behavioral science can play a leading role in understanding and addressing a range of psychological and social constraints to vaccination uptake.

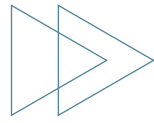
Vaccine hesitancy describes the continuum between vaccine acceptance and vaccine refusal (Larson, et al., 2014), and recognizes that a person's journey from non-intention to intention and finally to action is highly variable and discursive. Vaccine hesitancy is a critical area for investigation to understand how to reach the goal of increased immunization coverage (Butler, 2015; Frenkel, 2021; Schmid, et al., 2014; Feemster, 2020). Assessing the features of vaccine hesitancy can show us that the intention to be vaccinated and the behavioral outcome of vaccination is intimately related to context, and the antecedents of vaccination vary across time, place, and vaccine.

In selecting the population of the study, our research team theorized that the role of perceived barriers would likely mirror findings in the literature on vaccine hesitancy and construal-level theory and the multidimensional model of behavioral barriers (Chu and Liu, 2023; Gerend, et al., 2013). Our study population consisted of those who were not vaccinated against COVID-19 and had no intention to be vaccinated. Consequently, our team theorized that the salient barriers driving hesitancy presented by our participants were more likely to be psychologically distant, higher-order barriers to vaccination, such as vaccine safety and relevance, rather than psychologically immediate, lower-order barriers to vaccination, such as distance to the clinic or costs for transport.





Steps of our research



Step 1: Evidence review

To initiate our research, our team conducted an extensive literature review framed around the Capability, Opportunity, and Motivation (COM-B) model for a systematic approach to understanding influence, behavior, and behavior change. (Michie, et al., 2011). “COM-B” stands for:

1 CAPABILITY

This refers to an individual’s psychological and physical capacity to engage in a particular behavior, encompassing factors such as knowledge, cognitive abilities, and mobility.

2 OPPORTUNITY

This refers to the external factors that enable or hinder the occurrence of a behavior. It includes the physical, social and economic environment in which the desired behavior occurs. There are three sub-components of opportunity:

A. Physical opportunity refers to the availability of resources, time, and physical spaces required to perform a behavior.

B. Social opportunity relates to social and cultural factors such as social norms, social support, and social influence from others, that impact a desired behavior.

C. Economic opportunity includes financial and economic factors, such as cost, affordability, and accessibility of resources required to engage in a desired behavior.

3 MOTIVATION

Motivation refers to reflective and automatic brain processes that drive behavior and decision-making. Reflective motivation involves conscious decision-making processes and beliefs about a behavior, such as attitudes, beliefs, intentions, and goal setting. Automatic motivation includes the unconscious or automatic processes influencing behavior, such as habits, impulses, emotions, and automatic responses. In our literature review, we examined reflective and automatic processes through the lens of risk perception, trust and credibility, agency, social influence and beliefs, and attitudes as they determine reflective and automatic decision making processes.

To apply the COM-B model, we defined specific sub-components influencing each of the individual nodes (capability, opportunity, and motivation). We mapped the findings of the literature to each sub-component of COM-B before conducting a synthesis of the literature under each one. By synthesizing findings within the COM-B framework, the literature review produced insights into viable strategies to enhance vaccine demand in the focus countries based on available evidence.

To read our evidence review, please visit: [Barriers and Enablers: Behavioral Dynamics of COVID-19 Vaccinations in Low- and Middle-Income Countries.](#)





Step 2: Study design

Using the framework and insights from our evidence review, the team worked to complete a qualitative design for our study. We designed our study around focus group discussions (FGD) with three participant groups: unvaccinated adults, unvaccinated pregnant women, and community health workers involved with immunization programming. In Mali, an additional FGD was conducted with adult parents or caretakers of children under the age of two years old.

We started by first reflecting on the literature to identify behavioral barriers influencing vaccine hesitancy and uptake. These barriers and related indicators are presented below:

Table 1. Behavioral barriers and indicators influencing vaccine hesitancy and uptake

Behavioral barrier	Indicators
Convenience	Inconvenience Travel Issues Long waiting times Access to vaccines
Priority and alternatives to vaccines	Not prioritized Hidden costs Daily income Time
Misinformation	Knowledge and attitude Lack of information Inaccurate information Uncertainty about the process

Risk perception	Risk balancing Side effects Risk of falling sick
Trust and credibility	Lack of trust and credibility Belief that vaccines are ineffective Belief that a second dose is unnecessary Lack of trusted sources of information
Agency and confidence	Agency, self efficacy, confidence Decision-making power
Social influence and community knowledge	Knowledge and attitude Lack of information Inaccurate information Uncertainty about the process
Beliefs and attitudes	Beliefs and values Alternative natural remedies Cultural beliefs Religious beliefs

We then developed a qualitative instrument, research protocol, and institutional research board (IRB) package to facilitate the FGDs in close collaboration with the DRIVE Demand team from PATH's Digital Square initiative. The protocol, tool, and IRB package was then submitted for ethics approval from national research ethics committees in each respective country of study.





Step 3: Focus group discussions

Our FGDs delved deep into the dynamics of vaccine hesitancy, with a specific emphasis on both COVID-19 and routine immunization. These discussions provided a rich platform for participants to express their beliefs, attitudes, concerns, and experiences related to vaccine acceptance and hesitancy. Through guided conversations facilitated by a trained moderator and a card sorting exercise, the FGDs allowed for exploring diverse perspectives across different demographic groups including variances in gender and age within the target populations.

The study team probed on themes such as trust in vaccines and healthcare systems, perceived risks and benefits of vaccination, cultural and societal influences, and information sources to uncover the underlying drivers of vaccine-related decision-making. Central to these questions were considerations of how, and to what extent digital tools impact the trust in or sharing of key messages that either hinder or enable vaccine acceptance. The interactive nature of FGDs fostered open dialogue, enabling participants to share personal experiences and insights, thus contributing to a comprehensive understanding of the factors that shape vaccine behavior.

Each focus group consisted of three components. First, we asked participants to engage in a card sorting exercise wherein they ranked individual barriers from most to least important in relation to their decision to be vaccinated against COVID-19. Second, our team facilitated a structured FGD covering each aspect of the COM-B model. Third, we asked participants to engage in a collective ranking of the top barriers that influenced their decisions not to receive the COVID-19 vaccinations.



Step 4: Analysis and playbook development

Next, the team analyzed the qualitative insights from the FGDs and reflected on their implications for ministries of health and their implementing partners for optimal impact and reach of routine immunization campaigns and future pandemic preparedness and response.

The insights include country-specific findings and cross-country analyses of each respondent group; these are organized in Section 2 of this report. Insights presented in Section 2 are thereafter synthesized further into the Practitioners Playbook, available [here](#).

SECTION 2

Insights from communities

MALI FINDINGS

UGANDA FINDINGS

TANZANIA FINDINGS

ZAMBIA FINDINGS

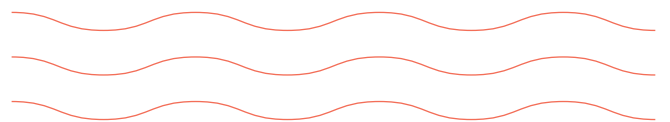
COMPARATIVE BEHAVIORAL
ANALYSIS BY POPULATIONS
OF INTEREST



Mali findings

Key findings from community-based focus group discussions on behavioral barriers and enablers of vaccine uptake

In Mali, we conducted separate FGDs with four key respondent groups: unvaccinated adults, unvaccinated pregnant adults, community health care workers involved in the delivery of immunizations, and parents of children aged 0 to 23 months. FGDs were conducted in Bamako and spanned approximately four days, concluding on April 26, 2024.



Respondent group 1: Unvaccinated pregnant people

RANKED BARRIERS

The primary barriers to vaccination among unvaccinated pregnant individuals include limited decision power, lack of time, concerns about lost income or wages, and the influence of unvaccinated peers. These factors are the most commonly cited obstacles to getting vaccinated, as visually represented below:

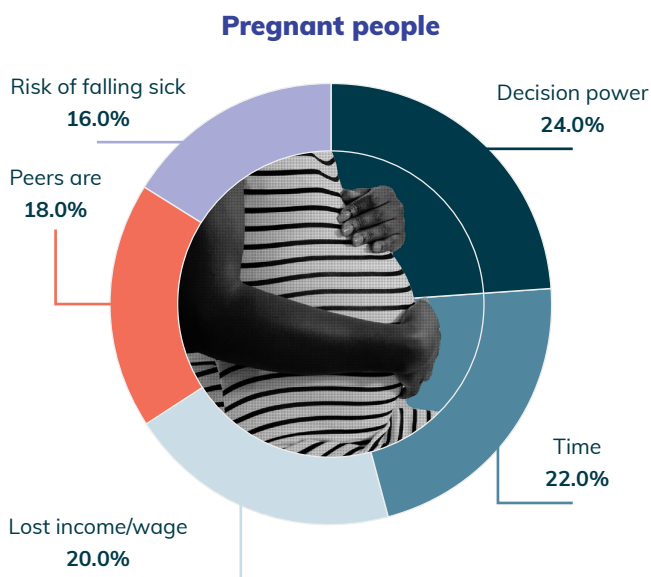


Chart 1, depicting the most influential barriers affecting vaccination intention

DISCUSSION

In this section, we explore the barriers faced by unvaccinated pregnant people across dimensions of capability, opportunity, and motivation. We explore communication channels, information barriers, and the influence of key messengers—such as community health workers. In doing so, we present an understanding of how vaccine knowledge, misinformation, and cultural and social dynamics influence their intention for vaccination.

Capability

Subtheme: Communication channels for vaccine awareness among unvaccinated pregnant people

Unvaccinated pregnant people access vaccine information through a variety of digital and non-digital channels. Television is considered the most reliable source that provides verified information; other digital sources include Facebook, WhatsApp, TikTok, and X. Non-digital sources include radio and health centers where community health workers directly inform and educate attendees during consultations.

“We get information through television. On TV there were frequent advertisements and sketches on how to avoid COVID-19 and preventive measures. In addition to television there is radio, social networks like Tik Tok and Facebook. Also, in health centers during our vaccinations or consultations, health workers raised awareness so that people could be vaccinated.

- Participant 9, unvaccinated pregnant person

Subtheme: Information barriers to vaccine acceptance

Despite access to multiple digital and non-digital channels, some participants experienced a lack of reliable and consistent information, leading to skepticism and mistrust in vaccine information and decision-making among unvaccinated pregnant people. Health workers face challenges while doing direct outreach due to community mistrust, while digital platforms often fail to provide the clarity and detail needed about vaccines.



For some people, refusal is because of the lack of reliable information about the vaccine. Even if it's on TV or the radio, when people don't have credible information about the vaccine, they refuse. In adults as well as children.

- Participant 4, unvaccinated pregnant person

Subtheme: Vaccine knowledge among unvaccinated pregnant people

Participants expressed a strong desire for reliable and specific information about vaccine types, side effects, dosages, and the illnesses they prevent. Participants also explained that there is still a substantial need for clarity and trust in information despite general awareness of each vaccine's benefits. Persistent barriers to full understanding and acceptance include concerns and fears, such as the risk of adverse events following immunization like paralysis and vision issues, which may be fueled by previous experiences or reports of such events.



What we have heard about vaccination against COVID is that getting vaccinated protects us against the disease. Even if you are in contact with sick people in the family, it will protect you against infection.

- Participant 4, unvaccinated pregnant person



At the start of vaccination against COVID-19, it was said that the vaccine killed more people. Is this still the case, and does it still kill like before? Before when we received the vaccine, some people got sick, they had headaches, vomiting or stomach aches; is this still the case?

- Participant 9, unvaccinated pregnant person

Opportunity

Subtheme: Convenience with door-to-door vaccination

Unvaccinated pregnant people expressed a strong preference for door-to-door vaccination strategies over traditional clinic visits. This preference is driven by concerns about the long waiting times at health facilities. Participants expressed clear recognition of the benefits of reducing the burden and inconvenience of travel and lengthy waiting times.



For vaccinations, I prefer door-to-door vaccinations than coming to line up for vaccination and spending hours without being able to get vaccinated.

- Participant 4, unvaccinated pregnant person

Subtheme: Interpersonal influence on whether to take up vaccines

A significant number of respondents discussed the importance of the role of the father and both parents in the decision to pursue routine immunization (RI) against preventable childhood illness. This can be attributed to strong familial hierarchies in health-related choices.



The decision is the parents who make it.

- Participant 7, unvaccinated pregnant person

Subtheme: Health workers as central messengers in vaccine education

Most of the participants consistently identified community health workers as the most reliable and primary source of vaccination information due to their direct involvement in health care and firsthand knowledge of vaccines. This reliance demonstrates the importance of health centers and their staff in both delivering and clarifying vaccine-related information during consultations and vaccination sessions.

Participants also expressed a high level of trust in health care professionals specifically for the COVID-19 vaccine. Doctors are viewed as key influencers and are capable of persuading the community to accept vaccination based on their health and safety recommendations.

“*The most reliable source of information on vaccination is health workers, because they are the ones who take care of the sick and they are the ones who indicate vaccination to the sick.*

- Participant 4, unvaccinated pregnant person

“*The doctors, because as I already told you, we trust the doctors. We know they are there for our health and safety; so, if they tell us that the vaccine is good and that it will protect us and protect our children and our community from disease then we will do it.*

- Participant 9, unvaccinated pregnant person

Motivation

Subtheme: Recognizing the crucial role of vaccines

Participants recognized that vaccines are crucial to prevent COVID-19 in risky situations of potential exposure. The emphasis across responses was on disease prevention, which participants view as a primary advantage of getting vaccinated. This shared belief underscores a motivation rooted in the desire to protect oneself and one's children from health threats.

“*Our opinion is really to get vaccinated to protect ourselves and our children against diseases.*

- Participant 5, unvaccinated pregnant person

Subtheme: Belief in misinformation related to vaccine uptake

Unvaccinated pregnant people expressed concerns about vaccines causing paralysis and other illnesses in their children receiving vaccines, often leading to their refusal of vaccines.

Despite the desire for accurate information about vaccines, including their reliability, type, diseases affected, side effects, and availability, the prevalence and spread of misinformation in informal community spaces often leads to vaccine refusal.

“*This is what is said through general gossip, because there everyone says what suits them whether it is true or false. Information about the vaccine from these sources is unreliable. These sources should not be trusted.*

- Participant 9, unvaccinated pregnant person

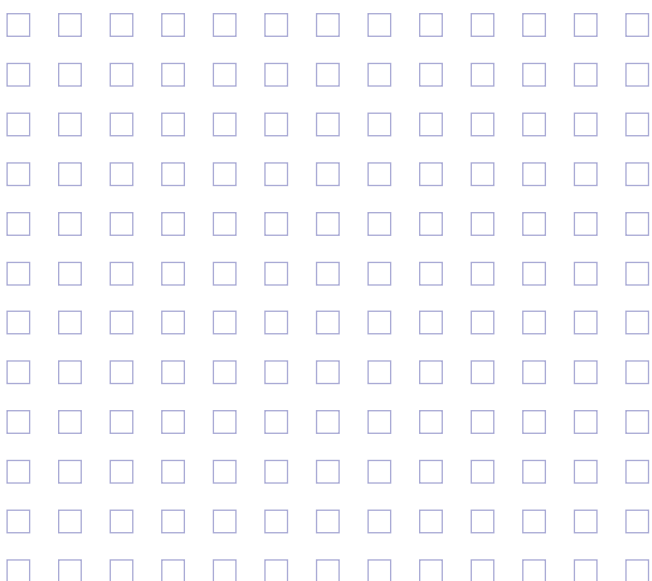


Subtheme: Decision-making ability

Some participants expressed a strong sense of autonomy, stating that the decision to vaccinate is entirely up to them. However, the majority of participants said that the decision is made by the father of the child or both parents together. In these contexts, vaccination decisions are a shared responsibility, which demonstrates that both parents must have access to accurate and reliable information about vaccines. A few participants also mentioned that the head of the family is the decision-maker, indicating the influence of family dynamics on health-related decisions.

“ No one makes the decision for me; the decision-making is up to me. I have no decision-making problem. The decision is up to me.

- Participant 1, unvaccinated pregnant person



Respondent group 2: Unvaccinated adults

RANKED BARRIERS

The primary barriers to vaccination among unvaccinated adults in Mali include concerns about lost income or wages, lack of agency, access issues, cultural beliefs, and limited decision power. These factors are the most commonly cited obstacles to getting vaccinated, as represented in the donut chart below.

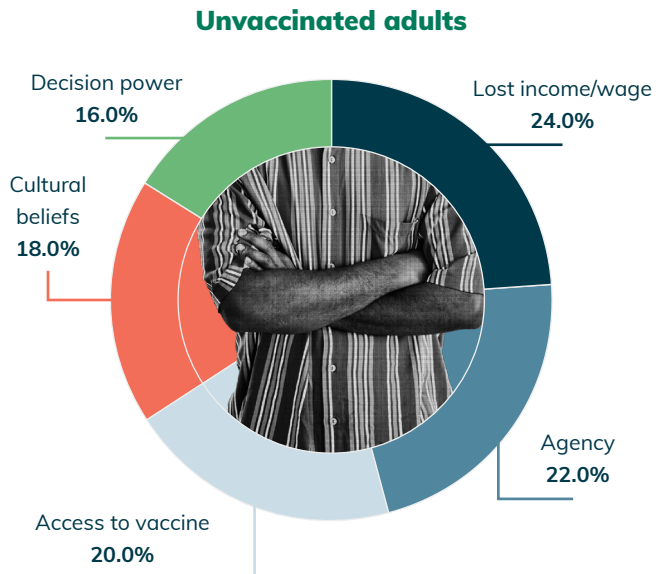


Chart 2, depicting the most influential barriers affecting vaccination intention amongst unvaccinated adults

DISCUSSION

In this section, we will explore the most significant barriers faced by unvaccinated adults in accessing and accepting vaccines. These barriers range from economic factors like lost income and agency to practical issues such as access to vaccines and decision power. Additionally, cultural beliefs and the influence of peers and community leaders play a significant role. The discussion will delve into themes such as barriers to accessing accurate information through digital channels, reliance on community messengers, knowledge of routine immunizations and COVID-19 vaccines, and the challenges in official health communication. By examining the capability, opportunity, and motivation of unvaccinated adults, we aim to identify strategies that could effectively enhance vaccine uptake in this group.

Capability

Subtheme: Barriers to access accurate information through digital channels

Participants mentioned that platforms like Facebook, TikTok, and WhatsApp often spread inaccurate information. Participants were worried about the potential legal consequences of sharing false information, so many people preferred using a government toll-free number for reliable information instead of social media.



On social networks there is generally false information and also topics of disinformation. Facebook, TikTok, and others can convey false information. If you are not careful, you will only find false information.

- Participant 9, unvaccinated adult

Subtheme: Community messengers and platforms for accessing vaccine information

Participants shared a strong reliance on and trust in local community leaders like the imam or the village chief. Unvaccinated adults also expressed more trust in these figures than in formal authority figures, demonstrating the significant influence of such local leaders on community members' acceptance of vaccination information.

However, it was also noted that this trust is not universal—some participants stated that they would not be convinced to vaccinate by the village chief because of lack of trust. While community leaders can play a crucial role in disseminating vaccine information, their degree of influence may vary among individuals. The leader's credibility is also tied to their sources of information, with participants expressing more confidence in leaders who rely on safe and reliable sources.



If the information comes from the village chief or the imam to encourage people to come and get vaccinated, I will accept.

- Participant 6, unvaccinated adult

Subtheme: Knowledge of RI and COVID-19 vaccines

Unvaccinated adults showed a general understanding of the benefits of vaccination. Participants recognized that vaccines, including for COVID-19, serve as preventative measures that allow the body to develop antibodies against viruses and thus reduce the risk of disease. Among unvaccinated adults, routine immunizations are widely accepted, and most children are vaccinated from an early age. Participants trust information from health workers and view them as the primary source of reliable information about when and why to get vaccinated.

However, the potential side effects of the COVID-19 vaccine have led to some fear and hesitation. Participants understand that complications from COVID-19 can be serious, but they also express concerns about the vaccine being in the experimental phase and the potential consequences of receiving it.



For me, a vaccine prevents a disease. Even if you don't have it, it can help kill or reduce viral viruses that live in our bodies. The presence of viruses in the body makes you sick. This is an important measure to protect your health and promote good physical development.

- Participant 6, unvaccinated adult



The consequences for people who received the first doses of the COVID vaccine have raised fears among many people.

- Participant 7, unvaccinated adult

Subtheme: Trust and challenges in official health communication channels

Unvaccinated adults expressed a strong preference for official sources, primarily the Ministry of Health, as the most trusted channels for vaccine-related information. Participants expressed a clear reliance on health workers and health authorities to provide accurate and reliable information, highlighting a structured trust hierarchy in health communication.



For me, the most reliable information is that provided by the health authorities of a country and or the site that these authorities tell you to find the right information. For me, that's it. Furthermore, when you visit health centers and your doctor tells you something, you can believe it, particularly in relation to reliable sources of information.

- Participant 8, unvaccinated adult

Opportunity

Subtheme: Travel considerations to health facilities for vaccines

Participants said that local health facilities are conveniently located within walking distance, which enables continuous access to vaccinations and facilitates regular vaccination practices in their community. Ease of access is a positive influence and contributes to the community's acceptance of and adherence to vaccination schedules. This has significantly improved health outcomes for vaccinated children compared with outcomes for those not vaccinated.



It's easy because local health facilities are within walking distance, no need to take public transportation.

- Participant 9, unvaccinated adult

Subtheme: Reliability and reach of official government communication

Participants largely trust information coming directly from official sources such as the Ministry of Health, television, radio, and health workers. However, there is a discrepancy in the timeliness and reach of this information, as some participants felt uninformed about vaccine availability. While the capacity to disseminate information exists, its execution can be inconsistent, which affects the overall effectiveness of vaccination uptake initiatives. Furthermore, some participants selectively choose what information to seek from these sources, indicating a biased decision-making process that may ignore new or updated information.



If the information does not come from the Ministry of Health, we do not take it into account.

- Participant 9, unvaccinated adult

Subtheme: Interpersonal influence on whether to take up vaccines

The majority of participants emphasized the personal nature of the decision to vaccinate, clearly showing their independent ability to make health choices. There is also an openness to support others in their decision to vaccinate, indicating a cooperative social environment that respects individual decisions without imposing beliefs. Some participants indicated that they would not discourage others from getting vaccinated and would even accompany them to the vaccination site. Additionally, the influence of trusted community leaders, religious figures, and village chiefs was noted as a significant factor that could sway individuals' decisions to vaccinate, particularly if these leaders endorse vaccination based on reliable information.



If anyone else wants to get vaccinated, I will even accompany them to the vaccination site. It is with everyone's consent, there is no obligation to be vaccinated.

- Participant 9, unvaccinated adult

Motivation

Subtheme: Subjective risk of acquiring vaccine-preventable diseases

Participants acknowledged that routine vaccinations are widely accepted in their community and were able to recall a time when VPDs such as measles had severe consequences. However, the introduction of vaccines by AstraZeneca and Johnson & Johnson for COVID-19 has been met with skepticism and wariness. Doubts about these vaccines, fueled by observations and complaints from those who were vaccinated, have led to hesitancy and a decision to wait for potentially better-quality products in the future.



The benefits of vaccines are that they protect children against many diseases.

- Participant 2, unvaccinated adult



I observed those who were vaccinated had complaints. So, I doubted the vaccine. Let one person complain, okay, but two people, three people, all the people who received the vaccine. So, I decided to wait and see in a few years if new good quality products appear. I might consider getting vaccinated. For the moment, with the products available, I would not get vaccinated.

- Participant 7, unvaccinated adult

Subtheme: Influences on vaccine hesitancy: misinformation, skepticism, and personal concerns

Unvaccinated adults expressed a range of beliefs regarding misinformation related to vaccine uptake. While some participants are aware of the potential legal repercussions of sharing false information, others express skepticism toward rumors and highlight the difficulty in distinguishing between real and fake news. Notably, fear of side effects and consequences deterred some participants from getting vaccinated, indicating that personal experiences and observations play a significant role in shaping their beliefs.



It is difficult to distinguish fake news from real news because fake news is often well fabricated. This is why we always seek to confirm the veracity of the information. We then work with the results they provide us.

- Participant 9, unvaccinated adult



The arrival of COVID-19 was very worrying. Some people experienced side effects after vaccination for up to a week, which frightened others. The consequences for people who received the first doses of the COVID vaccine have raised fears among many people.

- Participant 6, unvaccinated adult

Subtheme: Decision-making ability to take up the vaccine for one’s children and dependents

Unvaccinated adults expressed a strong sense of personal agency in vaccine decision-making for their children or dependents. They asserted that they are the primary decision-makers for their family’s health. Mothers in particular considered themselves to be decision-makers about RIs for their children. However, participants also expressed concerns about vaccine availability, suggesting that stock shortages could potentially influence their decision-making.



For routine vaccinations, this concerns children, so it is the mother who makes the decisions.

- Participant 5, unvaccinated adult



Respondent group 3: Community health workers

RANKED BARRIERS

The primary barriers to vaccination among community health workers in Mali include a lack of information, limited decision power, access issues, and uncertainty about the vaccination process. These factors are the most commonly cited obstacles to getting vaccinated, as presented below:

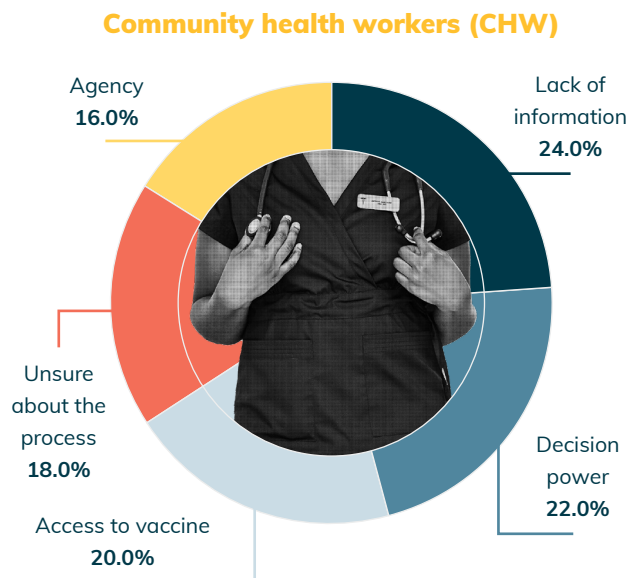


Chart 3, depicting the most influential barriers affecting vaccination intention among community health workers [CHW]

DISCUSSION

In this section, we explore the challenges and barriers faced by community health workers in delivering vaccination services across dimensions of capability, opportunity, and motivation. We delve into various themes including digital and channels for vaccine information, challenges in building trust, the need for complementary capacity-building, and the persistent barriers to vaccine acceptance.

Capability

Subtheme: Digital and non-digital channels for vaccine information

Community health workers use tools such as WhatsApp, Facebook, phone calls, and texts (short message service [SMS]) to facilitate communication about vaccination services. If a patient misses their second dose of a two-dose vaccine, the community health worker will call them using the phone number provided at the first visit to remind them about their missed appointment and ask them to come to receive the second dose. Some community health workers are members of WhatsApp groups and use them to convey messages about vaccination, especially in areas where many people initially refuse to be vaccinated.



We inform women leaders, village chiefs, and youth members, who then pass the information on to residents.

- Participant 1, community health worker

Community health workers also use non-digital channels to inform women leaders, village chiefs, and youth members about vaccination, who then pass the information on to their communities. The Social Development Department within the Ministry of Health and Social Development (MOHSD) trains

essential community members before the start of a vaccination campaign to raise awareness among residents.



As he just said, I am myself a member of one of these groups on WhatsApp, that of World Vision, the group of father educators. They have a branch in Senou, where the COVID-19 vaccination was to take place. Many women had not agreed to be vaccinated, so they had to call me to convey the message, and subsequently, many agreed to be vaccinated.

- Participant 7, community health worker

Subtheme: Challenges in building trust and effective communication in vaccine mobilization

Lack of trust in vaccines is exacerbated by rumors on social media that claim that vaccines have harmful or even lethal consequences. This misinformation leads to widespread distrust in vaccines, making it difficult to mobilize the population for vaccination campaigns.

Non-digital channels for receiving and sharing vaccine information also present their own set of challenges. Door-to-door campaigns, for example, have proven to be very difficult because community members often respond with hostility and lack of respect. This approach is met with suspicion, as people believe that if vaccinators are going door-to-door, the vaccine may be of poor quality. Monetary incentives for vaccination have also been counterproductive because they lead to a loss of confidence in vaccines. People perceive these incentives as a sign that the vaccines may not be beneficial for their health. It has also caused misunderstandings in certain neighborhoods where people have accused community health workers of withholding money.



Giving money to get vaccinated makes people lose confidence in vaccination. They are coming to get vaccinated for their own health, so if you give money, how do you expect them to have confidence in this vaccine? They know that in the event of illness, it would have consequences for themselves. Normally, it is up to them to come and get vaccinated, but if you give them money, they will not trust this vaccine. Money lowers confidence.

- Participant 5, community health worker

Subtheme: Capacity-building initiatives to improve skills

Community health workers highlighted several capacity-building initiatives to improve skills for effective vaccine service delivery, such as strategic collaborations with the MOHSD to train key community figures, women leaders, village chiefs, and youth members. This preparation not only empowers community leaders but also streamlines the vaccination process by reducing the logistical burdens often associated with large-scale vaccination efforts.



One idea is to raise awareness in neighborhoods by transmitting information to village chiefs, councilors, and imams. This will facilitate the dissemination of information and avoid excessive workload.

- Participant 8, community health worker

Subtheme: Barriers to vaccine acceptance

Misinformation and conspiracy theories have a strong influence, particularly among illiterate populations. These individuals strongly believe that vaccines can be harmful and cause infertility or other health issues. Unverified claims about vaccine-related death and other health issues

spread rapidly on social media, undermining efforts to promote trust in public health initiatives and medical interventions.

Such misconceptions affect trust in COVID-19 vaccines. Community health workers face the same challenge of distrust that paints vaccines as part of a larger plot to harm the population. The skepticism is deeply entrenched, and the information provided is often insufficient to change these beliefs.



Illiterate people really pose a problem for us because they refuse vaccination, believing that it is fake medicines that are making their wives infertile, and they believe in many conspiracy theories involving doctors and Europeans. They will never be convinced, no matter how much explanation we give them.

- Participant 1, community health worker

Opportunity

Subtheme: Facilitators for the provision of vaccine services

Participants emphasized that community engagement is a crucial facilitator to enhance the provision of vaccine services, with community health workers playing a pivotal role in organizing and conducting vaccinations. They use a structured approach that maintains a calendar of activities to target specific groups like children, the elderly, pregnant people, and nursing mothers to ensure comprehensive coverage. Innovative outreach methods during vaccination drives—such as door-to-door campaigns and organized car caravans with DJs—significantly increased community participation and awareness. These efforts also involved key community leaders including women leaders, village chiefs, and religious figures, who help effectively disseminate vaccine-related information.



All members of the community must come and get vaccinated. However, priority is given to infants, the elderly, pregnant people, and nursing mothers.

- Participant 4, community health worker

Subtheme: Barriers to the provision of vaccine services

Community health workers identified several barriers to providing vaccine services, including public mistrust and misinformation about vaccine safety and effectiveness, which can be fueled by rapid vaccine development and deployment; rumors and cultural beliefs also act as barriers. Community health workers faced further challenges in implementing large-scale vaccination programs due to patient reluctance, limited vaccine availability, and logistical constraints, such as limited vaccination days and times.



For example, vaccines are not always available, there is a shortage, and when there are vaccines, they are only available at the regional level, which means that people have to travel long distances to get vaccinated.

- Participant 5, community health worker

Subtheme: Enhancing community engagement through effective communication

Community health workers emphasized the need to improve communication with community members and proposed strategies to engage community groups, village leaders, and religious leaders to disseminate information and increase awareness. They also suggested targeted awareness campaigns, like using trusted individuals to convey messages and digital communication channels such as WhatsApp for sharing vaccine-related information.



One idea is to raise awareness in neighborhoods by transmitting information to village chiefs, councilors, and imams. This will facilitate the dissemination of information and avoid excessive workload.

- Participant 8, community health worker

Subtheme: Interpersonal influence on vaccine uptake

Participants discussed the significant impact of interpersonal influence on individuals' decisions to take up RI and COVID-19 vaccines. They emphasized the importance of building trust and relationships with community members, explaining the benefits and addressing concerns, and sharing personal experiences to alleviate fears, which can increase the likelihood of individuals accepting vaccination. Community health workers also noted the importance of visual evidence, such as images on TV and credible sources like WHO, in shaping individuals' decisions.



If we know their families, we go in to talk with the parents. If they accept, we do it, otherwise we leave it.

- Participant 3, community health worker



If we are told it exists, we believe it. But for the other aspects, we do not believe in their content 100%. When you see it on TV, you can believe it. Because even for COVID, the images on TV allowed people to believe it when seeing the images of cases of death in hospitals in Europe, health personnel camouflaged. Especially on France 24 or TV5, seeing these images you know that the disease exists.

- Participant 2, community health worker

Motivation

Subtheme: Perceptions that RI and COVID-19 vaccines are unnecessary

Community health workers face challenges in providing vaccination services due to misconceptions and misinformation within the community. They reported encountering community members who believe RIs are unnecessary, with concerns ranging from vaccine harm to conspiracy theories.

COVID-19 vaccines have been met with skepticism, which is driven by doubts about their safety and efficacy. Community health workers need to navigate these misconceptions to motivate community members to take up vaccination services, highlighting the importance of addressing misinformation and building trust in vaccine development and rollout.



Those who do not come to be vaccinated are those who do not believe in vaccination at all. They say it was France that sent the vaccine to kill us.

- Participant 9, community health worker



Some of us refused to be vaccinated because of the debates over the rapid arrival of the vaccine. We didn't trust the vaccine. Reason why many refused to be vaccinated.

- Participant 1, community health worker

Subtheme: Subjective risk of acquiring vaccine-preventable diseases

Community health workers emphasized the critical importance of vaccination in preventing disease transmission and death, particularly among children. They stressed that vaccination is a crucial

tool in protecting public health and that a lack of vaccination can have serious consequences. This understanding motivates community health workers to promote vaccination services and encourage community members to take up vaccines.



The lack of vaccines can even lead to the death of many children. Additionally, when an outbreak occurs, the spread of the disease is limited if many people are vaccinated. If many people are not vaccinated, the disease can spread more easily.

- Participant 9, community health worker

Subtheme: Belief in misinformation related to vaccine uptake

Community health workers are motivated to provide vaccination services partly by their commitment to dispel misinformation and conspiracy theories that they frequently encounter. They recognize the challenges posed by such misinformation, particularly its impact on illiterate individuals who are more susceptible to false claims about vaccines causing infertility or being part of harmful plots. By offering reliable information and reassurance, community health workers aim to overcome these barriers, helping ensure that community members feel safe and informed about the benefits of vaccination.



Illiterate people really pose a problem for us, because they refuse vaccination believing that it is fake medicines that are making their wives infertile, and they believe in many conspiracy theories involving doctors and Europeans. They will never be convinced, no matter how much explanation we give them.

- Participant 1, community health worker

Respondent group 4: Parents of children ages 0 to 23 months

DISCUSSION

In this section, we explore the barriers, facilitators, and dynamics of vaccine acceptance amongst parents of children aged 0–23 months, framed across dimensions of capability, opportunity, and motivation. We highlight digital and non-digital information channels, the role of trusted messengers in promoting vaccine acceptance, and the ways in which misinformation, distrust in government, and subjective risk of VPDs depress vaccine acceptance.

Capability

Subtheme: Credible digital and non-digital sources for vaccine information

Parents reported having access to proximal digital channels like Facebook, TikTok, and WhatsApp for vaccine information. However, some preferred government sites or health workers as reliable sources. However, they did acknowledge the convenience and accessibility of digital channels in obtaining vaccine information.

Parents also mentioned that non-digital channels such as television, radio, and health centers are considered trustworthy sources of vaccine information. They expressed trust in information disseminated through television and radio broadcasts and the reliability of health workers.

Neighborhood leaders, key local decision-makers, and trusted community figures like imams were also identified as credible sources of vaccine information.



We watch a lot of TV, especially the newspaper through which we find a lot of information; radio stations; the phones; TikTok and Facebook. We have a lot of information through these channels.

- Participant 6, parent

Subtheme: Barriers to accessing vaccine information

Some of the barriers to accessing vaccine information identified by parents included a lack of trust in digital channels and limited access to reliable sources of information. Some parents preferred traditional media like TV and radio, while others relied on health workers for information. However, images of health workers in protective suits during the COVID-19 pandemic created additional fear and misinformation among parents.



People were scared because health workers protected themselves with white suits, looking like corpses. Who would want to bring their child into such an atmosphere? Seeing them, we had the impression of being confronted with death... People were really frightened, especially when they saw the images broadcast. I know a lot of people were scared. Just seeing their cars in front of a house made everyone flee.

- Participant 2, parent



Subtheme: Community messengers and platforms for accurate vaccine information

Parents reported that proximal community messengers and platforms, such as health workers, midwives, and nurses are trusted sources of vaccine information. They stated that people are more likely to listen to and trust individuals from their own environment. Health workers were particularly seen as reliable and approachable sources of information for parents seeking advice and guidance on vaccination. Community relays were also identified as a valuable resource for providing information during vaccination campaigns, leveraging the trust and credibility they have built within the community.



As the others said, we trust health workers, whether they are nurses or midwives. When they come to give information, people listen to them because they trust them. I find that midwives and nurses are listened to a lot.

- Participant 3, parent

Subtheme: Perceptions of government health programs and immunization drives

While some parents trusted information from government sites and health workers, others were skeptical, especially when it came to the COVID-19 vaccine. The community's perception of vaccination has improved over time, with television, radio, and health workers playing a crucial role in disseminating information and encouraging parents to vaccinate their children.



If it's not the government site, I myself don't trust the information on Facebook.

- Participant 3, parent

Opportunity

Subtheme: Vaccination facilitators

Parents identified home vaccination sessions, awareness campaigns through television and radio, and outreach by health workers in the community as facilitating vaccination services. They appreciated the convenience of vaccination services being offered in schools and community health centers, which made it easier for them to access vaccines for their children. Efforts by health workers to raise awareness and provide vaccination services in accessible locations were crucial in encouraging parents to vaccinate their children.



At the time, health workers were traveling because people were not going to health centers. They organized home vaccination sessions to encourage the population and talks to raise awareness and invite them to go to the health center after giving birth for follow-up of the children and cooking demonstrations. Especially when it's your first child, you are taught how to take care of him.

- Participant 2, parent

Subtheme: Challenges and opportunities in vaccine accessibility

Participants reported inconsistent availability of RI vaccines at health facilities, leading to stockouts and the need to purchase vaccines from pharmacies, which is often unaffordable. This inconsistency poses a significant challenge to completing vaccination schedules, particularly for newborns, and causes frustration and exhaustion among parents. Additionally, parents encountered added costs when accessing vaccine services, including paying for such services. In some cases, parents had to make multiple attempts to get their children vaccinated, which added to the time and financial burden.

Regarding COVID-19 vaccines, some parents had to pay for their own vaccines, while others did not believe in the vaccine’s importance or had mixed beliefs about its efficacy. However, some parents appreciated the convenience of home vaccination visits by health workers, which provided an opportunity for convenient and discrete vaccination.



Yes, we arrived early, but there were no more syringes or vaccines. We were released. I’m not sure if it was the syringes or the vaccine itself. In the end, we were asked to go home.

- Participant 4, parent



For my part, I did not face any difficulty because I was vaccinated at my workplace, but afterwards, I saw many people having difficulties due to negligence and they had to pay to be vaccinated. I personally know people in this situation.

- Participant 3, parent

Subtheme: Negative experience with community health workers

Parents reported negative experiences with community health workers when accessing vaccine services, which created another barrier to vaccination. They described community health workers as often being late, dismissive, and unsympathetic, which fueled rumors and discouraged people from seeking vaccination. The use of personal protective equipment during the COVID-19 pandemic also frightened parents and made them feel uncomfortable bringing their children to health centers. Additionally, stockouts of vaccines and lack of awareness raising by health workers further hindered parents’ ability to access vaccination services.



If you make an appointment with someone and they have household chores or small businesses to manage, and they arrive early for vaccination but the health workers are late, this gives rise to rumors and often discourages people.

- Participant 2, parent

Subtheme: Community knowledge and perceptions of RI and COVID-19 vaccines

The community’s knowledge and perceptions of RI have improved over time as a result of health workers’ efforts to raise awareness and provide vaccination services in accessible locations. However, some parents still harbor fears and misconceptions about RI, indicating a need for continued education and awareness campaigns to address these concerns and promote accurate knowledge about RI. The community’s knowledge and perceptions of the COVID-19 vaccine are mixed, with some people believing in its importance and others doubting its effectiveness or safety.



Nowadays, the community perceives vaccination better, better than before. If we talk about vaccination and the information is disseminated where it is needed, especially if it comes from television, radio, and health workers who go into the community, that is enough to encourage parents to bring their children. Even in the past campaign, awareness was broadcast on television and many people came out to get vaccinated. The truth is people are buying into it more now than ever before.

- Participant 3, parent



Motivation

Subtheme: Perception that the COVID-19 vaccine is unnecessary

Some parents expressed disbelief that the COVID-19 vaccination is necessary and doubted its importance or effectiveness. This perception was often rooted in rumors and misconceptions about the vaccine’s impact on fertility and other aspects of health. Despite some positive experiences with vaccination, these parents remained unconvinced, demonstrating a lack of motivation to get vaccinated due to a perceived lack of need or benefit.

“ I do not believe in vaccination against COVID-19. I never believed it anyway.

- Participant 4, parent

Subtheme: Subjective risk of acquiring vaccine-preventable diseases

Parents perceived VPDs as a significant risk to their children’s health and acknowledged the importance of vaccination in preventing serious illnesses like polio, measles, and seizures. They recognized that vaccination offers protection for their children’s health and the prevention of future illnesses. By completing vaccination schedules on time, parents believed they could safeguard their children’s well-being and avoid potential consequences of incomplete vaccination.

“ Previously, children suffered from seizures, polio, and measles, which wreaked havoc on the community. Vaccination has significantly reduced the occurrence of these diseases. Nothing is more advantageous than having a complete vaccination. Children and pregnant people who get vaccinated are healthy. Thanks to vaccination, very serious

illnesses have disappeared. It is important to vaccinate correctly and ensure that this is completed on time.

- Participant 2, parent

Subtheme: Decision-making and agency to take up vaccines

Parents demonstrated a sense of agency regarding vaccination and expressed confidence in making decisions for themselves and their children without relying on others’ opinions or approval. Some parents even took initiative to accompany their children to vaccination appointments, showcasing their proactive approach to ensuring their family’s health and well-being.

“ We make the decision. Once we hear about vaccination and it’s good for the child, we’ll do it. We are not waiting for the spouses’ decision. Our duty is simply to inform our husbands, otherwise the decision is ours.

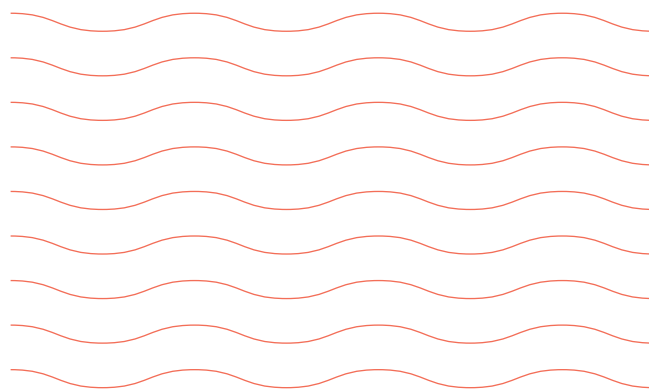
- Participant 3, parent



Uganda findings

Key findings from behavioral barriers and enablers of vaccine uptake

In Uganda, we conducted FGDs with three key respondent groups: unvaccinated adults, unvaccinated pregnant women, and community health care workers involved in the delivery of immunizations. FGDs were held in the Wakiso District, situated within Uganda’s Central Region, and spanned approximately two days, concluding on February 22, 2024.



Respondent group 1: Unvaccinated pregnant people

RANKED BARRIERS

The main barriers to vaccination in this category include concerns about side effects, fear of falling sick, doubts about vaccine effectiveness, and lack of information. These are the most frequently cited obstacles that hinder vaccination efforts among unvaccinated pregnant people as represented below:

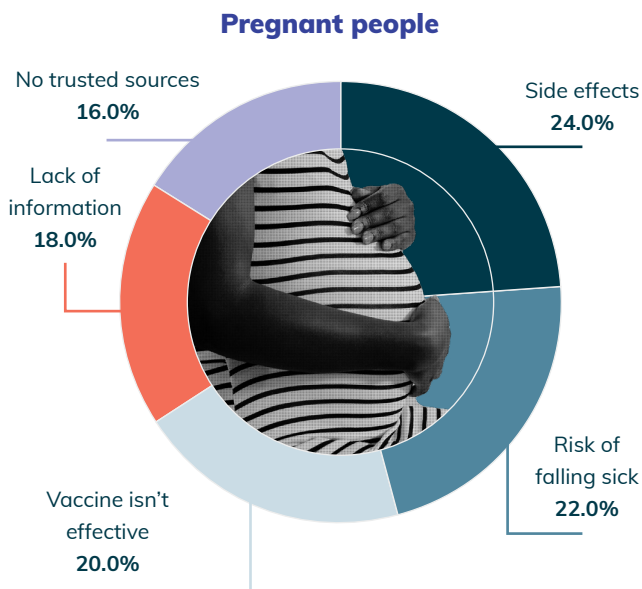


Chart 4, depicting the most influential barriers affecting vaccination intention amongst unvaccinated pregnant persons

DISCUSSION

In exploring the vaccination barriers faced by unvaccinated pregnant people, our findings highlight a complex interplay of mistrust, logistical challenges, and cultural influences that hinder vaccine uptake. This section sets the stage for a deeper discussion about how misinformation and conspiracy theories significantly shape perceptions on vaccines, contributing to a pervasive skepticism toward both routine immunizations and COVID-19 vaccines. Additionally, logistical barriers, such as delays in vaccine delivery and inadequate storage conditions, further complicate access to necessary health services.

Capability

Subtheme: Perceptions of vaccines

Across all respondents, the COVID-19 vaccine was perceived with more skepticism than RI, particularly due to concerns about the potential side effects of COVID-19 vaccination. Most respondents shared the belief that the vaccines may be ineffective and potentially lethal to them and their loved ones. Respondents also showed some uncertainty regarding the contents and development process of the vaccines and the necessity of follow-up or booster vaccine doses.

“ I don't see anything good about being vaccinated for COVID-19 because people got sick after being vaccinated for COVID-19.

- Participant 4, unvaccinated pregnant person

Respondents also reported the belief that the COVID-19 vaccine is incompatible with their blood type and suggested that individual “compatibility tests” should be carried out prior to vaccination.



If only people were tested first to see whether they are compatible with the vaccine before being vaccinated, it may help people not to have fear of side effects of the vaccines.

- Participant 6, unvaccinated pregnant person

RI was viewed favorably by respondents. Participants reported that they had more exposure to information on RI than on COVID-19 and that RI was largely accepted and understood by them and other members of their community. According to respondents, the same could not be said for COVID-19 immunizations. Additionally, their perceptions of individual RI shots were dependent on the type of RI. For example, respondents expressed that they understood the importance of polio vaccines for children but were distrustful of the human papillomavirus (HPV) vaccine, which some believed caused infertility in children as a part of an international conspiracy. Furthermore, negative past experiences of post-RI side effects contributed to COVID-19 vaccine hesitancy.



Vaccination against cervical cancer (HPV). We fear our children may not give birth in future.

- Participant 10, unvaccinated pregnant person



My brother got sick after being vaccinated for COVID-19, and when we took him to the hospital, they told us he is suffering from the side effects of the COVID-19 vaccine. My mother was vaccinated, and her eyes became swollen.

- Participant 9, unvaccinated pregnant person

Subtheme: Unraveling fears, misconceptions, and information gaps among unvaccinated pregnant people

Unvaccinated pregnant people expressed diverse fears and misconceptions regarding RI and COVID-19 vaccines. Concerns stem from historical experiences, familial anecdotes, and rumors circulating within their communities. Some women cited instances of adverse events following immunization as the primary fuel of their apprehension toward vaccines.



I heard that the injected arm is disabled. When you take one shot of the vaccine you can't be alive beyond three years and with two shots you don't even live for two years. You also become sick after vaccination. I heard from the people in my area, and I believed it after I saw my mom who also got sick for almost a month after being vaccinated.

- Participant 5, unvaccinated pregnant person

Misinformation regarding vaccine composition, side effects, and the intentions of vaccine developers further contribute to hesitancy. While some recognized the importance of immunization in preventing diseases, they also grappled with doubts fueled by perceived risks and uncertainties surrounding vaccine administration.



My grandmother said that vaccines used for immunization are causing abnormalities in children. She said they produced children during wartime and they weren't immunized, but they didn't die like the ones of nowadays.

- Participant 7, unvaccinated pregnant person

Opportunity

Subtheme: Availability and accessibility of vaccines at health care facilities

RIs were reportedly generally available at health care facilities for pregnant people, with uptake bolstered by public announcements supporting vaccination. However, a couple of respondents noted that the vaccines were not always available at all facilities due to delays or inadequate supply. Delays in the delivery of vaccines to far-away locations, i.e., from urban centers like Kampala to rural areas like Masaka, resulted in breaches of the cold chain, rendering the vaccines ineffective by the time they reached the destination health facility. Some facilities are improperly stocked with RI to meet demand, causing some members of the public to seek vaccinations at other less proximate locations.



The vaccines do not come on time, and it's available in government hospitals, which takes a long time to get vaccinated, and yet we were told the vaccine is expired by midday, but we wait up to 2pm.

- Participant 2, unvaccinated pregnant person



The [RI] vaccines are available but not in full capacity so people who want to immunize their children sometimes go to other government health facilities.

- Participant 3, unvaccinated pregnant person

Similarly, COVID-19 vaccines are reported to be widely available at health facilities. But unlike RIs, respondents reported that the issues affecting the uptake of COVID-19 vaccines are insufficient demand and undesirability. There were concerns about the efficacy of the vaccine, a perception that the COVID-19 vaccine was no longer necessary due to the reduction in public health safety measures,

and questions about the authenticity of the available vaccine at public health facilities.



The vaccine was there when COVID-19 still existed because we are no longer even told to wear masks and sanitize as it was before. We no longer even see those people who used to vaccinate it. It is there but the ones to be vaccinated are not available.

- Participant 7, unvaccinated pregnant person

Subtheme: Operational inconsistencies and inadequacies

Pregnant people felt frustrated by the uncomfortable and insufficient waiting conditions and seating arrangements at the facilities and negative attitudes from community health workers they interacted with. One respondent reported that they were left waiting while the community health workers went to lunch. One respondent also highlighted that relying on one vaccination day per week was insufficient to meet the demand for RI.



We have nowhere to sit, the health workers are rude to us, it really makes us feel frustrated.

- Participant 9, unvaccinated pregnant person



They ask for money, and yet the government announces that vaccination is for free. ... Since the government announces free vaccination for all the children, hospitals should stop selling it to us.

- Participant 10, unvaccinated pregnant person

Although RI and COVID-19 vaccines are free for community members, some reported that they were charged out-of-pocket costs for vaccines by community health workers. This deters people from accessing follow-up doses of vaccines.

Subtheme: Addressing social barriers to vaccine acceptance

Misinformation about vaccine safety and conspiracy theories are often fueled by negative personal experiences from community members who experienced severe side effects or even death, and these stories spread within communities. This is more relevant to COVID-19 vaccines than RI due to the novelty of the illness and its vaccines. One pervasive community-held belief noted by a majority of the participants was that the COVID-19 vaccine can be deadly.



The vaccines contain chips monitoring children and remote controlling them. That's why these days children are committing suicide, killing each other with knives—that all that is the white man's doing to reduce on African population and that scares people from getting vaccinated.

- Participant 6, unvaccinated pregnant person



I heard that the vaccine they administered to us for COVID-19, we are going to die after two years; but I am also still in my second year fearing that I might die if it expires. These rumors were spread from my workplace, areas of residence, and at school because by then I was still a student.

- Participant 6, unvaccinated pregnant person

Conversely, positive attitudes toward vaccination services can be credited to the dissemination of vaccine information from credible sources and figures in the community. Key messengers like the king, community health workers, village health teams (VHTs), and local leaders build trust in the information shared and can increase the community's acceptance and uptake of vaccine services. These individuals should serve as the basis of community mobilization and awareness initiatives for future vaccine programs.

Motivation

Subtheme: Impact of government restrictions and mandates

The motivation to get vaccinated was also influenced by government-backed vaccine initiatives and restrictions. Some respondents reported that despite an initial reluctance to take up the COVID-19 vaccine, they were compelled to get vaccinated through direct engagement with community health workers. Likewise, restrictions on school examinations and access to health care access for other services affected those who were unvaccinated. This highlights the impact of public health policies on vaccination decisions.



I was not going to be allowed to be vaccinated, but circumstances forced me. Health workers didn't allow me to treat the child unless the mother was vaccinated.

- Participant 2, unvaccinated pregnant person



I didn't want to vaccinate, but since I was a student I would not be allowed to sit for exams, and the health workers had come to my school.

- Participant 4, unvaccinated pregnant person

Conversely, motivation to get vaccinated was negatively impacted by inconsistent public health messaging delivered by the government and by the irregular enforcement of vaccination mandates, which undermined trust and reduced public compliance with vaccine initiatives.



Most people say immunizing children is not good because in most cases the government puts in place general immunization against children, for example for polio. And after almost all children have received the immunization, the same government makes an announcement how the vaccine had an issue—that's why many people in my community do not allow their children to be immunized.

- Participant 9, unvaccinated pregnant person

Subtheme: Social proofing vaccinations

Direct observation of perceived authority figures such as parents or community health workers getting vaccinated was a motivating factor to get vaccinated. Social proofing of vaccinations that leverages trusted figures can build confidence in vaccines and a willingness to take them up, particularly when introducing the new vaccine for COVID-19. Moreover, making vaccination visible and leveraging social pressure and peer relevance can further enhance the effectiveness of social proofing. By seeing others in their social circle get vaccinated, individuals may feel encouraged to do the same, thereby increasing vaccine uptake.



I got vaccinated after I saw my mother getting vaccinated.

- Participant 4, unvaccinated pregnant person



As long as that same health worker gets vaccinated in our presence and at the same time he/she is the one carrying out the vaccination exercise.

- Participant 7, unvaccinated pregnant person

Subtheme: Balancing perceived risks of vaccination and illness

Most participants perceived that the risks of RIs or COVID-19 vaccination is higher than the risks of the illness. There are concerns that the COVID-19 vaccine had been developed too quickly, that its roll out was irresponsible, and that the vaccine had been created by foreigners as a method of population control. Participants also believed that completing a two-dose vaccine schedule for COVID-19 would result in death or another illness.



I have nothing good to say about the COVID-19 vaccine because until now am still suffering from the side effects of the vaccine. It's unfortunate that before vaccination, they don't first check if someone is sick or if one's blood is compatible with the vaccine.

- Participant 6, unvaccinated pregnant person

Unvaccinated pregnant people held RI in higher regard than the COVID-19 vaccines, though perceptions varied depending on the specific RI in reference. For example, while participants generally noted the importance of polio vaccines for children, many distrusted the HPV vaccine, believing that this particular vaccine is intended to control African populations. Generally, unvaccinated pregnant people believed similar conspiracy theories about both RIs and COVID-19 vaccines.



That the HPV vaccination is meant to prevent cervical cancer in girls is another form of birth control to prevent girls from giving birth. It is rumored that the whites want to reduce the African population.

- Participant 6, unvaccinated pregnant person

Respondent group 2: Unvaccinated adults

RANKED BARRIERS

The primary barriers to vaccination among unvaccinated adults in Uganda include the risk of falling sick, concerns about side effects, the influence of unvaccinated peers, and doubts about the vaccine’s effectiveness. These factors are the most commonly cited obstacles to getting vaccinated as represented below:

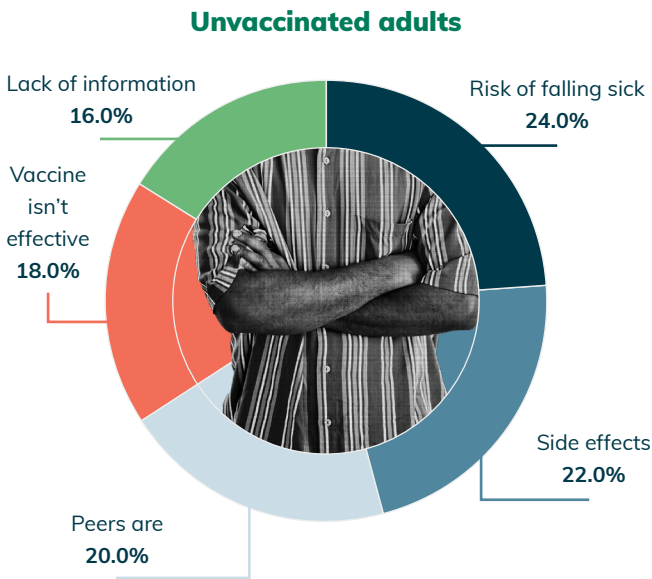


Chart 5, depicting the most influential barriers affecting vaccination intention amongst unvaccinated adults

DISCUSSION

This section on unvaccinated adults identifies several key barriers to vaccination, including misinformation spread through digital and traditional media, logistical challenges such as irregular vaccine availability, and corruption at health facilities. Societal influences including cultural norms and distrust in information sources also play a significant role in hindering vaccine uptake. These findings underscore the necessity for integrated strategies that provide reliable information, streamline vaccine distribution, and tackle cultural and social barriers to enhance vaccination rates.

Capability

Subtheme: Access to vaccine information

Unvaccinated adults have access to a range of digital platforms like TikTok, Facebook, and WhatsApp, which are praised for their wide reach and real-time updates. The accuracy of the information shared can sometimes be questionable.

Participants identified television channels such as Bukedde TV, CBS, BBS Television, and NBS Television, along with radio stations like Beat Radio and Kingdom Radio as reliable sources for accessing vaccine information. They trust their news coverage and believe information from certain sources, particularly from royalty, is credible. However, non-digital channels such as counselors, politicians, and village loudspeakers may also be sources of misinformation, highlighting the need to address misinformation across various communication platforms.

“When I hear information from village loudspeakers, I know it’s false.

- Participant 14, unvaccinated adult

Access to community messengers like the president and the village health teams (VHTs) is crucial for sharing vaccine information and building knowledge. Participants stressed the need for VHTs to be trained effectively to spread accurate information and to ensure they are on payroll. VHTs are known and trusted in communities and play a key role in health education. Endorsement from leaders like the president or the king is also essential for building trust in vaccines and has been successful in past campaigns.



The VHTs are so crucial in their communities because they are known and believed by the people; they are our first point of contact who give us medicine for flu and the like. They can gather us, and health educate us, and we listen to them.

- Participant 3, unvaccinated adult

Subtheme: Perceptions of RI and COVID-19 vaccine safety

Generally, respondents expressed concerns about potential adverse effects of Ris, such as malnutrition and birth defects in children. Others recounted specific incidents, like a child developing a skin rash after immunization, which heightened fears within communities. Participants also shared ideas that vaccinating pregnant people leads to hormonal imbalances in their children, resulting in early puberty.



Vaccinating pregnant people is causing hormonal imbalance in children. For example, children are developing breasts at eight years, children having menstrual periods at eight years—something that never existed in the past.

- Participant 1, unvaccinated adult

Skepticism about the safety of the COVID-19 vaccine and myriad beliefs about its side effects are common. Individuals recounted adverse reactions experienced by vaccinated people such as headaches and weakness in the injected arm. Tragic deaths in the community allegedly linked to vaccination further deepened mistrust despite assurances of vaccine authenticity. Discrepancies in vaccine types added to these concerns and caused more distress among recipients.



The vaccine contained the COVID-19 virus. People would say you are first infected with COVID-19, so I also feared.

- Participant 11, unvaccinated adult

Opportunity

Subtheme: Availability and accessibility of RI and COVID-19 vaccines at health facilities

While RI and COVID-19 vaccines are generally available at health facilities, there are instances when vaccine supply is insufficient to meet demand. Individuals are then directed to private clinics, which are sometimes inaccessible and charge high fees. Further limiting the accessibility of vaccines are allegations that community health workers unethically delay vaccination services and demand bribes from patients and community members in exchange for these services. Door-to-door vaccination services and other direct outreach services can help overcome financial and transport constraints, and vaccine supply must be adjusted to meet demand.



The vaccines are available, but the health worker will tell you that you have come late, not until you give them some money.

- Participant 1, unvaccinated adult



We direct people to health centers because we know they must be having vaccines, but when people reach there, the health workers claim the vaccines are out of stock and direct them to their clinics where they will part with some money like UGX 200,000.

- Participant 1, unvaccinated adult

Subtheme: Added costs of accessing vaccine services at health facilities

A significant number of respondents reported that some health workers charge fees for vaccines instead of providing them for free. Additionally, individuals are sometimes bribed by health workers who claim they arrived late.

Participants reported that COVID-19 vaccines were being sold by community health workers and that some members of the community were forced to pay due to pressing travel and other needs.



People would love to vaccinate for COVID-19, but the vaccine is for sale these days, especially [for] those who urgently need COVID-19 vaccination certificates to travel. They ask for like UGX 100,000, which you don't have, so the government should come out and tell us that the vaccine is now for sale so that we know.

- Participant 1, unvaccinated adult

Subtheme: Interpersonal influence on whether to take up RI

Unvaccinated adults expressed frustration with medical professionals who discourage traditional remedies, ironically leading to further reluctance about vaccinating children. This conflict also occurs within households where one parent advocates for immunization while the other adheres to traditional healing practices, creating barriers to vaccination.



People are complaining about doctors stopping them from using herbs on their children. For example, the vaccines injected on the thighs—doctors refuse people from using an onion to stop the thigh from swelling, yet people believe it works. That has made many people stop immunizing their children because they are not being sensitized enough.

- Participant 3, unvaccinated adult

Motivation

Subtheme: Subjective risk of acquiring diseases

Some unvaccinated adults were very concerned about acquiring VPDs, citing the severity of the diseases and the number of people who have suffered or died from them. But a significant number of participants showed less concern, attributing their confidence to the availability of alternative treatments like saunas, steam baths, and herbal remedies, along with the perceived strength of Africans and the public health mandates put in place by the Ugandan president to combat COVID-19.



No, because there is a sauna and steam bath, plus steaming with herbs.

- Participant 1, unvaccinated adult

Most respondents expressed fear and hesitation toward the COVID-19 vaccine due to perceived side effects such as abnormal headaches and loss of arm strength. Some even cited instances of death post vaccination in their community, further fueling their apprehension. Concerns about acquiring COVID-19 were outweighed by the fear of side effects, scarcity of vaccines, and the commercialization of vaccination certificates.



People have fear of the vaccine because of the side effects, so maybe they can be sensitized to know what they are going in for.

- Participant 6, unvaccinated adult

Subtheme: Cultural and social influences in vaccination decision-making

Beliefs and attitudes toward vaccination were deeply intertwined with cultural and societal norms. Preference for traditional medicine affected willingness and motivation to receive vaccines. The endorsement of vaccines by authoritative community or religious leaders was highly influential regarding public opinion about vaccines, either favoring or disfavoring immunization depending on the leader’s stance. The decision to vaccinate often involves not just individual judgment but also cultural and social influences, highlighting the need for targeted and culturally sensitive health communication strategies.



I had gone somewhere, and I saw a couple fighting, and the reason was the mother had taken the child for immunization yet the man believes in traditional medicine, claiming that in their family they are witch doctors so they don't immunize children.

- Participant 2, unvaccinated adult



Respondent group 3: Community health workers

RANKED BARRIERS

The main barriers to vaccination include concerns about side effects, fear of falling sick, doubts about vaccine effectiveness, and lack of information. These issues are the most frequently mentioned obstacles that hinder vaccine uptake among community health workers in Uganda, and they are presented below:

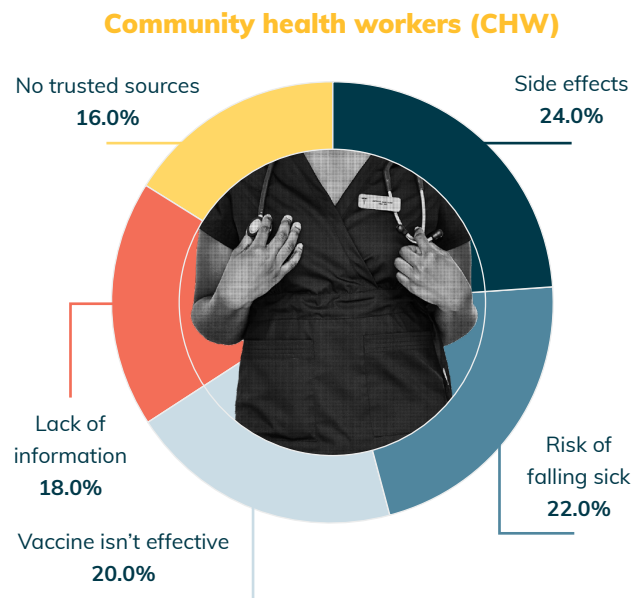


Chart 6, depicting the most influential barriers affecting vaccination intention among community health workers [CHW]

DISCUSSION

This section provides an in-depth look at the perspectives of community health workers on RI and COVID-19 vaccination. It uncovers their primary concerns, such as the fear of side effects, the risk of falling sick, doubts about vaccine efficacy, and a significant information gap. The discussion is structured around three key themes: capability, opportunity, and motivation.

Under Capability, the study emphasizes the role of education and community engagement in enhancing vaccine awareness and trust and addressing common myths and misconceptions. The Opportunity theme explores the logistical and systemic challenges that affect vaccine uptake, including the availability and accessibility of specific vaccines. Finally, the Motivation theme delves into the fears and concerns about vaccines and the role of misinformation in fostering vaccine hesitancy and undermining confidence. The study emphasizes the importance of addressing these issues to improve vaccination rates among community health workers and the communities they serve.

Capability

Subtheme: Community health worker perceptions of the efficacy of vaccines

Health workers acknowledged the role of RI in reducing disease prevalence and mortality rates, citing examples like polio and emphasizing the financial benefits of reduced medical expenses. They demonstrated high understanding that vaccines stimulate immunity against specific diseases, leading to milder symptoms or faster recovery in vaccinated individuals compared with unvaccinated individuals.



Vaccines help in reducing medical expenses since children are immunized and protected from diseases and the level of becoming sick is low.

- Participant 8, community health worker

Skepticism exists among some community health workers about COVID-19 vaccines. These health workers questioned the rapid development process and expressed concerns about efficacy and side effects. Some individuals thought that COVID-19 vaccination was compulsory for certain privileges like being on payroll but were still apprehensive about potential negative reactions.



It was a must; you don't have a COVID-19 vaccination card, you don't access payroll. So, to some people, it was forceful.

- Participant 8, community health worker

Subtheme: Participation in capacity-building initiatives for providing vaccine services

To enhance their expertise, skills, and knowledge essential for administering vaccine services, community health workers in Nansana, Wakiso District, underwent extensive training sessions facilitated by the Ministry of Health and vaccine suppliers. These initiatives covered vaccine storage, cold chain management, immunization schedules, and adverse effects management. They aimed to ensure the proper handling of vaccines and equip workers with the knowledge necessary to address potential complications.



Mentorship on cold chains, vaccine side effects and how they are handled—they also took us through advanced effects following immunization, how to fill it, and the process to follow to help a baby or adults because adverse effects came to adults after they were getting COVID-19.

- Participant 2, community health worker

Community health workers reported that the training did not cover every issue they face, such as language barriers for clients unable to read English, which complicates the consent processes required for vaccination. An overwhelming workload, extensive paperwork, and insufficient staffing leads to exhaustion among community health workers, which impacts service delivery efficiency. Financial constraints result in health workers often using personal funds for transportation and refreshments while conducting outreach activities; this emphasizes the need for adequate support and resource allocation.



The fact is we get tired. You find health center facilities like Health Center IIs have few health workers, yet other activities have to continue: you have to attend to Out Patient Department (OPD), family planning, immunization, antenatal, and you also have to go to the outreaches you selected to vaccinate children. So even going out to the community you walk. Sometimes you have to use your own money since government funds don't come on time. You use your transport money, and at times you don't have, you buy yourself refreshments, you get tired, and it strains you financially.

- Participant 3, community health worker

Opportunity

Subtheme: Impact of community attitudes on vaccine provision

Negative attitudes held by the community have a very strong impact on health workers and create a difficult and unsafe environment for them. Because community health workers were among the first to receive the COVID-19 vaccine, community members feel that the vaccine they are now receiving is a less effective version. Since there are multiple vaccines for COVID-19, some community members will only

receive their preferred brand. Rumors about expired vaccines suggest they are deadly or associated with “evil.” Initially vaccination cards were not available in Uganda, which also deterred people from receiving the vaccine. A lack of sensitization about the realistic side effects allows for rumors and misconceptions to flourish.

Community health workers shared their observations of different attitudes about the prioritization and uptake of RI:

- Some mothers may arrive late for vaccinations, leading to wastage of vaccines that expire in a short time span.
- Some mothers do not complete the full schedule for the RI, especially if the baby develops adverse side effects and their husbands complain. Others do not adhere to the schedule and come for additional doses after a long period of time.



Some mothers don't follow the immunization schedule/timeline. For example, some mothers stop on the BCG [Bacillus Calmette-Guérin] vaccine and return the child after one year, and they give excuses like having taken the child to the grandparent but when immunization is also done in the villages. Health center's have outreaches and carry out immunization in the villages' absence of the hospital is not an excuse.

- Participant 4, community health worker



COVID-19 vaccines were many, such as AstraZeneca, Pfizer, and Johnson; and people wanted a specific vaccine so they wouldn't allow to be vaccinated if that particular vaccine was not available.

- Participant 2, community health worker

Subtheme: Authority bias of community members to community health workers

Key community members who support vaccine initiatives and outreaches include VHTs, religious leaders, public figures on social media, and health workers. VHTs are trusted by the people because they are part of their community. Religious leaders and public figures play a significant role in promoting vaccine initiatives, but health workers are generally trusted more than political leaders due to their ability to explain the details and handle situations effectively.



People trust health workers compared to political leaders because of the way they explain to them and handle them.

- Participant 10, community health worker

Subtheme: Social norms related to RI uptake

Negative social norms about RI uptake cause significant challenges for community health workers and can create an unsafe environment for them. Beliefs that vaccines were brought by the government to harm people or that they have severe side effects are common. Some health workers also express fear and skepticism themselves about the contents and efficacy of the COVID-19 vaccines due to their rapid development. Religious leaders who associate the vaccine with the evil number 666 discourage their followers from getting vaccinated. Despite these challenges, health workers strive to educate and sensitize the community about the benefits of immunization, to debunk myths, and to address fears.



Misbeliefs that they are reducing the African population and so they are using the COVID-19 vaccine as a target to reduce the population such

that the people vaccinated will die in a period of four to six years—and because of that some of us we refused to get the vaccine.

- Participant 2, community health worker

Motivation

Subtheme: Balancing the consequences of remaining unvaccinated

The consequences of remaining unvaccinated had a significant impact on the decision to get vaccinated. Job seekers and employees might risk losing their job or not getting a job without a COVID-19 vaccination card. Vaccination requirements enabling one to stay on payroll or access specific buildings, along with travel restrictions were all influential for individuals who might have otherwise been hesitant. This proves that practical considerations like job security and travel needs can be powerful drivers for public health compliance.



It was a must; you don't have a COVID-19 vaccination card, you don't access payroll. So, to some people, it was forceful.

- Participant 2, community health worker

Subtheme: Subjective risk of experiencing RI or COVID vaccine side effects

There is a widespread fear of side effects of the COVID-19 vaccine. Some health workers are skeptical about the vaccine's contents and its rapid development timeline, leading to doubts about its efficacy. The severe side effects experienced by some vaccinated individuals, such as paralysis of the vaccinated arm and symptoms resembling a COVID-19 infection, have further fueled these fears and discouraged others from getting vaccinated.



Secondly, the side effects on those people that were vaccinated were severe. Besides the arm where they vaccinated being paralyzed for a whole week, people got sick, coughed, developed fever, and it looked like as if someone is infected with COVID-19, and that scared who were not yet vaccinated, hence not going for vaccination.

- Participant 6, community health worker

Subtheme: Overcoming misinformation and building trust in vaccination efforts

Belief in misinformation is a significant barrier to vaccine uptake. Some community members believe that vaccines are a government plot to reduce the population or that vaccines cause infertility, leading to vaccine refusal. This belief is further fueled by religious leaders who discourage vaccination, associating it with the “evil number 666.”



Also, most religious leaders had a bias towards COVID-19, and so when they would be preaching to their followers in churches they would discourage them from being vaccinated, saying that the vaccine contained evil number 666—so for that fear people never went for vaccination.

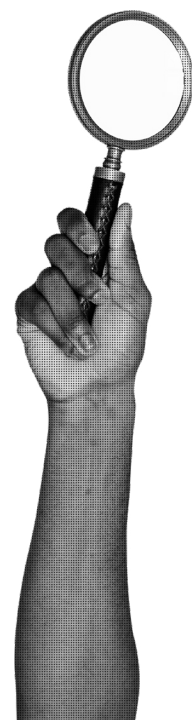
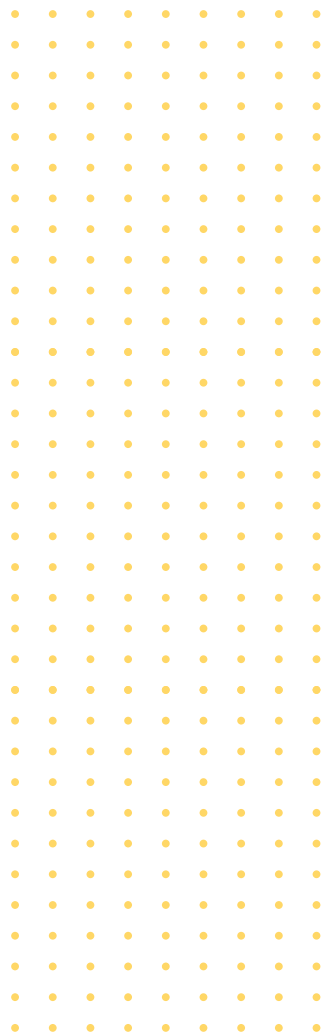
- Participant 6, community health worker

Trust and credibility in the vaccination process are crucial to vaccine uptake but remain fragile even among community health workers. Direct observation of leaders receiving vaccines can help build trust, as evidenced when workers accept vaccination after seeing their leaders participate. Engaging trusted community figures like religious leaders and local council members in health communication is an effective strategy to enhance trust and acceptance of vaccination among the broader population.



Some of our leaders showed an example. They came to our facility and were vaccinated in our presence, so we realized maybe it wasn't a trick and accepted after seeing them being vaccinated.

- Participant 2, community health worker



Tanzania findings

Key findings from behavioral barriers and enablers of vaccine uptake

In Tanzania, we conducted FGDs with three key respondent groups: unvaccinated adults, unvaccinated pregnant individuals, and community health care workers involved in the delivery of immunizations. FGDs were held in the Ilala and Temeke districts, situated within the Dar es Salaam Region, and spanned approximately three days, concluding on March 28, 2024.



Respondent group 1: Unvaccinated pregnant people

RANKED BARRIERS

Among unvaccinated pregnant individuals, the most significant barriers to vaccination uptake were identified as lack of information and misinformation. Additionally, many cited the use of natural remedies and fear of side effects as hindrances to getting vaccinated. The concern about the risk of falling sick also played a role, though to a lesser extent. These insights are visually represented in the chart below:

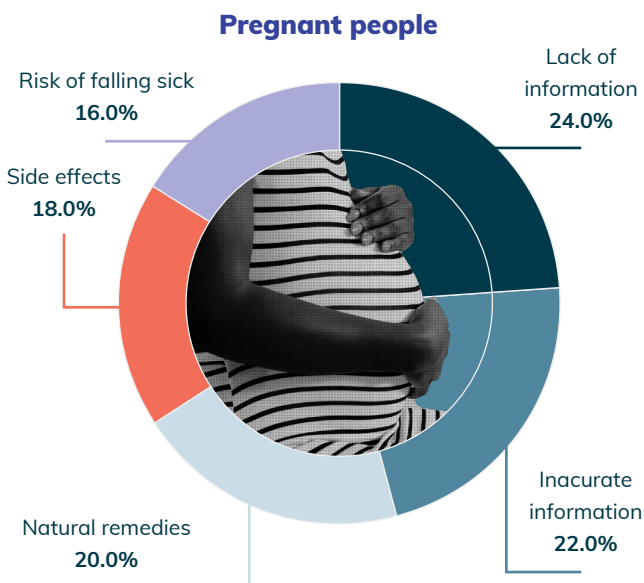


Chart 7, depicting the most influential barriers affecting vaccination intention

DISCUSSION

Our findings demonstrate mistrust of information about the COVID-19 vaccine and general support for the use and benefits of natural remedies as alternatives to vaccine uptake. Our findings also explore the preferred information channels of participants and how misinformation contributes to skepticism of certain information channels and messengers.

Capability

Subtheme: General knowledge of vaccines enabling routine immunization uptake and disabling COVID-19 vaccine uptake

Participants generally accepted RIs, and a majority of respondents were not concerned about their children receiving them. When discussing the reasons for their acceptance, participants felt that information about RIs was readily available from trusted sources.



Many members of the community think that vaccines are important for children, and this is because of the education provided about these vaccines for children.

- Participant 6, unvaccinated pregnant person

Conversely, many participants are reluctant about the COVID-19 vaccine and believe that they, or their children, do not require it. Participants emphasized their own intellectual capability and agency in deciding whether to receive vaccinations, informed by their own personal understanding of their bodies, their education, and public health messaging from cultural and institutional messengers.



Many people see this COVID-19 vaccine as a vaccine for the elderly, and even if you look at the number of people who have been vaccinated, most of them are elderly. Many young people say that they are still strong and are not at risk of contracting the disease of COVID-19, so they do not see the importance of getting the vaccine.

- Participant 5, unvaccinated pregnant person

Insufficient information contributes to mistrust of the COVID-19 vaccine and makes people more susceptible to misinformation. Participants also discussed losing confidence in information about the vaccine such that they no longer sought it out.

Subtheme: Barriers to accessing reliable vaccine information

There was a consensus among participants that clear information on the efficacy and safety of the vaccine is necessary to make a clear decision about receiving it. Participants expressed a desire for clarity on the benefits, drawbacks, and potential long-term effects before considering vaccination.



If I get good information about the vaccine then I will make a decision. But for now, no.

- Participant 3, unvaccinated pregnant person

Participants suggested that if health care professionals or clinics were to share more clear information, people might be more open to the vaccine and reconsider their decision. Local governments and villages should promote events in the community for vaccine information, such as discussions and meetings, to help individuals distinguish between reliable and unreliable sources.



Maybe for advice, since at the clinic we are taught various things, and these people who are involved with the COVID-19 vaccine would come and teach us when we come to the clinic so that people can get more understanding about the COVID-19 vaccine.

- Participant 4, unvaccinated pregnant person

Opportunity

Subtheme: Disproportionate presence of non-trusted social information channels and messengers

Unvaccinated pregnant people shared that they receive vaccine information from social media networks like Facebook, WhatsApp and Instagram. However, they said that they do not trust this information because it did not come from trusted messengers.



Social networks like Facebook and Instagram are very misleading because there, everyone writes their thoughts. I don't trust the information on the networks.

- Participant 5, unvaccinated pregnant person

Participants reiterated the importance of cultural leaders, government officials, and public health figures relaying information and noted that this form of communication has not been sufficiently available.



Information found on the street, maybe someone is talking, you can't believe it; but when the leaders give it, you know this has come from the ministry, it is a true statement.

- Participant 8, unvaccinated pregnant person

Subtheme: Presence of both social and physical opportunities to seek immunizations at health facility

Participants reported that both routine immunizations and COVID-19 vaccines were readily available at health care facilities in their communities and that they had the social permission to seek vaccinations for themselves and for their children.



The decisions are the same on all vaccines. I am the one who decides, and I can't be decided by someone else on the issue of vaccines.

- Participant 8, unvaccinated pregnant person

Motivation

Subtheme: Nudges generating automatic motivation for routine immunization, not COVID-19

Participants shared that the available information on COVID-19 and its vaccines is insufficient, and because of this, the subjective risk perceptions of acquiring COVID-19 were minimized. It has come up repeatedly in our research that confusion on COVID-19 perpetuates the belief that the risk of post-vaccination side effects was higher than their risk of becoming sick while unvaccinated.

However, discussions with participants indicate that they would have felt motivated to get vaccinated if the vaccine had been listed on their RI card. The COVID-19 vaccine is perceived as separate from the “necessary” routine immunizations because of its separate documentation. One participant noted that she very carefully follows the instructions on her children’s vaccination cards, which clearly stipulate which vaccines were required and when, even if she does not understand it herself. Another participant

noted that they did not receive the COVID-19 vaccine because it was not on the clinic card for her routine immunizations.



I have not received the vaccine because it is not written on the clinic card. If it was written, I would have already been vaccinated, and maybe now I would be about to get the second one.

- Participant 4, unvaccinated pregnant person

Subtheme: Belief in misinformation motivates vaccine hesitancy

Participants noted that their COVID-19 vaccine hesitancy was partly motivated by information and beliefs on alternative natural remedies. They discussed the messaging shared about these alternatives, such as boiling and steaming certain leaves to alleviate chest pain. Participants advocated for a balanced approach, emphasizing the importance of both natural remedies and vaccination.



I concur because we were informed that getting vaccinated against COVID-19 is not necessary, but boiling leaves and inhaling steam can help relieve chest pain.

- Participant 5, unvaccinated pregnant person

Subtheme: Risk balancing of the COVID-19 virus and perceived vaccine side effects

There were differing opinions about who is eligible for the COVID-19 vaccines. Some participants stated that only individuals with underlying health conditions like diabetes or high blood pressure should be vaccinated and that those who are otherwise healthy should not.

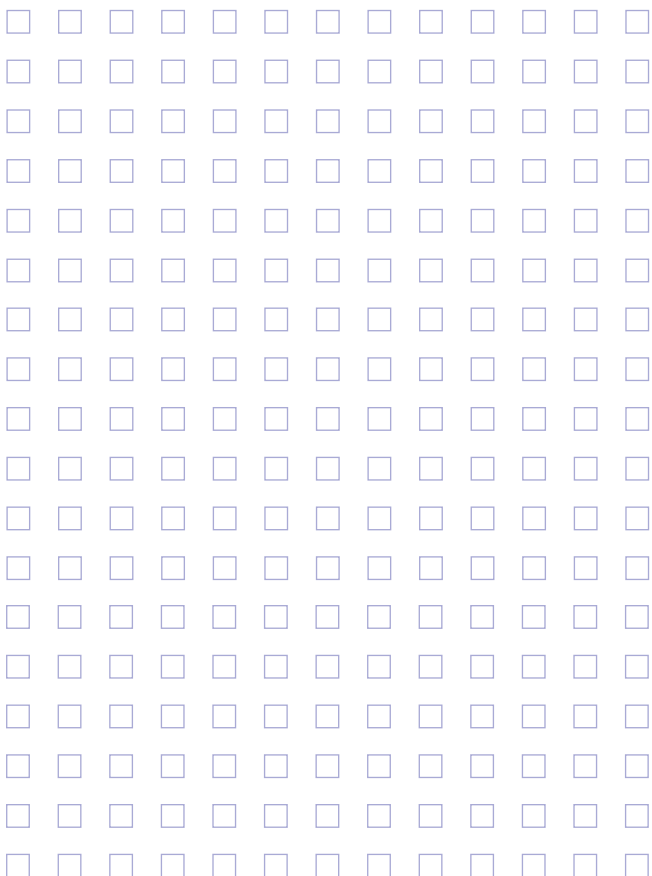
“
 What I heard in the community during COVID-19 is that maybe people with diabetes, high blood pressure, and those with serious illnesses are supposed to go for the COVID-19 vaccine.

- Participant 9, unvaccinated pregnant person

Additionally, some expressed fears that the long-term effects of the COVID-19 vaccine for children may cause more harm than good.

“
 Some people say that if I take my child to get vaccinations it will cause harm, so he is ready not to give the child vaccinations because of the fear of the effects of those vaccines on children.

- Participant 6, unvaccinated pregnant person



Respondent group 2: Unvaccinated adults

RANKED BARRIERS

For unvaccinated adults, the fear of side effects is the most prominent barrier to vaccination uptake, followed by concerns about the vaccine's effectiveness. A majority of respondents stated that a lack of information or the presence of misinformation were major hindrances to vaccination uptake. These insights are visually represented in the chart below:

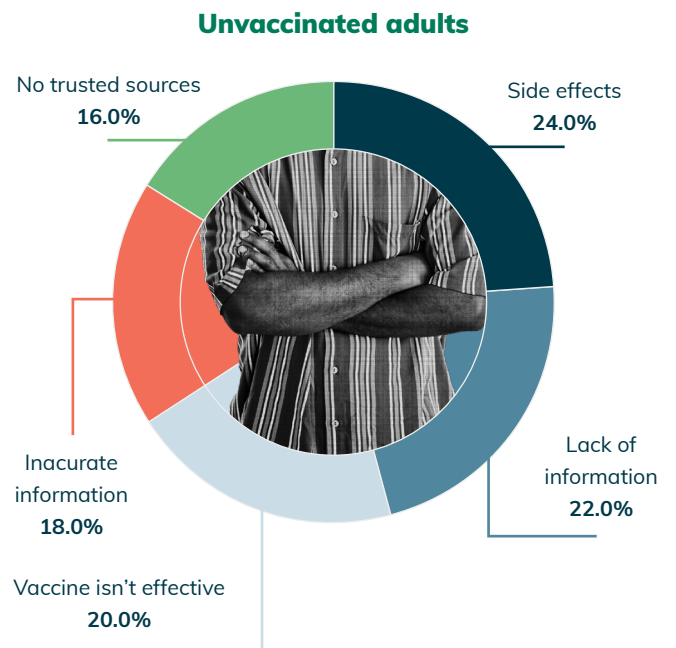


Chart 8, depicting the most influential barriers affecting vaccination intention amongst unvaccinated adults

DISCUSSION

In this section, unvaccinated adults identified key barriers to vaccination, including the lack of adequate information and the fear of side effects from the vaccine. The participants discuss the lack of trust among certain sources of information and ways to make information more credible for the public to follow, as well as ways to tackle misinformation about side effects.

Capability

Subtheme: Access to digital and non-digital channels for vaccine information

Unvaccinated adults spoke about some of the common non-digital sources of information like local government announcements, media outlets, and street loudspeakers. For instance, polio vaccine updates are commonly broadcasted on radio and television. Street promoters disseminate vaccination details, while publications, flyers, and social media platforms like Facebook, X (formerly known as Twitter), and Instagram have started to play a significant role in digital information dissemination. The Ministry of Health is viewed as trustworthy, often running campaigns with well-known actors and football players to promote vaccines.



The Ministry of Health is always a reliable source of information, and campaigns to promote vaccinations frequently use well-known individuals, such as football players and actors.

- Participant 8, unvaccinated adult

However, participants noted that sometimes these channels and sources have also contributed to vaccine hesitancy. For example, respondents noted that information presented by government officials caused young people to become hesitant and fearful that the vaccine will cause male dysfunction or homosexual behavior.

Subtheme: Knowledge of routine immunization and COVID-19 vaccine

Routine vaccines, such as for measles or polio, are widely recognized and established by public awareness campaigns that have instilled trust since childhood. However, the novelty of COVID-19 vaccines caused hesitancy and fear regarding its safety and efficacy. The COVID-19 vaccines are not yet fully accepted by society, unlike routine vaccines, because these misconceptions are rampant.



Concerning routine vaccines, I have heard that they need to be tested extensively and proven safe before being distributed. However, concerning COVID-19 vaccines, there was a lot of fear surrounding them, with many people saying that they were still in the experimental stage.

- Participant 8, unvaccinated adult

The main concerns shared about the COVID-19 vaccine were the need for multiple doses, booster shots, and the variability of vaccines from different countries. The local government's influence in shaping community perceptions about the vaccine was strong, especially because of its emphasis on education and accurate information dissemination in rural areas where access to reliable information may be limited.



Vaccination education should be the first step toward improving it, and religious institutions like schools, mosques, and churches should be the conduits for this education. In order for the education providers to reach their people, they should also be respected members of the relevant community, like priests.

- Participant 10, unvaccinated adult

Opportunity

Subtheme: Misinformation spread by social media sources on the COVID-19 vaccine

Participants shared that non-digital information sources like news channels and media outlets are believed to be regulated by the government, which gains them widespread trust. Social media, on the other hand, is seen as misleading and untrustworthy despite how commonly used it is. WhatsApp, for example, is very commonly used and has an abundance of unverified information forwarded within groups to family members. Proliferation of misinformation among interpersonal networks via social media causes the obfuscation of actual credible vaccine information and contributes to vaccine hesitancy.



Social networks, particularly Facebook, are the most untrustworthy sources of information in my community because nobody comes with the news; instead, everyone writes it themselves. It is unclear where the news originated; others may have written it because they found it humorous, but people are taking it as fact.

- Participant 10, unvaccinated adult

Subtheme: No reported physical or social barriers affecting the opportunity to be vaccinated

As with other respondent groups, participants did not report any barriers affecting their physical or social opportunity to seek vaccination. Participants asserted that vaccines were readily available and that they had social permission to choose to be vaccinated or not.

Motivation

Subtheme: Subjective risk perception of illness and vaccination for COVID-19

Respondents reported that a confusing information ecosystem introduced serious concerns regarding the safety of COVID-19 vaccines.



As my colleagues said about the COVID-19 vaccines, for girls, if you get the vaccine, you will not give birth again, and for men, they may become gay.

- Participant 5, unvaccinated adult

In their opinion, the subjective risks associated with the vaccine were much higher than the risks associated with becoming ill, and they did not feel equipped enough to decide to get vaccinated.



For routine vaccines, I can make decisions on my own without assistance. But for COVID-19 vaccines, I need to receive expert education to fully understand the vaccine, including its risks and benefits.

- Participant 1, unvaccinated adult

However, some respondents noted that social proof and exposure to vaccinated people close to them and their communities had motivated their peers to seek vaccination.



In our health center, no one was forced, but fortunately or unfortunately, when COVID-19 came in, the administrator of our health center got very sick. So after seeing all the signs and symptoms of COVID-19 and treating them, everyone was vaccinated.

- Participant 11, unvaccinated adult

Respondent group 3: Community health workers

RANKED BARRIERS

For community health workers, the most prominent barriers included the fear of side effects and the belief that the vaccine is ineffective. Additional barriers were the lack of accurate information and trusted sources, cultural and religious beliefs, and a preference for using natural remedies. These insights are visually represented in the chart below:

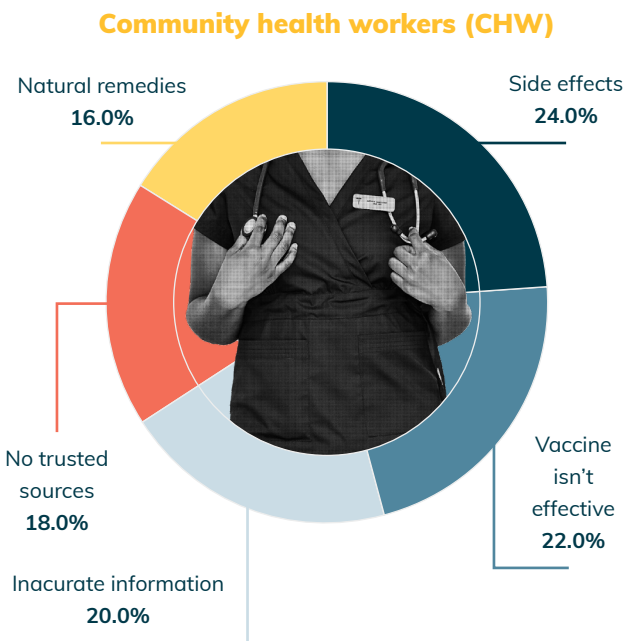


Chart 9, depicting the most influential barriers affecting vaccination intention among community health workers [CHW]

DISCUSSION

In this section, community health workers discuss some of the main challenges they face and how they try to overcome them to increase uptake of the COVID-19 vaccine. Community health workers also discuss the digital and non-digital sources of information they commonly use.

Capability

Subtheme: Knowledge or routine immunization and the COVID-19 vaccine

Community health workers unanimously defined vaccines as a form of immunity that protects individuals from contracting specific diseases. They emphasized the importance of vaccines and their role in preventing diseases considered to be fatal or highly dangerous. It was also noted by the participants that vaccinated individuals either avoid contracting the disease altogether or experience a milder form from which they recover quickly. The benefits they cited included promoting overall population health and reducing disease prevalence. It was noted that vaccines also support community health workers by reducing their risk of contracting illnesses while caring for patients.

“For instance, when you receive a vaccination as a health care provider or someone you look after receives one, the risk of infection between the community health worker and the patient is very low.

- Participant 1, community health worker

Subtheme: Training of community health workers on vaccinations

Classroom sessions and continuous medical education interventions were provided to community health workers to combat misinformation and ensure quality of services.

Community health worker participants reported that public mistrust of COVID-19 vaccines and a fear of COVID-19 infection have contributed to a decline in routine health care center visits among the public. They believe that their training has been critical to equip them with the knowledge, administration techniques, and patient communication skills to address this mistrust and fear during dialogues with patients.



The COVID-19 outbreak has had some impact on the health center where I work. It has not completely stopped people from receiving services, but since the outbreak, many people have stayed at home rather than visit health centers out of fear that their children will get the virus if they go to the hospital. As a result, fewer people have visited the health center out of fear of getting COVID-19.

- Participant 4, community health worker

Opportunity

Subtheme: Knowledge and perceptions of maternal and child vaccinations

Some parents do not wish to vaccinate their children at all, often due to insufficient information. They also may not receive the necessary vaccinations or information at a health care facility, largely due to high caseloads and staff shortages.

In some cases, children are entrusted to the care of relatives if their parents travel to work or have died. These family members may not have the child's vaccination cards or identification documents, so community health workers struggle to keep track of the children and what vaccines they have or have not received.

Unvaccinated mothers often struggle to keep to the required vaccination schedule for themselves and their children, whether due to forgetfulness, relocation, or that they don't feel it is important.

Community health workers emphasize the importance of timely vaccination for children to their mothers and have also stated that there are efforts to improve health tracking systems for follow-up when families relocate or their circumstances change.



In my opinion, there is still more need for vaccination education. As another participant noted, if a mother has given birth, she should receive adequate instruction on the first and last vaccinations. Some parents do not possess this knowledge. Others depart without receiving adequate vaccination information.

- Participant 3, community health worker



Another thing is the outreach. Some places are far from health care centers, which could cause a mother to arrive late for her vaccination. For instance, she was meant to finish the vaccination within three months, but she ended up finishing the first one after nine months or a year.

- Participant 1, community health worker

Subtheme: Interactions with communities when accessing vaccine services

Local health centers play a significant role in providing essential health care services to residents, particularly those who are pregnant, lactating, or seeking vaccination. The health centers are easily accessible and cater to travelers who seek health care services. However, some residents prefer to wait for outreach programs to receive vaccinations at their homes rather than visiting the health care center directly.



In addition, community health workers go from house to house educating people about vaccinations. When we went to outreach and met mothers there, when you ask them why they have not gone to get vaccinated, they say that we were waiting for them.

As a result, some people choose not to go to the hospital because they are waiting for the outreach, or because they are stuck in the street for another reason, so the CHW should go and encourage them to go to the health center.

- Participant 11, community health worker

Motivation

Subtheme: Vaccine hesitancy and job security

Community health workers receive directions from the district medical officer (DMO) to ensure vaccination coverage among all staff members at the center. Refusal of the vaccine poses a risk of dismissal, as it will be reported to the DMO. Fear of losing their job serves as the primary reason for community health workers to get vaccinated, outweighing concerns about contracting illnesses from patients.

“ Information should be delivered to the DMO that they have refused to vaccinate. That brought fear that if I do not vaccinate, I may be fired because I serve people. Health workers did not care that because they were caring for patients, they may get diseases or infect other people; but they looked at the fact that they could be fired, so this is what made them be vaccinated.

- Participant 2, community health worker

Some participants stated that people opt for vaccinations after witnessing the devastating effects of COVID-19 on their family members and friends. They said that watching people they love suffer motivated them to get the vaccine, because they did not want to go through the same struggle.

“ My friend told me about his family and how they were affected really badly from COVID. They could not breathe properly, and they had really painful

body aches. So, he went to get the vaccine because he did not want to go through that.

- Participant 4, community health worker

Subtheme: Subjective risk of infection for community health workers

In addition to job security and governmental vaccine mandates for community health workers, a key driver for the uptake of vaccine services is the concern about contracting an illness in the performance of their duties. Frontline workers engage with patients with unknown vaccination and disease statuses daily, and most respondents noted the importance of having some degree of protection from infection. One respondent said that vaccinated community health workers were less likely to stigmatize patients exhibiting potential COVID-19 symptoms, which ensures that these patients receive the care they need.

“ I can state without a doubt that vaccination is important, 100 percent, because, even during the COVID-19 pandemic, we were among the first casualties because, while providing care for patients, we were unsure of their status. Consequently, the vaccine has shielded us from the virus and has kept us safe. For instance, I did not become ill as a result of receiving the vaccination.

- Participant 4, community health worker

“ ...vaccination is crucial for health care professionals because it lessens the stigma that exists between them and their patients. For instance, during the COVID-19 pandemic, when a patient arrived at the clinic exhibiting symptoms, we were informed that everyone was afraid to touch him because the doctor was not vaccinated, and they feared becoming infected. Therefore, vaccination helps alleviate this stigma for our patients.

- Participant 5, community health worker

Zambia findings

Key findings from behavioral barriers and enablers of vaccine uptake

In Zambia, we conducted FGDs with three key respondent groups: unvaccinated adults, unvaccinated pregnant adults, and community health care workers involved in the delivery of immunizations. FGDs were held in Kafue, situated within the Lusaka Province, and spanned approximately two days, concluding on February 24, 2024.



Respondent group 1: Unvaccinated pregnant people

RANKED BARRIERS

From the ranked barriers, unvaccinated pregnant people are most concerned about experiencing side effects from the COVID-19 vaccine, as it was identified as the most significant barrier. Additionally, they feel they have no trusted sources for information about the COVID-19 vaccine, contributing to their uncertainty about the vaccination process. These insights are visually represented in the chart below:

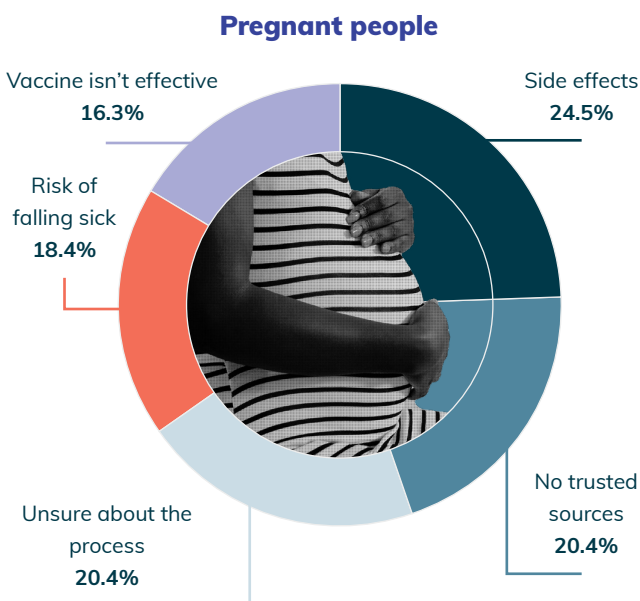


Chart 10, depicting the most influential barriers affecting vaccination intention

DISCUSSION

In this section, we explore the barriers and facilitators that have affected unvaccinated pregnant people in their intention to get the COVID-19 vaccine. Key insight from the discussion reveals that participants are mostly concerned about experiencing side effects from the COVID-19 vaccine. This concern has been fueled by misinformation and conspiracy theories that have shaped their perceptions about the COVID-19 vaccine. A key facilitator to vaccine intention is the trust in health care workers.

Capability

Subtheme: non-digital and digital channels for accessing vaccine information

Unvaccinated pregnant people identified digital platforms like WhatsApp and Facebook as primary sources for accessing health information. WhatsApp in particular has emerged as a favored choice due to its widespread usage and the convenience of sharing information through statuses.

“ I would prefer to use WhatsApp because a lot of people are on WhatsApp lately. I can capture the post and put it on my status because we like to view statuses a lot.

- Participant 12, unvaccinated pregnant person

However, respondents noted that information from these channels often includes misinformation and myths that contribute to their hesitancy to get vaccinated.

Non-digital channels like newspapers and radio channels and social interactions with their community were also a source of information, but participants find information published by newspapers and radio programs from the Ministry of Health more credible.

Participants said that they were educated effectively during antenatal and under-five visits by health care providers offering valuable guidance.

Subtheme: Gaps in knowledge or understanding of COVID vaccines

A disorganized information ecosystem without reliable education and information leads to misconceptions specific to the COVID-19 vaccines and not routine immunizations. Participants reported believing that the vaccine can cause sickness or death or that it is part of a broader conspiracy. These beliefs were not static, however, and respondents said that more education on the vaccine may influence their decisions.

“Concerning the COVID-19 vaccine, people were making us scared. They used to say that you will die when you get vaccinated ... if you don't have the COVID-19 virus in your body, you will have it once you are given the COVID-19 vaccine. That is why we were scared.

- Participant 2, unvaccinated pregnant person

Subtheme: Acceptance over time

There's a perception among participants that the acceptability of the COVID-19 vaccine, particularly for children, had changed over time. This shift in attitude may be attributed to receiving more information about the vaccine, which seems to have influenced some to be more open to vaccination.

“Currently, a lot of people have started accepting, unlike in the past—maybe because they are receiving some information from people.

- Participant 12, unvaccinated pregnant person

Opportunity

Subtheme: Trusted sources of information

Community health workers and church leaders were regarded as the most trusted source of health information among unvaccinated pregnant people. The church was mentioned as pivotal and should be prioritized in messaging strategies. There is an idea that health care workers and church leaders would not willingly spread misinformation and that they are therefore more trusted in the community.

“If the church hasn't given an announcement and the health workers haven't passed through, then it means that the information is false.

- Participant 7, unvaccinated pregnant person

Subtheme: Availability of routine immunizations at health facilities

A majority of participants know that routine immunizations can be taken care of in their local clinic or hospital. However, some participants said that vaccines were not available during the communicated schedule, leading to children missing out on vaccines.

“People from the hospital—sorry, from the clinic—usually pass through. They communicate to us on the time they will come through. They usually do it from a certain pre-school ... that is where we usually go.

- Participant 9, unvaccinated pregnant person

“One of my children waited up to five years. My children start school early, so you find that they are in school when they are supposed to be attending [the] under-five clinics.

- Participant 12, unvaccinated pregnant person

Motivation

Subtheme: Subjective risk of experiencing COVID-19 vaccine side effects

Most of the participants had concerns about the side effects of the COVID-19 vaccine, fueled by stories of others' experiences. RIs were considered safer and their side effects less severe because they are more familiar.

“ Routine immunizations are just fine because they don't make us sick like the way the COVID-19 vaccine does ... because a lot of people get sick when they are given the COVID-19 vaccine.

- Participant 13, unvaccinated pregnant person

Subtheme: Subjective risk of acquiring COVID-19, i.e., related to respondents' self-reported risks of acquiring COVID-19

While the majority of the unvaccinated pregnant people were concerned about the side effects of the vaccine, they were equally concerned about possible infection with COVID-19 due to the risks associated with contracting the disease. This concern stems from hearing personal experiences or being in close proximity to infected individuals.

“ Yes, I am concerned that I may get infected because my family gets in contact with a lot of people in their daily life, and COVID-19 is transmitted through contact with other people. I may protect myself, but then I don't know how my children are interacting with their friends who may have COVID-19, so I am at risk of getting sick.

- Participant 13, unvaccinated pregnant person

Respondent group 2: Unvaccinated adults

RANKED BARRIERS

From the ranking derived from the card sorting, the most significant barrier identified by the unvaccinated adults was the risk of experiencing side effects from the COVID-19 vaccine. Participants ranked two other barriers highly: the risk of falling sick and the lack of trusted sources for vaccine information. These insights are visually represented in the chart below:

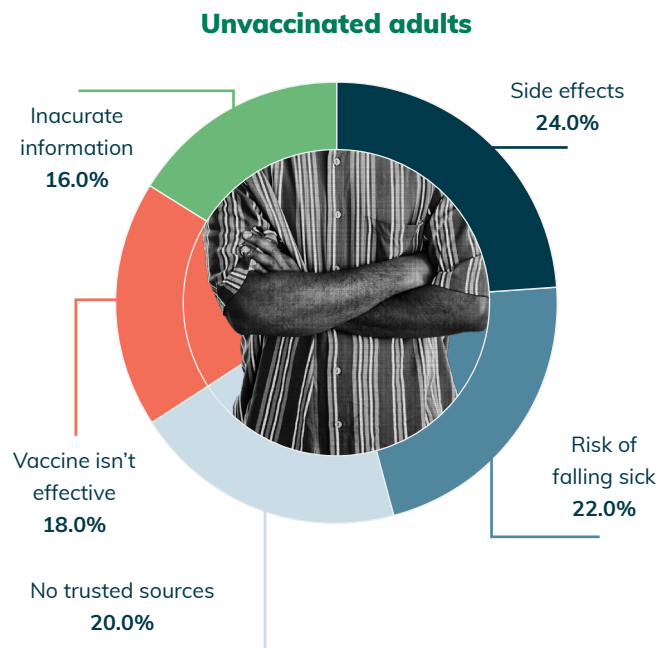


Chart 11, depicting the most influential barriers affecting vaccination intention amongst unvaccinated adults

DISCUSSION

In this section, we explore the barriers and facilitators among unvaccinated adults that have affected their intention to get the COVID-19 vaccine. The key identified barrier from the discussion reveals that participants are concerned about the side effects of the COVID-19 vaccine, fueled by rumors of adverse effects such as premature death.

Capability

Subtheme: Access to proximal digital and non-digital channels for accessing vaccine information

Unvaccinated adults mentioned that digital tools like WhatsApp and Facebook serve as platforms for sharing health information, given their widespread use. In addition to digital channels, traditional media outlets such as television, radio, billboards, flyers, and posters were also cited as sources of health information.



We may hear from a person, but we want to hear from the radio because maybe the information is coming from the Ministry of Health or other organizations.

- Participant 12, unvaccinated adult

Subtheme: Framing effect and base rate neglect affecting perceptions of COVID-19 vaccines

Participants overestimated both the proportion and the severity of adverse effects of the COVID-19 vaccine. Reports of headaches, nausea, weakness, and fainting after receiving the COVID-19 vaccine among their peers who had been vaccinated were mentioned as concerning. They believed that many people in their community had suffered an adverse reaction after vaccination and that severe reactions are common.



... routine immunization vaccines like polio and measles, did not have any kind of side effects. When I was young, I was vaccinated, and I still don't have any single problem. COVID-19 vaccines were having side effects, and a lot of people were complaining.

- Participant 5, unvaccinated adult

Conversely, other participants held positive views about routine immunization and did not associate them with adverse side effects. When discussing routine immunization, participants were far more likely to report positive perceptions of vaccines and emphasized that the benefits of vaccination outweigh the potential drawbacks.

Opportunity

Subtheme: Communal social influence contributing to positive beliefs on vaccines

The unvaccinated adults emphasized their trust in information provided by health workers or individuals trained by health professionals. Organizations like the Community Welfare Assistance Committee and the Southern Africa HIV & AIDS Information Dissemination Service were regarded highly, as they receive health information training from public health officials.



Let me tackle the issue of involving the headman. There are instances when the health workers explain everything to the headman and the headman informs the community. For those who are not feeling well, the health workers will ask them before vaccinating them. Most communities respond positively when the headman sets an example by getting vaccinated.

- Participant 7, unvaccinated adult

Participants displayed mixed feelings concerning authority bias when discussing the potential impact of recommendations from religious or community leaders. Some believed that endorsements from influential figures like pastors or community leaders could lead to positive responses to vaccination. Others, however, remained skeptical, emphasizing the necessity of comprehensive information, assurances of safety, and proper conduct by community health workers to gain community trust.



So, we cannot be convinced just because a pastor is the one who has recommended ... no. The health workers should perform well ... their performance will convince us.

- Participant 4, unvaccinated adult

Subtheme: Interpersonal influence on whether to take up the COVID-19 vaccine

For some unvaccinated adults, the decision-making process is heavily influenced by family members, spouses, and parents who express concerns about potential negative outcomes of vaccination.



In my case, my mother used to listen to what was being said. Seeing those who were fainting, getting sick, getting weak ... so she was in fear that my child may die. So, that is how she stopped us.

- Participant 2, unvaccinated adult

The external influence of family members' concerns about COVID-19 vaccines shaped their own vaccination decisions.



Regarding the COVID-19 vaccine, no one is allowed to take it at my place. They don't allow it because it ... it makes people sick when they receive the COVID-19 vaccine. Otherwise, we have all been given routine immunizations.

- Participant 3, unvaccinated adult

Motivation

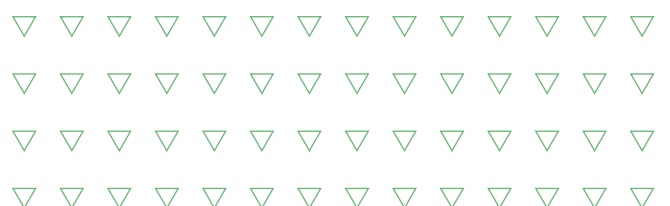
Subtheme: Subjective risk of experiencing COVID-19 vaccine side effects

The majority of the unvaccinated adults expressed hesitancy toward the vaccines based on what they had heard or observed in their communities about side effects like headaches, nausea, weakness, and fainting. Unvaccinated adults also said that their fears associated with COVID-19 vaccines are fueled by rumors that vaccinated individuals may die prematurely or suffer from severe illnesses. Participants noted that widespread side effects could lead to decreased productivity and increased economic strain on both local communities and the entire country if more people are sick or die.



As we mentioned earlier, say I have been vaccinated and maybe I am the one fending for the family. You find that you start having complications from getting the vaccine and end up dying.

- Participant 4, unvaccinated adult



Respondent group 3: Community health workers

RANKED BARRIERS

The most significant barriers identified by the community health workers include no trusted sources concerning COVID-19 information, the aspect of religious beliefs, and the feeling that the vaccine is ineffective. These insights are visually represented in the chart below:

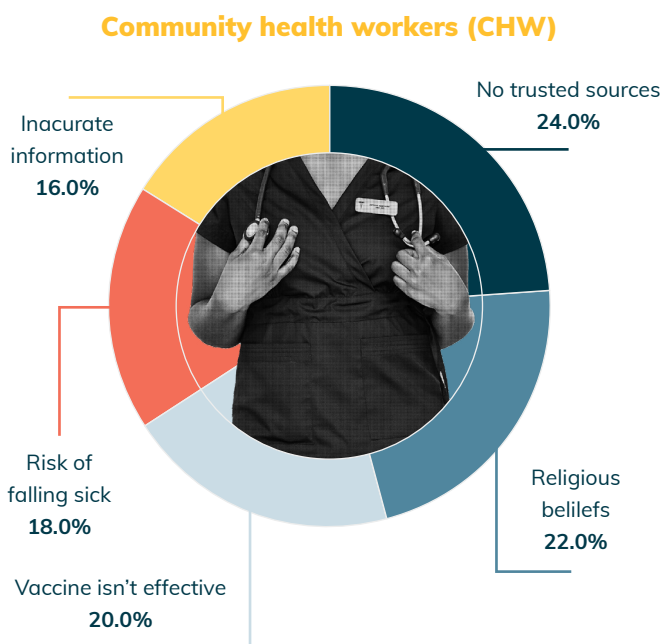


Chart 12, depicting the most influential barriers affecting vaccination intention among community health workers [CHW]

DISCUSSION

This section covers the discussion held with community health workers on some of the barriers that have affected their intention to get vaccinated, as well as the systems that are working for them in facilitating vaccine uptake. They also provide insights into the barriers to vaccine uptake they have encountered when interacting with patients within their health facilities.

Capability

Subtheme: Access to proximal digital channels for accessing vaccine information

Health workers identified several digital tools that are crucial for accessing health information such as the SMARTCare system, which is used for antiretroviral therapy and maternal and child health. This system incorporates features that prompt community health workers to inquire about vaccination status during patient interactions. Messages pop up in the system and serve as reminders for both patients and community health workers to ensure vaccinations are not overlooked during consultations.

The Zambia Information and Communications Technology Authority uses text messaging to deliver crucial vaccination information directly to individuals' phones, ensuring widespread access. Health workers also leverage various online platforms like Facebook, Google, WhatsApp, YouTube, and Instagram to access, share, and discuss health-related information. Through these platforms, they engage in peer-to-peer knowledge sharing, disseminate information to patients about vaccination risks and benefits, and actively participate in community-level awareness campaigns. Health care facilities also make phone calls to remind patients about vaccination appointments and inform them about available vaccines.



After accessing the information, I would also deliver the same information in my church WhatsApp group. We have a WhatsApp group where we send every information that affects us. Through that, people will find out more. So, a lot of people got information on COVID-19 ... what COVID-19 is ... how it comes about and how you need to protect yourself.

- Participant 9, community health worker

Subtheme: Access to proximal non-digital channels for accessing vaccine information

Community health workers used various non-digital methods to educate communities about COVID-19 and promote preventive measures. Drama performances during commemorations were used to sensitize communities, while posters served as visual aids depicting how COVID-19 is acquired and prevented. Presentations and outreach programs conducted in schools, churches, and areas with limited information yielded positive results in awareness raising. Health workers also took advantage of pre scheduled clinic visits to educate patients on COVID-19, particularly those with chronic conditions like hypertension and diabetes. Additionally, community-based volunteers and neighborhood health committees (NHCs) played a crucial role in reaching remote areas by using megaphones to educate residents about the importance of vaccination, which resulted in increased facility turnout. Community health workers also used a public address system to inform community members about upcoming activities and events at the facility.



We also utilize the MCH (Maternal and Child Health) department. There are days when they have antenatal and family planning. So, we utilize those days by letting one health care worker volunteer to give information on COVID-19 to these mothers.

- Participant 5, community health worker

Subtheme: Capacity-building initiatives to improve skills necessary for providing vaccine services

One key way that community health workers promoted COVID-19 vaccine uptake within their facilities was through capacity-building they received during the pandemic. Through morning briefings and orientation sessions, community health workers were equipped with crucial information about the vaccines, their importance, and potential side effects. They were also trained on effective strategies for disseminating accurate information to their peers and communities.

These capacity-building efforts were facilitated by external sources but driven by the health care workers themselves, who took on the responsibility of educating their colleagues. By leveraging their newfound knowledge and understanding, health care workers played a vital role in dispelling misinformation and encouraging vaccine uptake among their peers. Community health care workers also derived knowledge about the vaccines through information, education, and communication materials, which eventually led to increased voluntary vaccine uptake. Refresher courses were also provided periodically, typically in conjunction with vaccination campaigns or when a new vaccine was introduced.



We mostly used to have orientation at our facility and from these meetings, we observed that most of our staff members believed what was circulating on social media platforms instead of reading the books that we have. Yes, so, we used to mostly give each other enough time to read our own notes and books. Thereafter, we would have clinical meetings concerning COVID-19 vaccines.

- Participant 7, community health worker

Opportunity

Subtheme: Travel considerations from homes to health facilities

The community health workers noted that some people encounter challenges in reaching health facilities due to distance, which makes it difficult for them to adhere to the vaccination schedule. As a result, the frequency of health care visits necessary for multiple doses may prove impractical or inconvenient for those residing far from health care facilities. The community health care workers also noted that the distance challenge arose when children were away at boarding schools during the interval between COVID-19 vaccine doses, leading to missed opportunities for vaccination.



I think distance, as well. There are some areas where it is very difficult for people to get to the health facility. I can give an example of people using a pontoon or a canoe for them to move from one point to the other, so it can be difficult for them to follow the immunization schedule.

- Participant 10, community health worker

Subtheme: Frequent relocation

A key challenge identified by community health workers in administering RIs is the frequent relocation and travel of families, which leads to missed opportunities and difficulties in tracking vaccination status across different locations. This results in health facilities not having complete records of a child's immunization history, especially if they have received vaccinations at multiple locations.



So, you find that this mother will maybe come at nine months, and the child has missed all these vaccines because at the time the child was supposed

to get the vaccines, the facility knew that she is in Monze and maybe got the vaccines from there. But when the child is sick and is brought to the facility, you find that the child never got the vaccines when you look at the under-5 card. So, I think they need more knowledge. I don't know whether they need to be followed up in the community.

- Participant 6, community health worker

Subtheme: Social norms related to COVID-19 vaccine uptake in the community

Community health workers noted that community and peer influence played a significant role in COVID-19 vaccination uptake, especially among adolescents. Health workers encountered resistance rooted in various community beliefs and spiritual convictions. These beliefs not only impacted individuals' willingness to receive vaccinations but also influenced their perceptions of vaccine safety and efficacy. The groups that are less likely to visit health facilities for vaccines are men, adolescents, pregnant mothers, children from families with strong religious beliefs, educated individuals, and people living with HIV.



We once had a polio campaign in Shikoswe area where we found parents saying, "You are not giving any vaccines here ... my child has received enough." The other man even came out with a gun saying that he will shoot us.

- Participant 2, community health worker



It is due to spiritual beliefs. There are certain churches that are against accessing health care service. They believe in herbs and prayers.

- Participant 12, community health worker

Motivation

Subtheme: Subjective evaluation of the risks of vaccination relative to the benefits

Respondents also noted that vaccine hesitancy among community health workers can also be attributed to their concerns about the side effects of the vaccines and incidences of postvaccination infection and illness among vaccinated patients and community health workers. From their perspective, the risks of side effects outweighed the potential benefits. One respondent noted that unvaccinated people did not seem to fall sick in contrast to the side effects and postvaccine infections seen in their vaccinated peers. Additionally, specific side effects were seemingly attributable to individual variants of the vaccines; for example, the AstraZeneca vaccine was linked to excess diarrhea and vomiting.

In contrast, some community health workers after engaging with provided IEC (Information, Education, and Communication) materials were directly motivated to take the vaccine due to their concerns about getting infected and spreading the virus to their patients.



I heard from other colleagues we work with who were saying that despite seeing our friends vaccinated, they still got sick from COVID-19, but we are still okay despite not getting vaccinated.

- Participant 9, community health worker



Take AstraZeneca, for example... People used to experience diarrhea and vomiting. Then Johnson & Johnson used to give pain on this part of the body (pointing to the top side of the body) ... and swelling of the face. So, when they see this happening, they would shun away from getting the vaccine.

- Participant 5, community health worker

Subtheme: Impact of vaccine sensitization

Interestingly, some community health workers were encouraged to take up the vaccine by their vaccinated peers who shared information about their experiences. Additionally, facility-led sessions and clinical meetings served as critical opportunities to share vaccine information among community health workers.



So, when someone gets the vaccine, they would say I got the vaccine and nothing has happened. Others would start getting vaccinated after receiving information from the clinic.

- Participant 7, community health worker



We used to have a lot of clinical meetings on COVID-19 vaccinations, and we used to talk to our fellow workers about the benefits of the vaccine.

- Participant 7, community health worker

Subtheme: Limited impact of negative incentives

While respondents noted that the vaccine was mandated for community health workers in the initial periods of the pandemic, the mandates were often seen as coercive and temporary, so they were not effective in encouraging vaccination.



Initially, there was a report that said that all health workers should be vaccinated. So, that looked like it was mandatory... However, with time it was not mandatory.

- Participant 2, community health worker



Comparative behavioral analysis by populations of interest

Key findings from behavioral barriers and enablers of vaccine uptake

The analysis of the strength of insights across various contexts provides a comprehensive understanding of the key barriers influencing vaccination perceptions in four countries. This section focuses on four primary contexts: Uganda, Mali, Zambia, and Tanzania, and evaluates them against four critical barriers: risk of falling sick, lack of information, absence of trusted sources, and side effects. The insights are categorized into three levels: present, strong, and very strong, represented by dots.

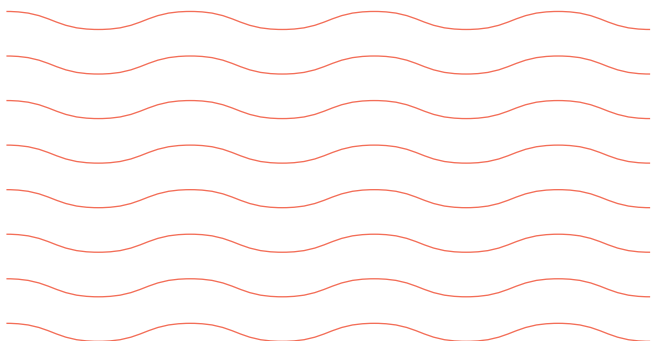




Table 2. Strength on insights across contexts

▶ Present ▶▶▶ Strong ▶▶▶▶▶ Very strong

Context	Risk of falling sick	Lack of information
Uganda	▶▶▶▶	▶▶
Mali	▶▶▶	▶▶▶
Zambia	▶▶▶	▶
Tanzania	▶▶▶	▶▶▶

Context	No trusted sources	Side effects
Uganda	▶	▶▶▶▶▶
Mali	▶▶	
Zambia		▶▶▶▶▶
Tanzania	▶	▶▶▶▶▶

In Uganda and Tanzania, concerns about side effects are very strong, coupled with strong perceptions of the risk of falling sick and moderate to strong lack of information. Mali faces a very strong lack of information and a strong perception of the risk of falling sick. Zambia exhibits a very strong absence of trusted sources and strong concerns about side effects. Efforts in these regions should focus on providing clear, trustworthy information and addressing specific concerns about side effects to enhance vaccine confidence and acceptance.



Respondent group 1: Unvaccinated pregnant people

RANKED BARRIERS

Among unvaccinated pregnant people in the four countries, the most significant barriers to vaccination uptake include the risk of falling sick, lack of information, and fear of side effects. Additionally, the absence of trusted sources and doubts about vaccine effectiveness are notable concerns. These insights are visually represented in the chart below:

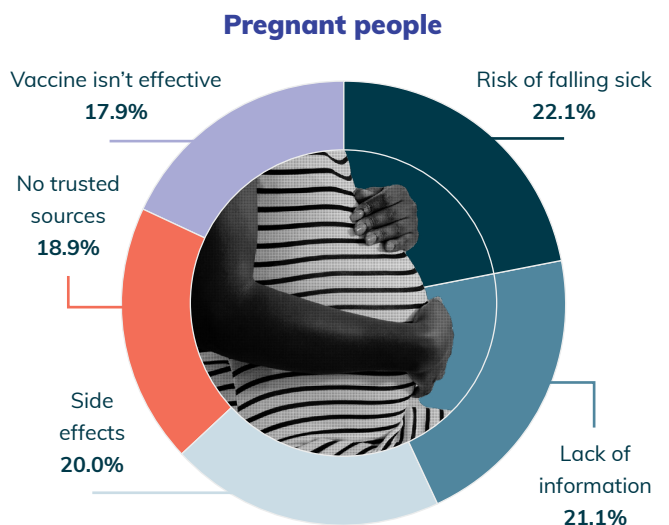


Chart 13, depicting the most influential barriers affecting vaccination intention

By examining these barriers, we better understand the unique concerns and perceptions of unvaccinated pregnant people, which can inform the development of targeted interventions/solutions to address their needs and promote vaccine confidence, ultimately protecting the health and well-being of both mothers and babies.



DISCUSSION

Table 3. *Capability: respondent group 1, unvaccinated pregnant people*

Cognitive bias/insight	Definition	Example in the data
Illusory truth effect	Repeated exposure to misinformation makes people more likely to believe it.	The abundance of information and misinformation circulated through social media and among community members discourages unvaccinated pregnant people across all countries from getting the vaccine, as they often believe the false information.
Authority bias	The tendency to add more weight to the opinions of perceived authority figures.	In Tanzania, authority figures such as members of parliament and renowned footballers have the ability to encourage the public to increase vaccination uptake, as they are perceived as trustworthy figures.
Pessimism bias	The tendency to overestimate the probability/likelihood of the occurrence of a negative outcome while underestimating the likelihood of a positive outcome.	In all countries, information provided by health clinics and community health workers highlights the role of COVID-19 vaccines as a preventative measure. However, misinformation about harmful side effects or fatalities often outweighs the positive aspects, leading the public to avoid the vaccine.
Belief bias	The tendency to evaluate the validity of a claim based on how believable/probable one subjectively finds it.	Vaccine-hesitant health care workers in Tanzania and Uganda believed that the vaccines were developed as a population control mechanism and contain a tracker which is injected into the body's system, leading to a vast number of harmful side effects.
Cognitive overload	Access to too much information or having too many simultaneous tasks causes a reduction in efficiency and effectiveness.	Information comes from a variety of sources including social media, radio, and community or family discussions. However, due to the abundance and diverse nature of this information, individuals often find it challenging to discern what is true or false.
Status quo bias	When someone prefers to do nothing or adhere to a past choice.	Vaccination cards are widespread in Tanzania, documenting all the required vaccines for children. Since the COVID-19 vaccine is not included in the list, parents may not perceive the need for their child to receive the COVID-19 vaccine.





Table 4. Opportunity: respondent group 1, unvaccinated pregnant people

Cognitive bias/insight	Definition	Example in the data
Social conformity	The tendency to align one's belief, attitude, or behaviors with others with whom they identify.	Community and family discussions about personal experience of taking the vaccine and severe side effects hinder individuals from taking the vaccine.
Authority bias	The tendency to add more weight to the opinions of perceived authority figures.	Across all countries, participants reported that they would be more willing to take up vaccines if culturally and socially important figures endorsed the vaccine and indicated information channels that were representative of this authority.
Illusory truth effect	Repeated exposure to misinformation makes people more likely to believe it.	Across all countries, participants noted that they had been repeatedly exposed to misinformation by their social peers and communities through both digital and non-digital means.

Table 5. Motivation: respondent group 1, unvaccinated pregnant people

Cognitive bias/insight	Definition	Example in the data
Loss aversion	The phenomenon where an actual or potential loss is perceived more intensely than equivalent gains.	Individuals, particularly in Uganda, perceive the process of obtaining the vaccine as tiresome, time-consuming, and costly. Many would prefer to forego vaccination than to endure long queues or encounter rude community health workers.
Appeal to nature fallacy	When it is suggested that something is good because it is natural or bad because it is unnatural, there is bias involved.	Unvaccinated pregnant people in Tanzania often opt for natural remedies instead of receiving the vaccine. They believe that these remedies, which have been used for years, are proven effective; they see the vaccine as unnecessary.
Omission bias	The propensity to undervalue the consequences of taking action (commission) even when the consequences of inaction are worse or equal to those of action (omission).	In all countries, participants reported that severe adverse side effects were common among those who had received the COVID-19 vaccine. Many participants reported that they believed these side effects were more likely to occur and be more harmful than simply becoming infected by the COVID-19 virus.
Ambiguity bias	The tendency of people to avoid options or decisions that we consider to be ambiguous or missing.	Uncertainty among individuals in Uganda and Tanzania regarding the COVID-19 vaccine increases as they are unsure about the need for a booster shot. This leads to fears that the vaccine itself may not provide sufficient benefits.
Authority bias	The tendency to add more weight to the opinions of perceived authority figures.	Community health workers and clinics conduct informational sessions about vaccines, which are generally perceived as trustworthy. As a result, some individuals recognize the potential benefits of receiving the vaccine.



Respondent group 2: Unvaccinated adults

RANKED BARRIERS

Among unvaccinated adults, significant barriers to vaccination uptake include the risk of falling sick, fear of side effects, and lack of trusted sources. Additional concerns are the lack of information and doubts about vaccine effectiveness. These insights are visually represented in the chart below:

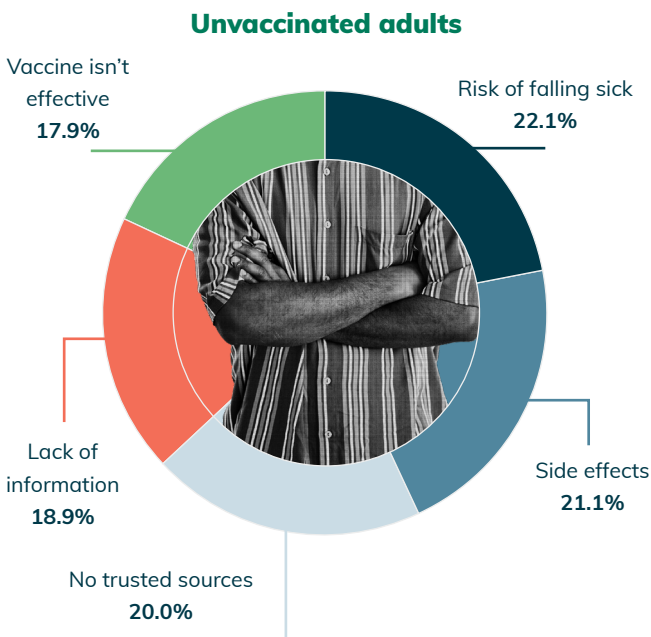


Chart 14, depicting the most influential barriers affecting vaccination intention amongst unvaccinated adults

By examining these barriers, we can better understand the concerns and perceptions of unvaccinated adults and inform the development of targeted interventions to address their needs and promote vaccine confidence.

DISCUSSION

This section focuses on the specific cognitive biases identified across the different countries for unvaccinated adults. These biases have shaped how participants have viewed the vaccine.

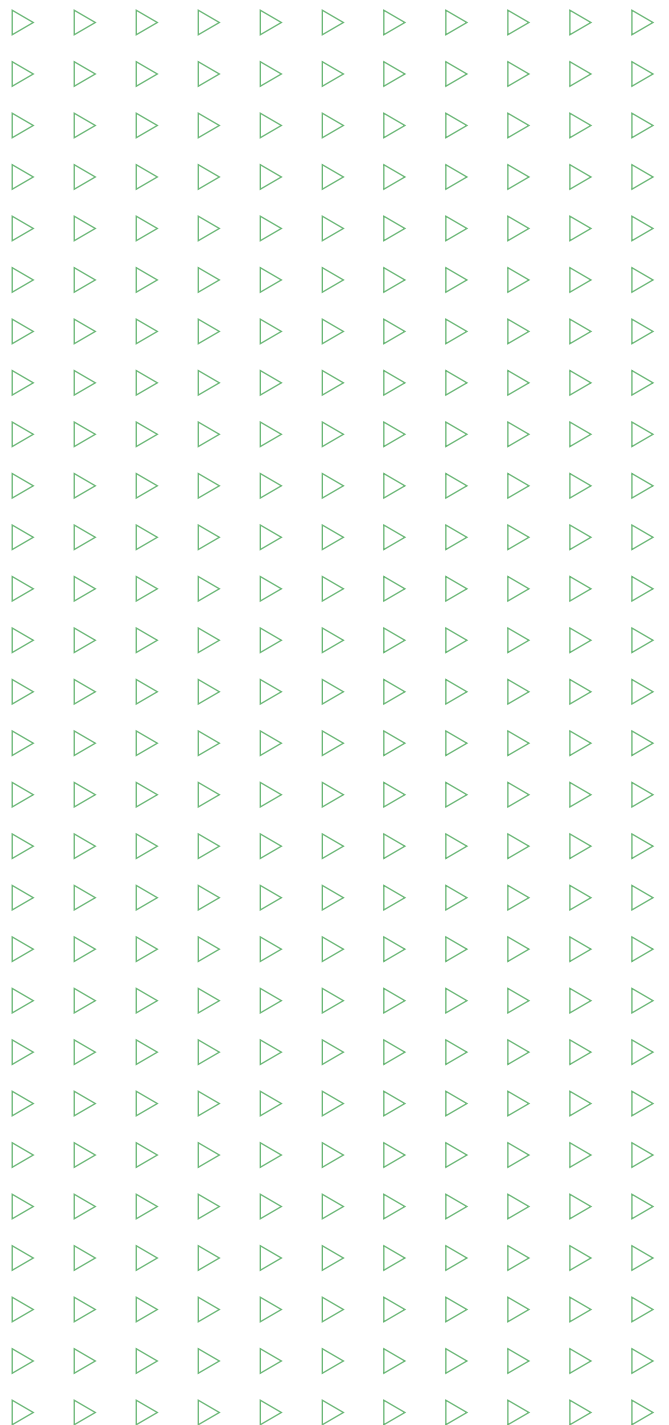




Table 6. Capability: respondent group 2, unvaccinated adults

Cognitive bias/insight	Definition	Example in the data
Illusory truth effect	Repeated exposure to misinformation makes people more likely to believe it.	Participants reported repeated exposure to misinformation and a confusing information ecosystem that mixed truth and myth.
Anchoring effect	The tendency to rely on the first piece of information exposed when making decisions.	Across all countries, unvaccinated adults have been significantly influenced by misinformation, both offline and online, regarding the safety, efficacy, and potential side effects of vaccines. This misinformation has anchored their decision to refrain from taking up the vaccines.
Authority bias	The tendency to add more weight to the opinions of perceived authority figures.	Across all countries, several influential figures of authority such as religious leaders, health workers, and local leaders are trusted in disseminating COVID-19 vaccine information.
Negativity bias	Tendency of individuals to pay more attention to negative information than positive information.	In all countries, unvaccinated adults predominantly focused on the negative aspects of the vaccine, including its development process, the motives behind the vaccine, and the reported adverse side effects.

Table 7. Opportunity: respondent group 2, unvaccinated adults

Cognitive bias/insight	Definition	Example in the data
Belief bias	The tendency to evaluate the validity of a claim based on how believable/probable one subjectively finds it.	Unvaccinated adults expressed frustration with medical professionals who discourage traditional remedies, leading to further reluctance to vaccinating children. This conflict in beliefs also occurs within households where one parent advocates for immunization while the other adheres to traditional healing practices, creating further barriers to vaccination.
Social influence	The process by which individuals' thoughts, feelings, or behaviors are affected by the presence or actions of others.	In two of the countries of study, unvaccinated adults are notably influenced in their decision-making process by family members, particularly spouses and parents, who express concerns about potential negative outcomes of vaccination. The external influence of their family members' worries about adverse effects of COVID-19 vaccines shapes their own vaccination decisions.
Illusory truth effect	Repeated exposure to misinformation makes people more likely to believe it.	Across all countries, participants noted that they had been repeatedly exposed to misinformation by their social peers and communities through both digital and non-digital means.



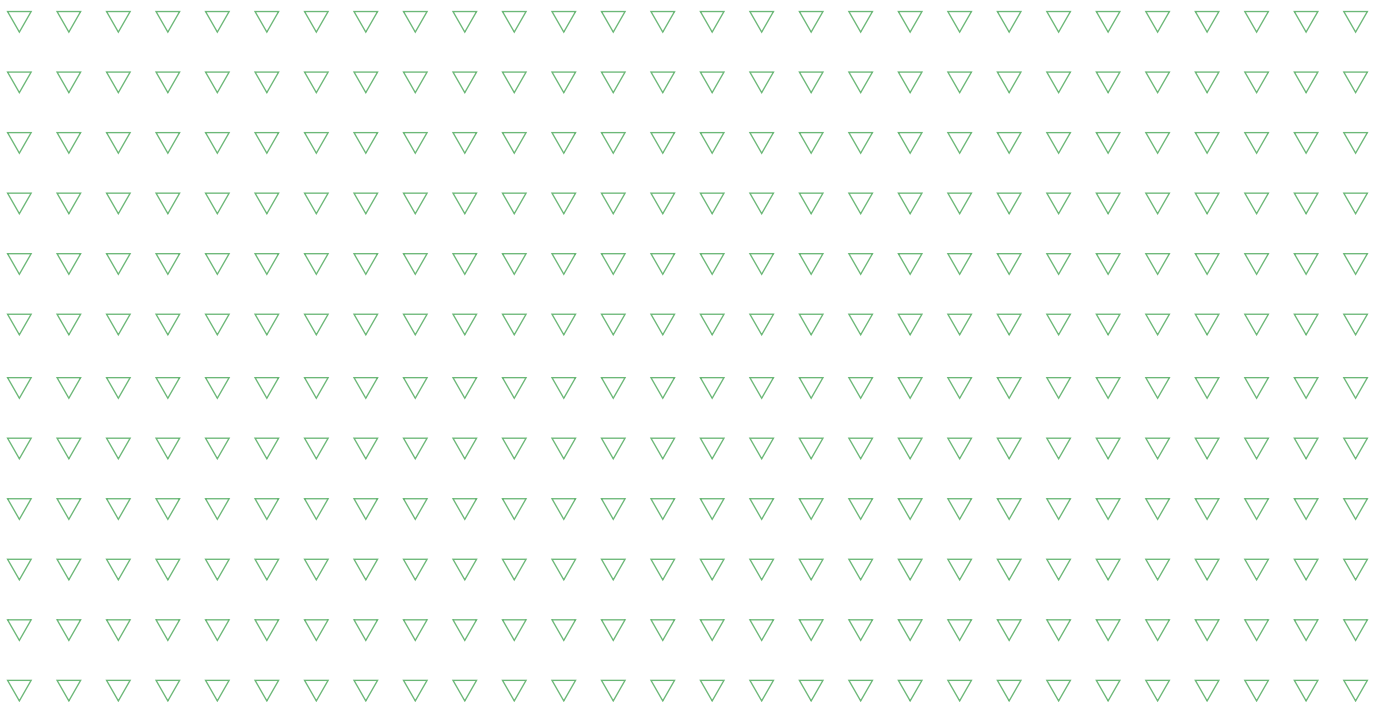
Table 8. Motivation: respondent group 2, unvaccinated adults

Cognitive bias/insight	Definition	Example in the data
Omission bias	The propensity to undervalue the consequences of taking action (commission) even when the consequences of inaction are worse or equal to those of action (omission).	In all countries, reports of adverse reactions, such as headaches and weakness, further fueled hesitancy. Despite some acknowledging the vaccines' authenticity, reports of post vaccination illness, such as pain at the injection site or experiencing fever and headaches, were common concerns that added to skepticism.
Loss aversion	The phenomenon where an actual or potential loss is perceived more intensely than equivalent gains.	In Zambia, unvaccinated adults expressed concerns that widespread vaccine side effects could result in decreased productivity and increased economic strain on both communities and the entire country. This perception of potential loss significantly influenced their decision not to take up the vaccine.
Anchoring effect	The tendency to rely on the first piece of information one is exposed to when making decisions.	Across all countries, unvaccinated adults have been significantly influenced by misinformation, both offline and online, regarding the safety, efficacy, and potential side effects of vaccines. This misinformation has anchored their decision to refrain from taking up the vaccines.
Belief bias	The tendency to evaluate the validity of a claim based on how believable/probable one subjectively finds it.	Evidence from various countries indicates a persistent shared belief in inaccurate information regarding vaccine development and safety. Many individuals remain unconvinced about the effectiveness of the vaccine and concentrate only on adverse side effects and conspiracies.
Cognitive dissonance	The mental discomfort brought on by having two or more beliefs, attitudes, and values that directly contradict each other.	While some of the unvaccinated adults in Mali were aware of the benefits of the COVID-19 vaccine, they also harbored concerns, such as fears about side effects and doubts about efficacy. These deterred them from getting vaccinated.
Authority bias	The tendency to add more weight to the opinions of perceived authority figures.	In Uganda, cultural beliefs influenced vaccine decision-making, with some families rejecting immunization based on their traditional healer's guidance.
Ambiguity aversion	The tendency of people to avoid options or decisions that we consider to be ambiguous or missing.	In Tanzania and Zambia, unvaccinated adults noted that confusion was widespread; individuals were getting different information and they could not determine whether it was true or false, particularly in rural areas where access to accurate information is limited. Due to the conflicting information, the decision-making process was complicated, leaving individuals uncertain of whether they would like to get vaccinated.



Table 8. Motivation: respondent group 2, unvaccinated adults

Cognitive bias/insight	Definition	Example in the data
Pessimism bias	The tendency to overestimate the probability/likelihood of the occurrence of a negative outcome while underestimating the likelihood of a positive outcome.	Across all countries, one hindrance to getting the vaccine was the prevalent negative experience associated with side-effects. These were described in stories about blood clots and partial paralysis.
Illusory truth effect	Repeated exposure to misinformation makes people more likely to believe it.	In Uganda and Tanzania, unvaccinated adults justified their decisions not to take up the vaccines because of the preconceived notion that they were linked to malnutrition, birth defects, and hormonal imbalances in children.
Confirmation bias	The tendency to only seek information that confirms initial judgments or conclusions ignoring information against them.	In Uganda, a few unvaccinated adults were inclined to prioritize traditional remedies over medical advice, given their cultural beliefs, as they felt that doctors were not adequately educating them on COVID-19 vaccines.

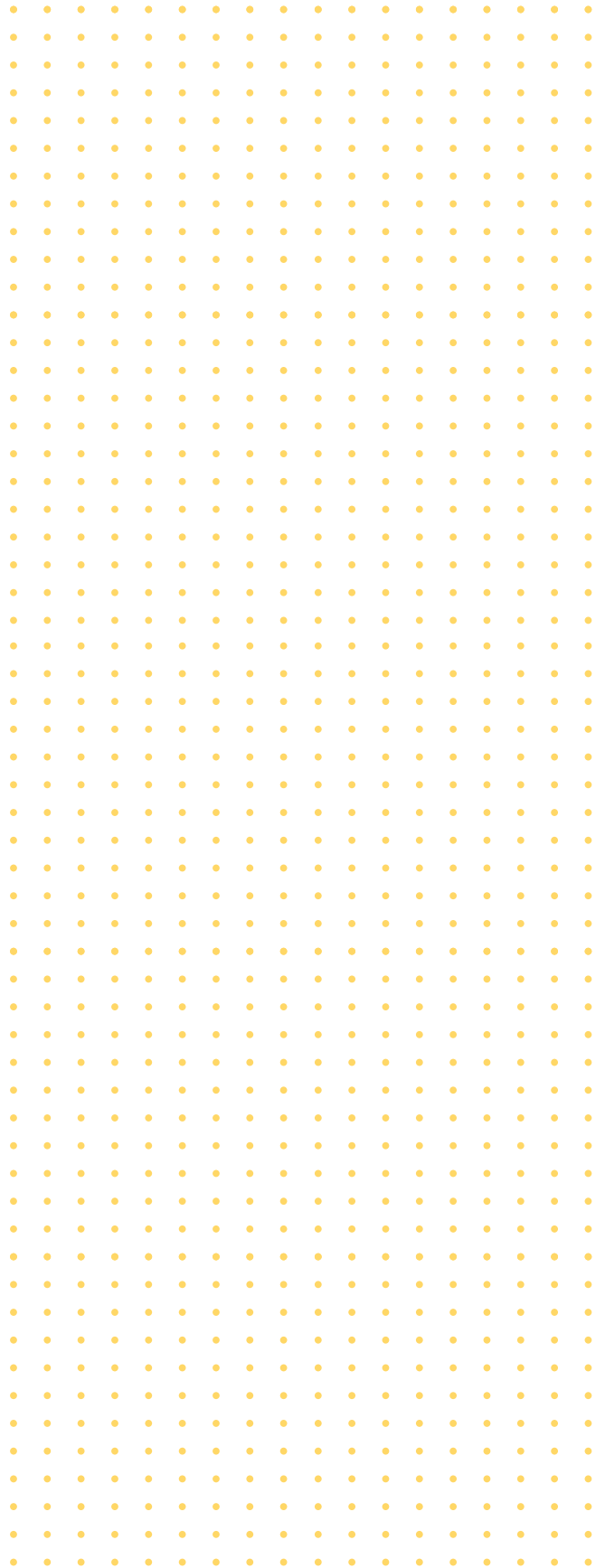




Respondent group 3: Community health workers

RANKED BARRIERS

Community health workers play a vital role in promoting vaccine uptake and improving public health outcomes in their communities. However, various barriers can hinder their efforts to encourage vaccination. This section highlights the most significant obstacles that community health workers face in promoting vaccine uptake, as identified by the respondents in the study and visually represented in the chart below:



Community health workers (CHW)

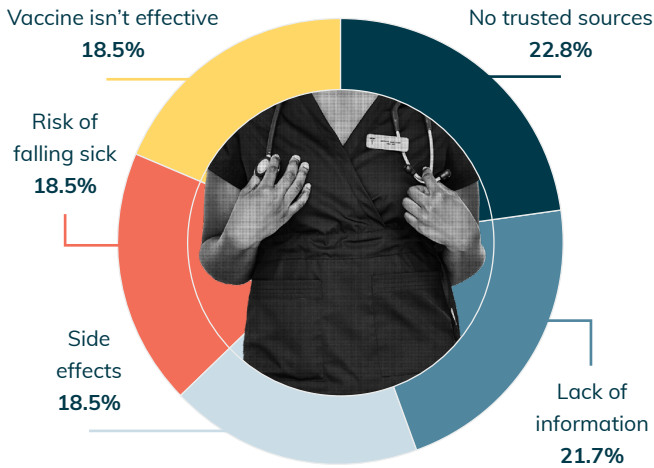


Chart 15, depicting the most influential barriers affecting vaccination intention among community health workers [CHW]

Understanding these barriers is crucial for developing effective strategies to address them and empower community health workers to promote vaccine uptake and improve public health.



DISCUSSION

Table 9. Capability: respondent group 3, community health workers

Cognitive bias/insight	Definition	Example in the data
Ambiguity bias	The tendency of people to avoid options or decisions that we consider to be ambiguous or missing.	Across all countries, vaccine-hesitant health care workers were mistrustful of the quality control measures taken for the COVID-19 vaccine due to uncertainty about its expedited development and roll-out. In Tanzania, this uncertainty was also related to the effects of the vaccine.
Anchoring effect	The tendency to rely on the first piece of information one is exposed to when making decisions.	In Uganda, vaccine-hesitant health care workers were reportedly anchored on preexisting local conspiratory beliefs about the underlying motivations of internationally sourced vaccines.
Cognitive dissonance	The mental discomfort brought on by having two or more beliefs, attitudes, and values that directly contradict each other.	While health care workers were trained on the benefits of the COVID-19 vaccines, this knowledge was at odds with their beliefs/concerns about the safety and effectiveness of the vaccines. This confusion arose from exposure to vaccine misinformation among vaccine-hesitant health care workers in Uganda and Tanzania.
Belief bias	The tendency to evaluate the validity of a claim based on how believable/probable one subjectively finds it.	Vaccine-hesitant health care workers in Tanzania and Zambia believed that the vaccines were developed for profit-motivated reasons, that they contain harmful substances, and that they cause a variety of side effects.

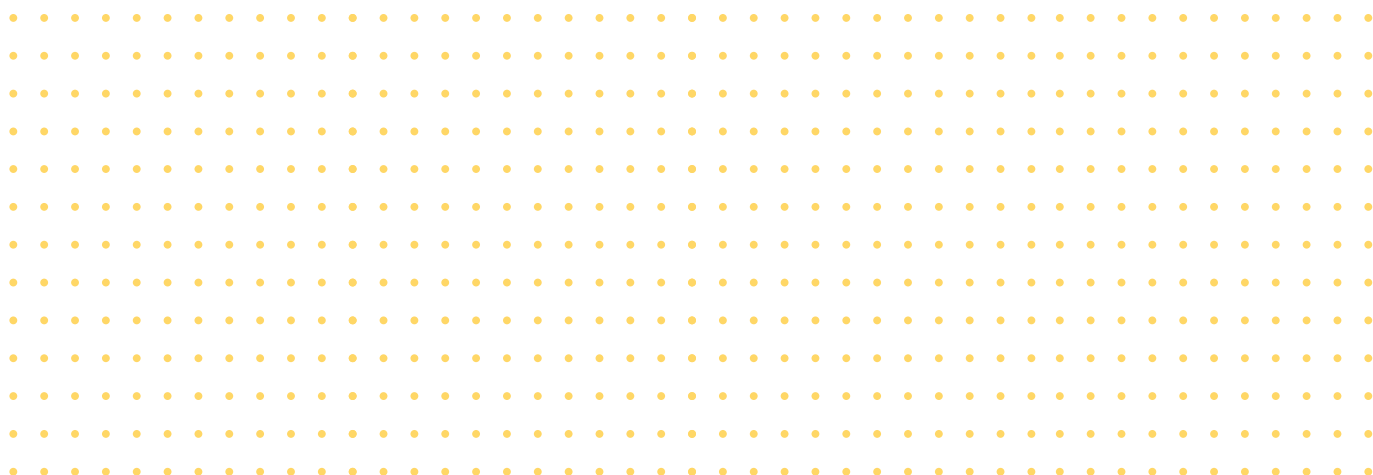




Table 10. Opportunity: respondent group 3, community health workers

Cognitive bias/insight	Definition	Example in the data
Authority bias	The tendency to add more weight to the opinions of perceived authority figures.	In Tanzania, vaccine-hesitant health care workers were actively discouraged from taking up the vaccine by local community and religious leaders. Across all countries, community members were discouraged from taking up vaccine services due to the opinions of these authority figures.
Cognitive overload	Access to too much information or having too many simultaneous tasks causes a reduction in efficiency and effectiveness.	Due to multiple responsibilities across different departments, insufficient staffing, and extensive paperwork, health care workers experienced work-related stress and burnout that affected their ability to support vaccine outreach and in-facility service provision.
Illusory truth effect	Repeated exposure to misinformation makes people more likely to believe it.	In all countries, health care workers reported that locally held beliefs about vaccines—repeated through social networks and communities—directly impact the credibility of these beliefs (and misinformation) and affect the motivation of their peers to get vaccinated/encourage vaccine uptake.
Social conformity	The tendency to align one’s belief, attitude, or behaviors with others with whom they identify.	Peer conversations and clinical briefings served to encourage the uptake of vaccine services among vaccine-hesitant health care workers in Zambia.

Table 11. Motivation: respondent group 3, community health workers

Cognitive bias/insight	Definition	Example in the data
Psychological reactance	Discomfort felt as a result of rules, regulations, and mandates that are seen as threats to individual decision-making freedoms.	Zambian vaccine-hesitant health care workers felt discomfort and resisted the vaccination mandates, as they believed they were coercive.
Authority bias	The tendency to add more weight to the opinions of perceived authority figures.	Vaccine-hesitant health care workers were motivated to take up the vaccines after observing local leaders (Uganda) and supervisors (Tanzania).
Pessimism bias	The tendency to overestimate the probability/likelihood of the occurrence of a negative outcome while underestimating the likelihood of a positive outcome.	In all countries, information regarding vaccine-hesitant health care workers suggested that they felt that they were very likely to experience the moderate-to-severe side effects of vaccination and were not motivated to take the vaccine. This was greater than their perceived likelihood of not experiencing these symptoms.
Loss aversion bias	The phenomenon where an actual or potential loss is perceived more intensely than equivalent gains.	In Uganda and Tanzania, health care workers were averse to the potential loss of income and employment as a result of nonadherence to governmental vaccine mandates. Across all countries, health care workers were also motivated due to aversion to spreading the disease to their patients.



DIGITAL RESULTS IMPROVE VACCINE EQUITY AND DEMAND (DRIVE DEMAND)

Behavioral insights from a multicountry qualitative study on vaccine intention



 Busara  PATH  digital square  Supported by The Rockefeller Foundation