

Barriers to vaccine uptake in the fishing and island communities of Uganda: a qualitative study

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Abstract

Background: Despite global and local initiatives to increase vaccine uptake, timeliness of vaccinations and vaccine uptake remain low among residents of islands and fishing communities in Uganda. Vaccine coverage (all vaccines) among island communities stands at 37.1% compared to 55%, the national level. This qualitative study was conducted to (i) understand key barriers to vaccine uptake among residents of islands and fishing communities of Lake Victoria, Buganda sub-region, Uganda and (ii) identify specific needs of the communities; ahead of implementation of a mobile health intervention to promote vaccine uptake.

Methods: Exploratory qualitative. Data were collected through focus group discussions with women of reproductive age and village health teams (VHT) and key informant interviews with the health coordinators and health service providers. Data were analysed through content analysis, by coding pre-established and recurrent themes.

Results: Under the barriers, seven themes were identified: Opportunity cost of seeking vaccines versus making a living, Distance/Cost to health facility, Availability of service provider, Attitudes towards vaccines, Decision making regarding the use of vaccines, Knowledge of availability of services, and Attitudes of service providers. Participants suggested strategies to improve uptake: 1) more health education and regular reminders using VHTs, public address systems and mobile technology; 2) bring services closer to people through scheduled vaccination campaigns to reduce on cost of seeking services; and 3) strengthening public-private partnerships in the health sector for delivery of vaccine services.

Conclusion: In light of the current barriers to vaccine uptake, innovations to increase the utilisation of vaccination services in remote underserved settings need to be multi-pronged, responding to user, structural and supply-side factors. The use of mobile technology and public-private partnerships for health have the potential to bridge existing vaccine delivery and uptake gaps.

Background

Vaccines are vital and have been credited for increased survival and reduced morbidity from preventable infectious diseases [1, 2]. The global vaccine action plan 2011–2020 [3] is an agreement among 194 states to ensure equitable benefits of immunization to all people. Uganda has made strides in vaccination coverage with support from international initiatives such as Global Alliance for Vaccine and Immunizations (GAVI). Despite the above initiatives, timeliness of vaccinations and vaccine uptake remain low among residents of islands and fishing communities in Uganda. Vaccine coverage (all vaccines) among island communities stands at 37.1% compared to 55%, the national level [4]. Although the importance of vaccines is appreciated, many residents of islands and fishing communities do not access these services [5].

Fishing and island communities are vulnerable to many threats to their well-being due to limited access to regular and reliable transport services, poverty, ignorance and absence of adequate health services to

respond to these threats [6, 7]. In the case of Uganda, fishing communities that include mainland landing sites and islands have been reported to have low vaccine coverage as reported above [4]. Barriers to vaccine uptake and the provision of services are often intertwined and well documented. These include limited vaccine supply, number of health centres and workers, service deliver points, and transport to and from health centres [8–10]. Recent research has focused on the barriers and motivators to the uptake of vaccines in resource-constrained and remote locations including among others intent of the mother, community access, cost, number of clients at health centre, unfriendly workers and staffing [9, 10], and yet less attention is given to the role of structural factors/enablers to uptake of vaccination among island and landing sites communities. To increase on vaccine coverage among the fishing communities, structural factors need to be fully understood.

To respond to vaccine uptake and utilisation challenges, a specialized package of interventions is being run for island and landing sites residents, using an existing mobile health application developed to support community health workers [11]. In the current intervention, community health workers (village health teams- VHTs) use the application to register pregnant women and those with children under five in order to connect them to health workers and a subsidized boat taxi service manned by trained boat riders. The ultimate goal of this set of interventions is to reduce the vaccine client waiting time and cost of seeking services and improve timeliness of vaccination and coverage among islands and fishing communities. The program is premised on documented successes of similar programs in LMICs including in neighbouring Tanzania (11, 12).

Prior to the implementation of the above intervention, a baseline assessment of different stakeholders' perceptions towards existing vaccination services, challenges and opportunities, was conducted. The aim of this paper is to provide an in-depth understanding of what the barriers to utilisation of vaccination services are, from various stakeholders. The information will ultimately feed into enhancing the provision of current and future interventions aimed at improving vaccine coverage in this and related settings.

Methods

Study design

The study utilized an exploratory qualitative design using focus group discussions (FGDs) and Key informant interviews (KIIs) as part of the baseline assessment of the study sites. Participants were purposively selected to represent the different users as well as influencers to explore persistent barriers to utilization of vaccination services.

Study setting and population

Data were collected from participants residing or working in Wakiso district at Busabala landing site and Busi and Zzinga islands of Lake Victoria which, like other islands and landing sites, are characterized by poverty, poor coverage of social services and poor health outcomes. Before implementation, we explored

the experiences of women of reproductive age and those with children under-5, VHTs, health providers and members of the District Health Office with respect to improving vaccine access and utilisation

Data Collection

Six field interviewers were recruited based on academic qualifications, fluency in English and Luganda, and previous experience in conducting qualitative studies. The interviewers were trained on the study design and qualitative interview techniques. They also reviewed the interview guide, and held mock interviews as part of the data collection quality assurance training. Data were collected through 14 FGDs and three KIIs. With the help of the trained field interviewers. VHTs residing and working in the study communities were recruited to take part in the FGDs which were conducted in September to October 2019. The VHTs selected were those that were actively participating in community work under the national community health strategy. Each group had eight to twelve participants who were selected to ensure that different areas in the communities were represented. The FGDs had mixed representation of the different age groups. KIIs were conducted with the health providers, and two health coordinators in November 2019. On average, the FGDs lasted 60 minutes and the KIIs 45 minutes. All interviews were audio recorded and later transcribed and translated into English by a native Luganda speaker with experience in transcription.

Table 1

Group Composition and Discussion Guide for the Focus Group Discussions and Key Informant Interviews

Participants	Type of interview	Number of participants				Issues discussed/ discussion guide
		Busabala	Busi	Zzinga	Wakiso	
Village Health Teams	FGD (1) FGD (14)	1	4	3	0	<ul style="list-style-type: none"> ♣ Knowledge, attitudes and practices regarding immunization ♣ Challenges and opportunities for promoting immunisation coverage ♣ Roles of mobile technology, challenges and opportunities in marginalised settings
Women of reproductive age		42	23	30	00	
VHT Coordinator	KII (4)				1	
Health coordinator					1	
Health Providers		1		1		

A thematic interview was designed, reviewed by a team of behavioural scientists and experts in maternal, newborn and child health, pretested and used by the research team to guide the interviews. The guide was translated into Luganda and back-translated into English by an independent translator to ensure that meaning was not lost in the process. The discussions were also held in Luganda, which is the language spoken widely in Buganda sub-region and well understood by all participants. The discussions were held in community halls and each discussion had a moderator and a note taker.

Data analysis

The transcribed discussions were divided into three pre-defined themes: 'Knowledge, attitudes and practices regarding immunization', 'Challenges and opportunities for promoting immunisation coverage' and 'Roles of mobile technology, challenges and opportunities in marginalised settings'. Under each theme, the unit of analysis was the specific text about the participants' responses in relation to a particular subject. The discussion notes were further supported by observation notes of each FGD. The analysis which focused on main areas of consensus and disagreement was conducted using a thematic approach. In the first instance, a process of initial reading and re-reading of the transcripts while listening to the audio recordings was done to make a sense of the data. A preliminary coding scheme was then developed based on themes from the discussion guide. This was followed by manual content analysis informed by Graneheim and Lundman [12] in order to describe and interpret the experiences of the VHTs. Open coding was followed by scrutiny of each code resulting in refinement of the coding scheme. The resultant codes were organized under key themes. Findings from the VHTs were triangulated with key informant interview data from the health coordinators and health providers working in Wakiso district where the VHTs work.

Results

The results are presented in four thematic areas: 'Barriers to utilisation of vaccination services', 'Enablers to utilisation of vaccine services', 'Recommendations to improve use', and 'The role of mobile technology to improve health and vaccine coverage'. Under each theme, anonymous quotations are presented to illustrate the main points that emerged in the discussions.

1. Barriers

From the users' and health providers' perspectives, the barriers to access and utilisation of vaccination services, as reported by service users, community leaders and service providers, are many. They are categorized into user's (demand-side), structural and supply-side barriers. Regarding perspectives on key inherent barriers to utilization of vaccination services, six (6) themes were identified: Opportunity cost of seeking vaccines versus making a living, Distance/Cost to health facility, Availability of service provider, Attitudes towards and decision making regarding the benefits of vaccines, Awareness of the importance of using vaccination services and knowledge of availability of service, and Attitude of service provider. To elaborate on the findings, anonymous quotations bearing the participant's number according to the order and type of interviews are presented.

i. Opportunity cost of seeking vaccines versus making a living

Some women reported that in the absence of their spouses and financial support, they have to make a living. As such, it is hard to prioritise visiting a health facility for vaccines when they have to work.

"I know that vaccines are important but it is important to get food for my children too.... I cannot leave my garden to go for a vaccine, when my child is not sick. How will I feed my children? The landlord will not

understand that I have no rent” (R6, Women FGD, Busi Island)

Furthermore, because services are not entirely free, one has to first get the money before going to a health facility.

“We are told that government facilities are free including in the national referral but when you go there that is not the case. You have to part with some money to be assisted. You pay before being assisted!” (R1, Women FGD, Busi Island).

ii. Distance/Cost to health facility

Distance and cost to get to the health facility is prohibitive as a standalone but also intersects with household power dynamics in decision making and spousal control of income to act as barriers to vaccination. This is clearly stated below.

“Most men (spouses) don’t want to provide money to go for immunization. That limits me in terms of transport.” (R8, Women, FGD, Zzinga Island).

“Transport (to the islands) is a challenge and the Health Centres are very basic in facilities. The Health Centre of Ggoli is far off and it costs 30,000 = ugx to and fro, and yet they have all the facilities” (R5, Women FGD, Zzinga Island).

“We use a lot of money to come for health care. Sometimes you have to come and spend the night on the island where the vaccines are. You have to spend money on accommodation and transport. That is a serious impediment to access” (R2, Women FGD, Busi Island).

‘If I have transport challenge I can’t come. They made an outreach once for 3 months and stopped’ (R1, Women FGD, Zzinga Island)

iii. Availability of service provider

The presence of the health service provider at village and facility level is a barrier to access. This is compounded by the lack of drugs when health workers are present as well as deployment of health workers who have families to return to outside the islands. This is evidenced below.

“VHTs are the most available but the Health Centre workers are far” (R8, Women FGD, Zzinga Island).

“You are sometimes worried about the absence of the health workers at the HCs even on the days they have claimed they are to vaccinate” (R2, Women FGD, Busi Island).

“All is well with accessing vaccines but the problem is with child birth or delivery...all the midwives are not from within the islands and that presents a challenge (R6, Women FGD, Zzinga Island).

iv. Attitudes towards the vaccines

Attitudes of mothers toward vaccines play a role as barriers. Some are worried of the side-effects and this weaves into their interaction with older women that didn’t immunise their own. Myths and misconceptions have a role to play as barriers.

“The injections given to the children are painful and you spend sleepless nights. Even the older people who weren’t vaccinated are opposed to the practice and they claim it causes cancer” (R3, Women FGD, Busi Island).

“Some still have myths and misconceptions” (Health Coordinator1, Kil Wakiso).

v. Decision making regarding the use of vaccines

Women’s lack of control over decisions to get their children vaccinated or not are eminent in this setting. In many cases, men have the final say in the decision making process for seeking health in general and

for vaccines, in particular.

'My husband said that I cannot get his children immunised. So my children are not immunised'. (R4, Women FGD, Zzinga Island).

vi. Knowledge of availability of services

The level of awareness varies and in some instances knowledge of availability of service exists but is deterred by negative attitudes towards the service.

"I for one do all the immunisations for my children. But some people don't because they hold old notions that others can live without immunisations. What they don't know is that there are some new diseases that have emerged and even the nature of food we eat is poisonous" (R1, Women FGD, Busabala).

"...the major barriers are cultural beliefs, distance and finances" (Health provider 1, KII Zzinga Island).

vii. Attitudes of service providers

The attitude of health workers is imperative in vaccination uptake. There is concern over priority for immunisation by mothers that go with partners while others are pushed behind the waiting lines. This discourages mothers that don't have partners present. This is not the case in private facilities where users pay and are attended to without regard to status.

"In government they prefer women who go for ANC and Immunisation with their partners/spouses and yet some of us don't have them...those with them then jump the queue. Even the time for lunch is lockdown by the health workers and we have to wait." (R4, Women FGD, Busabala).

"In the private facility you pay for the service and you are well worked upon but in the public facility, they want you to pay a bribe for service delivery. They sometimes harass you when you delay to go for ANC". (R2, Women FGD, Busabala).

For some mothers that understand the importance of vaccination, how they are received and handled by health workers at the facility becomes an enabler or deterrence. This includes counselling by health workers besides treatment.

"When you go for ANC you are well handled in the HC II. I was counselled on not worrying due to the blood pressure level being sporadic and affecting the unborn baby (R9, Women, FGD, Busi islands).

2. Enablers of vaccination service use

The users demonstrate to various enablers on their own side as well as those from the health structure. On the user's part, these include motivation due to the health benefits as well as concern for the long term risks associated with non-vaccination of the their children. On the health system's part, these include the resources (presence of health workers, vaccines) as well as the way health workers handle the mothers. Specifically, the enablers include: specific dates and time allocated to vaccinations; getting consultation about the status of both baby and mother; presence of VHTs as mobilizers and immediate health support staff; handling of clients by health workers; health seeking behaviour of mothers and concern for their offspring; and the presence of medical stocks for immunisation.

The study established that having specific dates and time allocated for vaccinations is crucial in addressing maternal and childhood health in fishing communities. This is amplified by a woman below: "When it comes to vaccination, we are given specific days and times and if you are in time, you are attended to. The problem comes when you are out of time and day...you are not attended to" (R3, Women FGD, Busi Island).

Specifically, the presence of VHTs is a big enabler in islands, some of which do not have any health centres due to population size. This can be illustrated below:

“VHTs have been effective on our health care and 5 years ago it was bad but the presence of health centres and VHTs has improved on the our wellbeing. VHTs train us in nutrition too” (R2, Women, FGD, Zzinga Island).

Their impact is less felt on the landing sites of the mainland but it is influential in mobilizing the population for vaccinations.

3. Recommendations to improve

Recommendations to improve on utilisations of vaccination services are two-fold, and these include access and experiences with health providers. On the part of the access, there should be ease of access to by clients to both the health centres/workers as well as to vaccines. There are also concerns for the welfare of the health workers as well as conduct of health workers towards clients. These recommendations are various and among others include:

i. Outreaches to bring vaccines closer to island communities that don't have health centres. This would mitigate cost, distance and time constraints. This could include allocating specific immunisation days per village. This is elaborated below:

“VHTs should be enhanced to improve on vaccination and family planning services. There should be ease of access and outreaches per village (R8, Women, FGD, Zzinga Island).

The above is in agreement with the residents of Busabala landing site on the mainland:

“VHTs should organise mobile immunisations from house to house or at the village centre” (R3, Women, FGD, Busabala).

ii. Increasing on the time for vaccination beyond midday

The requirement that vaccinations are not done beyond midday affects several women who have to cross between islands to access vaccines. They suggest that time for vaccinations should be increased beyond midday to cater for such structural impediments.

“...for us who have to move beyond our local island to the island where vaccination is...the end time of midday should be extended” (R7, Women FGD, Busi Island).

iii. Skilling the VHTs more to handle vaccines better

The VHTs have basic health training to manage vaccination and primary health diseases. This, the users feel is not sufficient given that in most islands they are the frontline and end line workers.

“They need to be given refresher courses on how to handle illnesses” (R2, Women FGD, Zzinga Island).

iv. Motorised ambulance for complicated and referred cases to the mainland

Most users indicate that there was a free motorised boat ambulance but it broke down and was not sustainable. This used to ensure access to maternal and child care services for emergency cases. This should be revived to ensure uptake of health services.

“Sometimes transport is hard due to hard-to-reach-nature of my village. We have to mobilise transport and get a motorised boat and they are sent to Entebbe for further management” (R4, VHT FGD, Ggaba).

v. Mothers without vaccination charts need to redo the exercise regardless

Many mothers claim to be at different stages of the immunisation process yet present no evidence in terms of vaccination charts. This, VHTs suggest, should be overcome by them redoing the vaccination

process.

“...it becomes difficult to determine the evidence of vaccination so we usually suggest that such mothers and children redo the vaccination in its entirety” (R7, VHT FGD, Ggaba).

vi. Better remuneration and working conditions for health workers

“I suggest that the District HO to support the VHTs financially with emoluments for them not to sell the drugs” (R6, Women FGD, Busi Island).

vii. There must be enforcement of the Immunisation Act

Most mothers are unaware of the Immunisation Act of the republic of Uganda, 2017 that makes vaccination mandatory.

“Mothers who don’t vaccinate are uninformed about the Immunisation Act 2017 that makes immunisation mandatory” (R7, VHT FGD, Ggaba).

viii. There should be better handling of clients by health workers

Users appreciate the work of VHT and health workers and the circumstances in which they operate but request for better interpersonal relations with them. Short of this, the users feel unappreciated by health workers.

“The VHTs are good and from our own community, but when we approach them they are sometimes diffident. Even the Health workers are lax at times. They don’t attend to us in detail. I once spent 5 hours without being attended to. But the medication of the VHTs is effective” (R4, Women FGD, Busi Island).

4. Role of mobile technology for health and vaccine coverage

The role of mobile technology for health and vaccine coverage is an end outcome of this project. Various projects have used mobile technology in health service delivery but this project is the first of the kind to focus on vaccination. There was need to assess whether such technology could aid health service delivery. The roles are mainly: contact with health workers during antenatal and child care; and the mobile application being faster and able to auto-detect errors, something that take longer when using a register. There are several anticipated roles of mobile technology in health as indicated below:

“A mobile phone is good. We have a health worker who comes from Wakiso district and is not a resident of the area. But we inquire from him as to his availability and he tells us when to get him” (R9, Women FGD, Zzinga Island).

“Sometimes when our children are sick in the night we call VHTs via mobile phone to get immediate first aid” (R2, Women FGD, Zzinga Island).

“The register is so time-consuming due to variables involved. With an application, the systems auto-detects mistakes and they are corrected rather than wait for the supervisor” (R9, VHT FGD, Busabala).

“This is a great innovation. However there are two strands: those who can use the mobile applications and those that are not versatile due to age and may not use it. There are those you train and they may not accept them. You also need to be careful of network availability; power for charging the battery...there is a proposal to take electric power to Busi Island but not Zzinga, which is further and yet smaller” (Health coordinator 2,KII, Wakiso).

Discussion

This paper was part of an assessment conducted prior to the implementation of a package of interventions aimed at improving vaccine utilization. This paper provides an in-depth understanding of what the barriers to vaccine uptake are from various stakeholders.

Overall, there is a good understanding of vaccine schedules and the benefits of vaccinations in limiting illness, disability and death among residents of these islands and fishing communities, as reported in the Northern part of Uganda [13]. However, this assessment demonstrates that barriers to accessing vital health services, including immunisations prevail in fishing and island communities. These include the opportunity cost of seeking vaccines versus making a living, distance and/or cost to health facility, availability of service provider, awareness of the importance of using vaccination services and knowledge of availability of services. In this regard, our findings are consistent with previous studies analysing barriers in utilizing vaccination services [8–10, 14].

The finding about attitudes towards and decision making regarding the benefits of vaccines is critical to efforts to respond to barriers to vaccine uptake. Several women are still unable to make decisions regarding the health of their children, as decisions are made by their male partners/spouses. This highlights the need to empower women as well as invest in health interventions that focus on couples and not individual roles. For instance, various studies have demonstrated that women who discuss health issues with their spouses and have their partner's approval on, albeit few, are more likely to seek and utilise health services in a timely manner [15, 16]. In addition, the attitudes of service provider were mentioned as deterrents to vaccinations services use. This finding has been reported in various settings under different health programs [8, 17].

Amidst the barriers, there are existing opportunities that can be harnessed to improve vaccine utilisation in these settings. These include scheduled vaccination exercises, using VHTs and mobile technology [5, 18]. Residents and health managers appreciate the value of these combined strategies. This is in line with studies on user's adoption and acceptance of technologies [19–21].

In the context of the landing sites and islands, while it is important to understand individuals' motives for not completing the immunisation cycle, studies have observed that motives cannot be understood simply as an individual choice [9]. Rather, a wider examination of pathways as well as intersecting structural factors such as poverty, distance, access to communication technologies [14] and other wider economic conditions that give rise to irregular uptake of vaccinations. Hence, intervention programs that focus primarily on individual determinants are limited in efficacy if they do not simultaneously address the structural enablers that shape behavioural uptake to vaccines [9]. Some of these include the use of technologies and mobile telephone application as mediators [18].

There are tested and proven interventions that can help bridge existing gaps. Quite often, residents have to access the mainland for better health care and services of value such as vaccines through fishing and commercial boat services run by non-medically trained fishermen and boat riders. Use of technologies and mobile phone applications also known as mHealth (mobile health) has potential to increase vaccination coverage in islands and landing sites of fishing communities in Low and Middle Income

Countries where vaccinations reminders have been successful [18]. Remote underserved settings require innovative solutions, responding to user, structural and supply-side factors.

In remote island communities users perceive public and private health facilities in a two-faced manner. The former are perceived to possess better skills and qualifications while the latter have a consistent presence a positive attitude. These findings are not unique as similar findings have been reported in the urban slums of Nairobi, Kenya [22]. However, they differ from those reported in more accessible, mainland and urban settings of Lagos, Nigeria [23]. Instead of amplifying one health provider over the other, a public-private partnership (PPP) model would be more appealing. This PPP must be synergised in times of emergency and expertise to provide timely and sufficient vaccination coverage.

A mobile health intervention to reduce waiting time, cost of seeking vaccines and ultimately increase vaccine uptake and coverage is currently under implementation. In the mobile health system, whenever a registration is made by a VHT, the client's information is transmitted in real-time to the health facilities enabling them to know what vaccine is needed, where and when. This allows them to prepare the required number of vaccines before outreach vaccine activities. Private boat owners support the intervention by providing subsidised transport to the health workers delivering the vaccines to the mobilised community members. As such, caregivers seeking vaccines for their children do not have to incur additional transport costs from the islands to the mainland or from the landing sites to other areas. Because VHTs would have mobilised caregivers and the health workers would know how many vaccines, by type are required, wait time will be reduced. The mobile application is a dynamic solution that allows a direct connection between households, VHTs, and health facilities and two-way information flow for the benefit of the client [11]. As such, data is accessible (to authorized caregivers) at different levels of the continuum of care. The ultimate goal of this set of interventions is to reduce wait time and cost of seeking services and improve timeliness of vaccination and coverage among residents of islands and fishing/landing sites. Compliance by all actors is very important for the success of this project.

The study, above will contribute to the body of knowledge on the effectiveness of digital health interventions and public-private partnership in improving vaccination coverage in the fishing and island communities. It is anticipated that the interventions will contribute to the body of knowledge on models of public-private partnerships for mobile health service delivery for under-served populations in Uganda and other sub-Saharan African countries.

This study has strengths and limitations worth mentioning. The major strength of this study is the use of FGDs and KIs that enabled an in-depth understanding of factors that limit or facilitate the utilisation of vaccinations services among fishing and island communities. The study was nonetheless limited to only residents of islands and fishing communities and health officials and providers in one part of Buganda sub-region and therefore study findings may not be generalizable to other regions in Uganda. However, the external validity of the results is enhanced by the fact that many residents of remote under-served settings in the country share similar challenges in accessing and utilising vaccination services.

Furthermore, we triangulated responses from different sources including FGDs and KIs, in an attempt to share a more representative picture.

Conclusions

In light of the current barriers to vaccine uptake, innovations to increase the utilisation of vaccination services in remote underserved settings need to be multi-pronged, responding to user, structural and supply-side factors. The use of mobile technology and public-private partnerships for health has the potential to bridge existing vaccine delivery and uptake gaps. But this must be pursued in contemplation of the socio-ecological environment in which the technology is applied.

Abbreviations

FGDs

Focus Group Discussions

KIs

Key Informant Interviews

VHTs

Village Health Team

LMICs

Low and Middle Income Countries

Declarations

Ethics approval and consent to participate

Ethical clearance was granted both by Mengo Hospital Research Ethics Committee, 39/4-2019 and the Uganda National Council for Science and Technology approval No. HS 2656, Informed consent was sought from all study participants and contact details of the research team, and MHREC were provided for any clarifications. To ensure confidentiality, participants who consented to participate in the study were given numbered tags for identification as opposed to using their actual names during the discussions. Permission to record the discussions was also sought from all participants.

Consent for publication

Not applicable

Availability of data and materials

All data used during this study will be made available after two years upon reasonable request on the APHRC Microdata portal: <http://aphrc.org/catalog/microdata/index.php/what-is-this>

Competing interests

The authors declare that they have no competing interests

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Authors' contributions

PB conceived the project and its design and drafted the manuscript. CCL, JDI, LK & PN contributed to the manuscript. All authors read and approved the final manuscript.

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