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Covid-19: Lessons from the pandemic in sub-Saharan Africa relevant to the WHO IA2030 vaccination agenda

Abstract

While the global need to promote vaccination against viral illnesses is recognized, there are fundamental reasons for the failure of many programs. The World Health Organization has emphasized that the causes of low vaccine use must be understood and addressed in order to increase people's demand for immunization services, and such understanding is central to promoting vaccine acceptance, as called for in the current WHO IA2030 initiative.

Immunization programs remain fundamental to both pandemic preparedness and robust health systems. But, to achieve the goals of IA2030 requires improved targeting and reach to protect against viral illness and other global pathogens, hence the need for creative and innovative community engagement to increase vaccine uptake, and the relevance of learning from past pandemics.

In sub-Saharan Africa, important lessons were learned during the Covid-19 pandemic; many of these are now broadly applicable to enhance current programs to promote vaccine acceptance such as the WHO IA2030 initiative. Strategies that helped increase vaccine uptake in Africa included six approaches to health promotion called for by the 2017 Lancet Commission on the future of health in sub-Saharan Africa. (Adoption of a community empowerment approach; Use of inclusive, people-centered strategies; Provision of innovative education; Creation of novel and improved tools; Training personnel to be mindful of, and responsive to, local needs; and Endorsement of non-traditional avenues to engage and inform).

This commentary describes the principles underlying these six approaches, and summarizes ways in which their use contributed to programs working to increase vaccine uptake in sub-Saharan Africa that are applicable in a global context.

Keywords: health literacy, public health, vaccine hesitancy, WHO health promoting schools

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Abbreviations: EE, education entertainment; HPS, health promoting schools; IA2030, WHO immunization agenda 2030; NCDs, non-communicable diseases; WHO, world health organization

Introduction

"If you know the enemy and know yourself, you need not fear the result of a hundred battles. If you know yourself but not the enemy, for every victory gained you will also suffer a defeat. If you know neither the enemy nor yourself, you will succumb in every battle." Sun Tsu.[1]

The World Health Organization's current immunization agenda (IA2030) is intended to inspire action around the world that maximizes the lifesaving impact of vaccines. The ambitious global objective is to "create a world where everyone, everywhere, at every age fully benefits from vaccines."[2]

While the story of vaccination to combat viral illness is one of overall success with increasing numbers of infants vaccinated worldwide, millions of lives saved, major innovation in vaccine development and wider adoption and improved distribution of vaccines, important challenges remain.[3] Worldwide, vaccine inequity prevails; many populations have poor access or limited supplies; millions of infants do not receive a full course of basic immunizations or are 'zero dose' children who get no vaccines at all, and large numbers are missing out on newer vaccines. Immunization programs are known to be fundamental to both pandemic preparedness and robust health systems.[3] But the prevalence of complacency, hesitancy and resistance obstructs progress and risks undermining past success, as well as leaving millions of children worldwide vulnerable to preventable viral illnesses, especially measles.

While this latest WHO call meets a recognized need to promote vaccination, there are fundamental reasons for the failure of many past programs. So, will the core principles advocated by WHO for this strategy to be people centred, country owned, partner based and data guided actually realize the stated goal of saving 50 million lives over the next decade?

Obviously, the public health community will hope so. But, as the words of Sun Tsu remind us,[1] for there to be success in this 'battle,' there is a fundamental need to understand both 'the enemy' (the world at large where change is needed), and 'ourselves' (the governments and agencies seeking to bring change about). And, the WHO has emphasized that the causes of low vaccine use must be understood and addressed in order to increase people's demand for immunization services.

In this context there are valuable lessons to be learned from past efforts to promote vaccination, including those hard won during the Covid-19 pandemic.[4–6] Covid-19 vaccines were an important product of modern science that clearly offered high protection against severe

illness and death from the virus.[3] But in sub-Saharan Africa a variety of often country-specific logistic, administrative and socially determined factors combined to compound challenges related to vaccine supply and access; vaccination rates were very low initially, and by December 2022 only nine of 52 African countries were predicted to reach vaccination rates in the range of 72% - 97%,[7] In countries that achieved the best overall vaccination rates, in addition to working to provide adequate, predictable supplies of vaccine, improve access to health services and impact remediable social determinants of health, effective campaigns identified other key factors that were barriers to vaccination, learned valuable lessons, and understood the need to adapt their approaches.

This review outlines these factors and summarizes remedial approaches adopted that are applicable to advancing the global agenda that WHO has called for in the IA2030 initiative.[2]

Factors and approaches that impacted vaccine resistance

During the Covid-19 pandemic in sub-Saharan Africa there were fundamental reasons for the failure of strategies to combat the virus in many countries. Vaccine supply problems, distribution inequities, vaccine hesitancy, resistance, misinformation and ignorance were the predominant factors that collectively impacted vaccination.[8–10] Hence, it was recognized that better understanding of the unique demographic and social factors predicating reluctance to be vaccinated that existed in specific sub-populations was required, and clarity regarding what knowledge, attitudes and behaviors existed among the large unvaccinated segments of the population in individual African countries.[6]

Fundamental to this was the gathering of information on what different sectors of the population saw as compelling reasons for and against their coming forward to be vaccinated, and finding ways to provide clear, respectful counter arguments that had 'relevance and resonance' for those who were undecided, misinformed, or lacking the necessary information. Innovative strategies and novel approaches had to be sought to counter misinformation, mistrust and complacency. But, in addition, 'soul searching' by those in government and public health proved to be essential to remediate insensitivity and reliance on 'top-down' directives, and lead to the adoption of strategies based on dialogue and mutual respect, so as to build trust and engage the at risk population. In this context, research identified the importance of individual countries identifying the fundamental issues underlying reluctance, and developing country-specific and culturally relevant strategies to counter unwillingness to accept vaccination.[3,11] Such data and the people-centred, country-owned, partner-based principles of IA 2030 emphasize this as a key component of how we as public health providers can contribute to the WHO initiative.

In spite of the WHO identifying vaccine hesitancy as a major threat to global health,[12] this was not the principal reason for sub-optimal vaccination coverage in sub-Saharan Africa,[13] because adequate supplies of vaccine and the ready access to vaccination required to meet the conventional definition of hesitancy were lacking, except in some urban locations.[4,14]

The Africa Centres for Disease Control set up the Africa Task Force for Coronavirus which coordinated efforts to address these issues. Multiple other key initiatives were also implemented; overall it was learned that future public health self-reliance in Africa requires investment; particularly capacity building to strengthen regional control and capability and acceleration of translational research to counter the current dependence on imported vaccines.[15]

But, during the pandemic, a broad understanding of the concept of vaccine hesitancy proved important, and acted as a driver in Africa for strategies now relevant the context of IA 2030. Historically, the term was coined looking at the issue of uptake of vaccines in general, and correctly identified that hesitancy to be vaccinated is a complex and context specific issue that varies across time and place and the vaccine(s) involved, with traits of 'complacency', 'convenience' and 'confidence' influencing hesitancy behavior. The 'Vaccine Hesitancy Determinants Matrix' compiled based on these traits remains relevant when considering low uptake of vaccines.[14] But, one caveat applies; the term 'convenience' is problematic in Africa and other low and middle income countries where social determinants of health have a significant impact on vaccine uptake.[16]

As Marmot et al emphasize in this context, "the gross inequalities in health that we see within and between countries present a challenge to the world."[17] A burgeoning volume of research identifies social factors at the root of much of these inequalities in health. Social determinants are relevant to communicable and non-communicable disease alike, and because they are integral impediments to vaccination campaigns, are also areas of necessary focus for remedial action.

While improvements to social infrastructure and standards of living are needed ultimately, 'health equity through action' as advocated by WHO,[18] and 'innovative interventions' that promote evidence-based knowledge, health-related skills and positive health behaviors are a logical way to approach socially driven public health challenges including vaccine hesitancy.[3,6,19]

The Lancet Commission on the future of health in sub-Saharan Africa similarly advocates for 'innovation to empower people to take control of their lives.'[20] Evidence from successful sub- Saharan Covid vaccination programs echoes the benefits of this approach, and emphasizes that conscious 'task shifting' is required. To be effective, governments, agencies, teams and individuals involved in public health endeavour must transition away from conventionally relied on forms of health informatics and focus instead on process that generates greater public engagement and the promotion of health literacy, while in parallel, working to improve access to essential health services.

'Task shifting' strategies applicable to advancing the WHO IA2030 agenda include those advocated by the Lancet Commission on the future of health in sub-Saharan Africa as a pathway to achieving longer and healthier lives for all Africans.[20] These can be summarized as follows:[5,21]

1. Taking a 'community empowerment approach'
2. Adopting 'people-centered strategies'
3. Creating 'innovative education'
4. Developing 'novel and improved tools'
5. Training personnel to 'respond to local needs'
6. Using 'non-traditional' avenues and outlets

Community empowerment

Community empowerment effectively engages all sections of society and involves stakeholders in sub-populations at particular risk, or who have specific concerns.[11,22] Effective community engagement is a powerful tool to increase awareness of the impact of viral illness and minimize vaccine hesitancy;[8,10] WHO communiques and reviews on the determinants of vaccine hesitancy emphasize the need to establish greater trust, improve communication, and reduce misinformation and rumour.[11,18]

Unique factors often exist that are of potential value for empowering individual communities; barriers to vaccination and potentially enabling elements both need to be sought, heard and included in constructive dialogue if people are to be 'won over' by vaccination programs.[23] Fear about the safety of Covid-19 vaccines was commonplace in Africa;[20,24] in Uganda for example fear was widespread that male impotence or female infertility resulted from one particular vaccine; this misinformation severely hampered uptake and support for vaccination even among healthcare providers; another vaccine available subsequently was free of this false association and hence proved more acceptable to many. WHO data and other reviews that provide summaries of the scientific evidence on vaccine safety are important resources to counter public concerns; the information they contain should be widely utilized in ways that enable communities to be educated and informed.[12]

Second order ramifications of factors such as malnutrition, lack of education and gender-related violence impacted many communities.[22] As did large refugee populations and significant levels of poverty as both scenarios were already known to increase vulnerability to vaccine preventable viral illnesses. Hence, promoting vaccine uptake required, special, often community-specific efforts. Identifying individuals who could 'champion' vaccination proved valuable; folk of all kinds are suited to this role; to be successful just requires energy, industry and commitment,[11,25] so suitable candidates can be identified in most communities.

Healthcare workers' attitudes have a key influence on vaccine decisions in the community.[24] This was a problem in Africa, with a 25 country survey by WHO identifying that at the height of the pandemic only 27% of health workers had been fully vaccinated compared to 80% in 22 high income countries,[26] in spite of this group being at high risk of exposure.[8] It is important therefore, that the healthcare community is engaged and supported effectively, particularly with regard to the sharing of up to date evidence-based data on vaccines, and individuals are seen to take advantage of vaccination themselves.[12]

It has been said: "Strategies to build vaccine literacy and acceptance should directly address community-specific concerns or misconceptions;"[11] and "Community engagement will become the single most powerful mechanism to successfully combat any vaccine hesitancy and resistance."[10]

People-centered strategies

Inclusive, people-centred strategies counter low public confidence by offering opportunities for dialogue that helps build trust and allow misinformation to be countered.[4,27] Trust and belief underpin compliance with health promotion initiatives, and are intrinsic yet modifiable components of vaccine uptake.[11,23]

The internet and social media are increasingly used to source information in Africa, as elsewhere. During Covid a major challenge was that reliable information was obscured by negative opinion and misinformation which spread rapidly, becoming a serious threat to public health; as Larson states in the context of vaccines, "misinformation is as dangerous as the disease itself."[28] So ways must somehow be found to enable the large numbers of people who seek information via social media to come to understand that viral illnesses are dangerous, and why vaccination is relevant to them individually, as members of a family, and part of a larger community.[2,29]

Discussions in 2019 between the WHO and Facebook (now Meta) led to a pledge by the tech giant to ensure users can separate fact from fiction across its platforms; also, that users would be directed to reliable WHO sourced information provided in several languages. But issues with on-line searches remain; a significant proportion of the most viewed videos on vaccination on YouTube contradict WHO information, and the majority are negative. Sadly, recent global measles epidemics underscore how much misinformation still negatively impacts people;[30] many parents chose not to vaccinate their children based on incorrect on-line information; consequently, large numbers of children died, with deaths predominantly occurring in low and middle income countries, and involving younger age groups; some families lost all their children.

Complexity surrounds why people refuse vaccines, hence "credible and culturally informed health communication is vital in influencing positive health behaviors."[11] Training in how to communicate effectively with people in different sections of society is beneficial. All those involved in education on viral illness and the importance of vaccination need both the information required and the tools necessary to discuss the pros and cons of vaccination. Learning how to address perceptions on vaccine safety using an open and non-judgmental approach is particularly important;[9] training involving standardized patient simulation encounters and role playing provides skills in how to counter misinformation and respond to argument.[31] Similarly, sharing information is most effective when done in a people-centred way that respects the culture and roots of the audience, and uses appropriate language and wording chosen to make the content understandable.[6,23]

Innovative education

Innovative education helps remedy inequitable knowledge distribution and offers ways to promote understanding.[5] A systematic review of Covid-19 vaccine acceptance rates showed large variability across 33 countries;[33] some of the lowest rates were in Africa, and those with the most knowledge and greatest understanding appeared most likely to comply with health authority advisories on vaccination. The key in Africa was to establish what gaps and controversies existed, and then use potential enablers as the basis for innovative educational solutions that created health promotion messages tailored to address specific issues which resonated with affected sub- populations.[11,33]

In Africa, young people make up a disproportionally high percentage of the population and have growing influence in society, hence the importance of contributions this age group can make to reducing vaccine resistance in society as a whole.

The WHO's 'Health Promoting School' (HPS) model is a proven way to involve and inform young people.[34,35] Encouraging children to adopt healthy lifestyle habits is a central objective, but the ultimate goal is to establish 'health literacy' through learning experiences initiated in the schools."[36,37] WHO estimates that schools have the potential to impact the health of more than 1 billion children worldwide, and research indicates that positive attitudes of living established early in life translate into adult life.[38] Importantly, effective HPS programs impact the broader community. While individual children in the schools obviously benefit, knowledge and practices introduced at school also 'trickle down' and are shared by siblings and parents, so that health related information, attitudes and practices become assimilated by a wider audience.[37,39]

The lack of Africa-centric data during the pandemic constrained efforts to educate; pertinent locally acquired data should be sourced and shared where ever possible as most people find such facts more compelling than data from populations elsewhere. Similarly, inquiry to find out what facts and health messaging are most likely to resonate with a particular sub-group of the population has merit;[24] the findings can form the basis of innovative content and identify optimal modes of

delivery. This approach was used to establish how African youth could be engaged to adopt healthcare practices with the potential to prevent their offspring developing non-communicable diseases (NCDs) like type 2 diabetes in adult life.[40]

To build vaccination trust among the general public "the spread of timely and clear messages through trusted channels" is recommended.[32]

Novel and improved tools

Novel and improved tools are important ways to build vaccine literacy, and often evolve in response to local need; they can be creative iterations of established concepts, or involve original material or unconventional roles for individuals or agencies;[5,27] simple tools can also help allay injection induced anxiety and the fear of pain that deter many from being vaccinated.[6,41]

Resistance to vaccination against Covid in Africa in part followed the recent global surge in opposition during outbreaks of measles and other viral diseases.[42] So, to be persuasive, public health caregivers needed to be creative, and present the rationale for immunization in novel and unconventional ways.

It was commonplace to see Presidents and Prime Ministers being vaccinated against Covid to endorse vaccination and even infer vaccine safety. However, where mistrust in authority exists, the example set by other personalities can have more impact. "Engaging formal and informal opinion leaders within these communities will be key."[11] The appeal of celebrity in Africa is considerable,[24,33] endorsements by Olympic gold medalists, broadcasters and recording artists for various causes are common, so there was merit to having individuals commanding respect speak to vaccination also.

Issues of access to vaccination and adequacy of vaccine supplies will be central to achieving the goals of IA2030. In Africa supply shortages were compounded by lack of ready access to vaccination centres;[11,24] some countries employed novel use of non-traditional outlets like pharmacies; pharmacists and teachers in school-based programs have proved able to improve malaria management by increasing access to rapid diagnostic testing and treatment.[43,44] In Chad, a novel strategy among mobile pastoralist communities combined programs for human and animal vaccination to increase vaccine uptake.[45]

Rural village health teams have great potential in vaccination campaigns; in Africa they were uniquely placed to improve engagement over vaccination as they are trusted members of many communities.[24,46]

Injection fears contributed to Covid vaccine hesitancy; fear of needles was not a frequently voiced concern among Africans, but likely did deter some from being vaccinated. A variety of novel approaches and tools proved helpful in alleviating injection induced anxiety; these ranged from hand holding combined with words of reassurance to the use of simple devices using vibration to counter the pain of injection.[5,47]

Any technology or techniques that can make being vaccinated more acceptable, or would make mass administration of vaccines more efficient warrants consideration. Cryodesiccation (freeze drying) allows vaccines to be given using a brief jet of air under high pressure rather than a needle, and having more vaccines available in freeze dried forms would also make storage and distribution easier.[6]

Training personnel to 'respond to local needs'

Training personnel to be mindful and responsive to local needs includes how to listen to the concerns people raise, as well how to respond.[20] Countering mistrust of government sources and authoritarian agencies was necessary in Africa. Empowering women also added inclusivity and expanded the number of people who benefited from vaccination.[6] However, sometimes initiatives that focus specifically on men are helpful to strengthen male participation and increase their support of women's decision making. Practical lessons in this regard were learned in Africa by programs providing mothers with prophylaxis to prevent HIV transmission to their unborn children, as husbands had to be motivated to give permission for the maternal testing required for fetal prophylaxis.[48]

Mistrust undoubtedly prevented accurate appraisal of the benefits of vaccination in many African countries. Similarly, strong reliance on traditional medicines and locally advocated therapies against Covid 19 was evident initially (even though the latter were unproven and expensive). But attitudes did change as personnel learned to respond effectively to local concerns and misconceptions. When evidence of vaccine efficacy was understood and it became clear that unvaccinated people reliant on local therapies were suffering more than others, more people came forward seeking vaccination.

Wherever there is widespread reliance on traditional medicines, or a distrust of 'Western' medicine it is prudent to train personnel to engage with traditional healers. Also, religious beliefs and trust in religious leaders have always been an important factor influencing vaccine uptake in Africa.[24] In Zimbabwe, the rise and spread of measles outbreaks in 2009-2010 were linked to negative teachings on vaccination among church groups, and there were parallels in many countries over Covid.[49]

Members of religious communities can lack freedom of choice, and feel at risk of sanctions if they voice opinion over vaccines or make independent choices over vaccination. However, the counterpoint is that where church leaders can be identified who are amenable to learning how to contribute affirmative public health messaging, training individuals such as these and leaders from other respected sectors of society can definitely have a positive impact through what they teach. Hence the relevance of training personnel how to engage, inform and support credible individuals.[11]

Non-traditional avenues and outlets

Non-traditional avenues that engage and inform can be valuable and should be sought and adopted.[27] Influential personalities can effectively champion vaccination, especially where mistrust in conventional authority figures exists. Music videos recorded by celebrities that promote various aspects of health through the genre of Education Entertainment have been shown to have widespread impact especially among youth.[33]

Music videos produced following an 'Education- Entertainment' (EE) format convey health messages through words deliberately incorporated into the song, texted sub-titles and the images in the video, and are a validated form of health promotion,[33] examples were successfully employed in Uganda during the pandemic. This genre has clear potential for future campaigns advocating vaccination as EE media can incorporate educational content into various forms of entertainment to increase knowledge, create favourable attitudes, and change behaviours.

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Media that can be produced using the EE model include news reports, documentaries and short films, but music videos are one of the most popular formats. In the design of EE music videos, the central issue to be framed is chosen first, and then layers of information are added to the lyrics that complement the central message. Creative elements like images, music, text and special effects are then added to attract inform, and influence the viewer.[50] In this way each music video can be created to be uniquely applicable to a specific topic like vaccination, or relevant to a particular audience.

The impact these videos achieve in Africa is all the greater when they are professionally recorded by celebrity artists, and their considerable reach comes from free downloads onto mobile phones, which are owned by the majority of the population. The repeated listening that follows coupled with viewing on YouTube and similar streaming services means that unlike a health message heard only once, every time a song is played or a video viewed, the educational message imprints again on the memory, which increases the probability that the message will be retained. Subsequently, recall of the core message also occurs when hearing a phrase from the song, glimpsing an image from the video, or even catching sight of the celebrity in another video.

We can only hypothesize that such imprinting translates into learned behavior or attitudinal change. However, evidence that many African school children can sing a phrase or quote a message from a health messaged music video, warrants attention;[33] such awareness is an achievement in itself in terms of health promotion. The download and streaming statistics available nowadays add proof of impact from this form of health promotion tool, and reinforce the potential for well produced EE media to positively impact behavior related to vaccination in other parts of the world.

Summary

To achieve the goals of the WHO immunization agenda 2030 requires improved targeting and reach to protect against viral illness and other global pathogens. Hence the need to understand and address the causes of low vaccine use, and create innovative community engagement strategies able to improve vaccine uptake. In this context there is relevance to learning from past viral pandemics. Covid-19 vaccines were an important product of modern science that clearly offered high protection against severe illness and death. But in sub-Saharan Africa a variety of often country-specific logistic, administrative and socially determined factors combined to compound challenges related to vaccine supply and access to health care. Although few countries achieved good overall vaccination coverage, many came to understand their country-specific barriers to vaccination, modified traditional approaches, and developed innovative and culturally appropriate strategies that countered factors that impacted vaccine resistance. In addition to working to improve access to vaccine supply and address remediable social determinants of health, effective campaigns incorporated health promotion approaches that helped to reduce societal reticence regarding vaccines, and many of these are applicable to advancing the ambitious global agenda that WHO has called for in the IA2030 initiative. Approaches of particular benefit included: task shifting away from conventionally relied on forms of health promotion, the importance of generating community engagement and greater public trust, and the value of innovative interventions that promote sound knowledge, health-related skills and positive health behaviors. All of which advance overall health literacy related to viral illness and the benefits of vaccination, and hence are applicable in a global context.

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The author has no conflict of interest to declare.

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