

Viewpoint

Childhood vaccine uptake in Africa: threats, challenges, and opportunities

Edward Mbonigaba¹, David Nderu², Simiao Chen³, C. Denkinge⁴, P. Geldsetzer⁴, S. McMahon⁴, Till Bärnighausen⁴

¹ Heidelberg Institute of Global Health, University of Heidelberg, Germany; College of Medicine, School of Public Health- University of Rwanda, Rwanda, ² School of Health Sciences, Kirinyaga University, Kirinyaga, Kenya, ³ Heidelberg Institute of Global Health, University of Heidelberg, Germany; Chinese Academy of Medical Sciences and Peking Union Medical College, China, ⁴ Heidelberg Institute of Global Health, University of Heidelberg, Germany

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Childhood vaccination is a highly effective public health intervention for reducing childhood mortality and morbidity. This review discusses the factors that have been shown to influence vaccination uptake in Africa. African countries should develop effective strategies to address failures and challenges faced with vaccination uptake and hesitancy for it to achieve high vaccination coverage and reduction of vaccine preventable diseases. This is particularly important because of the likely short-term decline in foreign aid due to the economic recession arising from the prevailing coronavirus disease 2019 pandemic.

Childhood vaccination is regarded as an effective public health intervention for preventing child mortality and reducing morbidity.¹ Despite of increased global childhood vaccination coverage and uptake observed over the years, Africa is still lagging behind.² Governments and their development partners have made deliberate attempts to improve childhood vaccine uptake and acceptance in resource-limited settings.³ In 2000, the Global Alliance for Vaccination and Immunization (GAVI) was established to accelerate vaccination uptake in different parts of the world, particularly where vaccination coverage is still low. Recent World Health Organization (WHO) estimates indicate that vaccines avert 2 – 3 million child deaths annually for example, smallpox and polio have been successfully eradicated in Africa through vaccination.⁴ Another notable example where vaccines have had apposite impact is in reduction of measles mortality due to improved mass vaccination campaign.⁵ These improvements in immunization programs are very important if high coverage is to be sustained over the years to reduce vaccine preventable diseases.⁶ Measles and poliomyelitis vaccine coverage in some African countries has improved as a result of administrative, technical, and financial support from bilateral or multilateral agencies such as United Nations International Children’s Emergency Fund (UNICEF), GAVI and World Health Organization.⁷

Consequently, some sub-Saharan African countries have experienced a reversal in gains after a long period of great progress towards eliminating vaccine-preventable childhood diseases. A large measles outbreaks in the Democratic Republic of the Congo exemplified this.⁸ Vaccination uptake and coverage in African countries continue to vary for example DTP3 coverage ranged from 56% in Nigeria to 97% in the Gambia based on the study conducted by Jacob S. Kazungu et al 2017.⁹

The review of various demographic health survey of west african countries indicate variations in vaccine coverage and uptake. A primary qualitative study conducted by Li et al 2020 in Kenya Health facilities indicate that empowering health care workers and care givers with immunization information will boost and have positive impact on vaccine confidence and uptake.¹⁰

THE FOLLOWING ARE AMONG THE FACTORS THAT INFLUENCING CHILDHOOD VACCINE UPTAKE

Maternal education: Maternal education is thought to be one important factor that influences vaccine uptake in low-income countries. A recent systematic review demonstrated that educated mothers, regardless of the level of education, are more likely to have their children vaccinated.¹¹ Another population based study conducted in Eritrea demonstrated that mothers who attended primary level of education were more likely to have their children fully vaccinated than mothers who have not received any education.¹² A study conducted in Norway found out that HPV vaccine initiation increased with increasing maternal income. Also, HPV vaccination initiation was higher among girls with mothers of low education.^{13,14}

However, in Africa, there are some factors which undermine female education such as early marriages and pregnancies. It is reported that about 40% of girls will get married before the age of 18 years and African countries account for high proportion of child marriages worldwide.¹⁵ Many girls are forced into early marriages due to cultural stigmatization.¹⁶ Many African countries have made commitments to move towards universal / compulsory primary education for girls to keep them long in schools and avoid

Table 1. Cross-comparison of vaccine hesitancy and uptake in Africa regions

Author	Year of publication	Title	Country
Sara Cooper et al	2018	Vaccine hesitancy – a potential threat to the achievements of vaccination programs in Africa	Africa
Linda K. Ko et al	2019	A qualitative study of perceptions of HPV vaccine and vaccine uptake among East African immigrant mothers	East africa
Aanuoluwapo Adeyimika Afolabi et al.	2021	Dealing with vaccine hesitancy in Africa: the prospective COVID-19 vaccine context	Africa
Ingrid T. Katz et al	2013	A Qualitative Analysis of Factors Influencing HPV Vaccine Uptake in Soweto, South Africa among Adolescents and Their Caregivers	South Africa
Jacob S. Kazungu et al	2017	Crude childhood vaccination coverage in West Africa: Trends and predictors of completeness	West Africa

early female marriages. Countries such as Zambia, Cameroon and South Africa started implementing re-entry policies so that mothers can return to school after giving birth. However, young mothers usually have no financial support to be enrolled to school and face isolation in school.¹⁷ For example, a study conducted in Ethiopia in the Ambo region found that while more than half of the mothers knew the importance of vaccination, few of them knew the age at which childhood vaccination should be initiated.¹⁸

Political instabilities: Childhood vaccination uptake has been affected by political instabilities, especially civil wars. This disrupts vaccination programs and prevents children from being fully vaccinated.¹⁹ Restoration of routine immunizations takes long because of the destruction of health care facilities during wars. For example, DRC Congo continues experiencing conflicts between the armed militia groups, FDLR and Mai Mai militia.²⁰ In Sub-Saharan African countries, such as Libya, where there has been armed conflict, health care systems have been rendered fragile.²¹

Reliance of foreign aid to fund vaccine procurement and delivery: African countries depend heavily on development partners for assistance in health care. Health care assistance is channeled through multinational agencies such as Global alliance for vaccine and immunization (GAVI), World Health Organization (WHO) and United Nation Children Fund (UNICEF). GAVI alone fully finances all supplementary immunization activities doses in 73 countries.²² This model of financing immunization program is not sustainable and is currently facing unprecedented financial constraints due to recession during the COVID-19 pandemic.

Vaccine coverage and hesitancy: Across the world, vaccines are an effective tool to control and eliminate diseases. Some people, however, perceive vaccines as unsafe and unnecessary. Vaccine coverage and hesitancy vary from country to country and region to region for example the study conducted by James Bao et al 2018- indicate how Rwanda had achieved 98% vaccination coverage²³ On contrary, this may not be the case in other african countries for example a study conducted in Nigeria by Sulaimon T. Adedokun et al 2017 revealed that vaccine hesitancy was attributed by individual and state level factors which influenced the risk

of children being incompletely immunized in Nigeria.²⁴ The problem of vaccine hesitancy, uptake and coverage is cross cutting issue and its magnitude vary from one region depending on each country specific policy measures towards vaccination. Therefore, factors influencing vaccine coverage, uptake and hesitancy do not affects African countries in the same way due to the nature of individual and state level settings.

Religion: Religious factors are key determinants of vaccine uptake in some countries of sub-Saharan Africa. Muslim families have been reported to have low vaccine uptake.²⁵ A study conducted in rural Nigeria revealed that full vaccination coverage was two-fold higher among children from non-Muslim families than children from Muslim families (Ayo Adebawale et al 2019). In another study conducted in Nigeria reported that Muslims opposed immunization because they had a belief immunization threatened the welfare of their communities.²⁵ This problem is not limited to the Muslim community only. Another example in developed countries is the orthodox Christian community in Netherlands where the results show low immunization uptake.²⁶

Distance and geographical location: Most people in Africa live in rural areas where health care service is not easily accessible.²⁷ In rural setting, childhood vaccination is hampered by low staffing and poor logistics. In addition, about 16% of rural villages do not have mobile vaccination programs because of a lack of transportation infrastructure and more than half of rural health centers experience vaccine shortage.²⁸ Due to the foregoing challenges urban vaccination campaigns are more successful (higher immunization coverage) than in rural settings.²⁹

Economic factors: There is an association between principal economic activities of a parent and full vaccination uptake. Poor and unemployed parents may not be able to pay health care cost unlike parents who are employed. The study findings show that there is a difference in economic conditions of household and vaccination coverage. Economic gap of households will influence vaccination uptake in most cases.³⁰ In areas of high economic quartile, there is a better immunization coverage rate and high chances of being vaccinated. Some of the reasons which mothers give for not vaccinating their children is that they lack money for these services. Some countries have good health insurance

policy like Rwanda where there is easy access of health care services.³¹

Emerging challenges: The COVID-19 pandemic has disrupted health activities and caused social economic and political stress. Countries are facing low routine vaccination rates as compared to the situation before the COVID-19 pandemic. A study conducted recently showed the devastating impact of COVID-19 pandemic on routine immunization in Africa.³² Another study revealed that the Indonesian government is struggling to maintain immunization budget amidst the pandemic.³³

CONCLUSIONS

Countries must address their local vaccination failures and problems through prioritizing funding for access to vaccine, strengthen large capacity vaccine coverage storage, maintain effective cold chain, improve on their research centers, and address vaccine hesitancy while identifying priority population for vaccination. Intensive community engagement and effective health communication are needed to disseminate accurate information and facilitate optimal vaccine uptake.

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All authors contributed to the manuscript.

COMPETING INTERESTS

The authors completed the Unified Competing Interest form at <http://www.icmje.org/disclosure-of-interest/> (available upon request from the corresponding author) and declare no conflicts of interest.

CORRESPONDENCE TO:

Mbonigaba Edward, Heidelberg Institute of Global Health, University of Heidelberg, Germany.

edwardnkwaya@gmail.com

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