

Integration of Early Infant Diagnosis of HIV Services Into Village Health Clinics in Ntcheu, Malawi: An Exploratory Qualitative Study

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Abstract

Integration of Early Infant Diagnosis (EID) of HIV into Village Health Clinics (VHCs) would increase the uptake of services. This study assessed mothers and health care workers' acceptability of integration of EID of HIV services into VHCs in Ntcheu, Malawi. We conducted an exploratory qualitative study in the phenomenological tradition among 20 mothers of either HIV exposed or non-exposed infants and 18 health care workers (HCWs) from February to July 2019. We analyzed the data using a thematic approach and guided by the theoretical framework for acceptability. There were positive perceptions of the integration of services. Acceptability is influenced by attitudes, perceived burden, intervention coherent services, and perceived effectiveness of services. The successful integration of EID of HIV into VHCs requires strengthening of the health system and community awareness. Efforts to mitigate stigma should be prioritized when integrating the services to optimize uptake of the services at a community level.

Keywords

early infant diagnosis, village health clinics, qualitative, exploratory, health care worker

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Introduction

Early Infant Diagnosis of HIV is a strategy for the ascertainment of HIV infection status among children.^{1,2} Early Infant Diagnosis of HIV is a step within the PMTCT services and falls within the third and fourth prongs.³ The third and fourth prongs focus on preventing transmission of HIV from infected mothers to their children and provision of care, treatment, and support for HIV-infected mothers, their children, and families respectively.³ The WHO pediatric treatment guidelines recommend that all HIV infected children less than 2 years of age initiate on Antiretroviral Therapy (ART) to promote their survival.¹⁻³ To facilitate immediate ART initiation following HIV diagnosis, WHO recommends HIV testing among all HIV-exposed infants at 6 weeks, ideally before 2 months, and further tests at 12 and 24 months of age.^{1,2}

Countries in sub-Saharan Africa (SSA) are lagging in meeting the target for EID of HIV services which are set at 95%.⁵ Sub-Saharan Africa persistently registers lower access to ART among children when compared to adults with only 28% of

those living with HIV receiving treatment⁶ and with a 77.7% coverage on early infant diagnosis.³ Similarly, uptake of EID of HIV services in Malawi remains low at 69% as of 2018, which negatively affects the uptake of ART.⁷ Furthermore, 20% of HIV-exposed infants in Malawi, are lost to follow up and 80% of these acquire HIV infection during the breastfeeding period.⁷ Within the group of HIV-exposed children that are lost to follow up, the risk of acquiring HIV increases with age.⁸ The low ART access among children largely stems from

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What Do We Already Know About This Topic?

Early Infant Diagnosis of HIV is feasible and effective in the prevention of Mother to Child Transmission (MTCT) and promotes the uptake of HIV services among HIV-exposed children however, its implementation is challenged by health systems, socio-cultural and individual factors thus leaving some infants at risk.

How Does Your Research Contribute to the Field?

Previous studies have focused on resolving the barriers through existing and established HIV service provision sites while our study leverages the integration of services and assessed acceptability of integrating EID of HIV Services in VHCs which has the potential to close the accessibility gap in rural settings.

What Are Your Research's Implications Toward Theory, Practice, or Policy?

Our study showed that the integration of EID of HIV services into existing VHCs is acceptable and will require a deliberate effort to strengthen the health system at a VHC level. The efforts include mitigating stigma through community awareness, mentoring and supporting VHC providers, and provision of infrastructural support for the clinic and accommodation for health workers.

delayed testing for HIV among exposed infants.⁹ The factors that affect the effective implementation of EID of HIV services are high loss to follow-up of exposed infants and delays in accessing EID of HIV testing, the long turn-around-time of results, poor laboratory procedures, and logistical challenges such as lack of transport, and delays in dispatching results.¹⁰ One way of resolving the challenges is by having services closer to where people are located and this could be through integrating the services within VHCs.²

Village Health Clinics in Malawi are primary health service delivery points at the community level located in hard-to-reach areas which are located 8kms or more from the health facilities or located in places that are difficult to access because of geographical terrain or natural barriers.¹¹ The clinics provide integrated community case management of childhood illness and are a platform for more health services if properly integrated.¹² Integration of health services provides greater access to comprehensive care and ultimately improves health outcomes for populations while gaining system efficiencies and facilitating sustainable development.¹³ Additionally, it improves the quality of care, increases services uptake, and improves health outcomes.¹⁴

Given that integration of EID of HIV services into VHCs is a plausible idea that could bring the services closer to the end-users,² this study assessed the acceptability of integrating

EID of HIV services into VHCs in Ntcheu, Malawi. Of the HIV-exposed children in Ntcheu, 31% were not accessing EID of HIV services at the time of the study which called for measures of improving uptake and retention in care.¹⁵ We specifically explored the perceptions of mothers and health care workers on and the factors that influence the integration of EID of HIV into VHCs.

Methods

Study Design

This was an exploratory qualitative study in the phenomenological tradition that assessed the acceptability of integrating EID of HIV into VHCs in Ntcheu district among women and health care workers that use and provide the services respectively. We conducted In-depth Interviews (IDIs) because they generate more insightful information.¹⁶ The Focus Group Discussions (FGDs) with HCWs provided more insight into their perceptions of the intervention and this gave us a broader range of information from different participants. We conducted 20 IDIs among mothers of HIV exposed and non-exposed children. We varied the selection of mothers on their HIV status because both groups use the VHCs and if EID of HIV services was to be integrated into the services, they will both be equally affected thus their perceptions mattered. We selected health care workers for the FGDs based on their experience and role in providing EID of HIV services, data management, village health clinic management, and clinical HIV care. We included HCWs because we wanted to tap their insights on their perceptions and acceptability, and how the services can be integrated and implemented thus broadening the scope of the responses.

Study Setting

The study was conducted at Ntcheu District Hospital and 2 VHCs named Kalumbu and Muwalo. We purposively selected the sites to include one which is located closer and the other further from the District Hospital to enrich our data by drawing from clients from varying geographical areas. Kalumbu village health clinic is located 7.6 km while Muwalo village clinic is in a hard-to-reach community and it is 33.7 km away from Ntcheu district hospital. The VHCs provide under-five clinics, an Extended Program on Immunization services (EPI), nutritional assessments, management of malaria, acute respiratory infections, and diarrhea conditions. These clinics have one health surveillance assistant (HSA) stationed at the clinic and 10 volunteers who are drawn from the village.

Sample Size

We used a purposive sampling method with maximum variation so that we draw responses from participants with varied characteristics.¹⁷ We varied the mothers following the demarcations that are defined by HIV-exposed infants birth cohorts in the EID program as follows: mothers of HIV exposed infants with the following ages, less than 2 months, 2-12months, and

12-24 months old children. We included mothers with HIV-unexposed children following these age ranges: less than 12 months, 12-24 months, and 24-60 months. All mothers with HIV-unexposed children less than 2 months of age were included in the less than 12 months age group. In total, we recruited 20 mothers until we reached data saturation (11 mothers of HIV-exposed infants and 9 mothers of HIV-unexposed infants). We employed a purposive sampling technique for HCWs and recruited those experienced in EID of HIV and VHCs interventions because they could provide rich information about the interventions. Therefore, we conducted 2 FGDs with 18 health care workers

Data Collection

Data were collected from February to May 2019. One research assistant and the Principal Investigator conducted the IDIs and moderated FGDs. The research assistant was trained by the Principal Investigator to conduct the IDIs and FGDs, note-taking, handling of sensitive issues, probing for more information, and maintenance of confidentiality. The research assistant was trained for 3 days on the tools and then he participated during the pretesting of the tools which took 1 week. The PI provided quality control by frequently checking on the data collected by the research assistant to ascertain completeness. All data tools were pre-tested to identify any problems such as unclear wording or time taken to administer so that the tools could be improved and be user friendly during data collection. The questions on the IDIs and FGDs guides were semi-structured and open-ended in nature to capture a depth of information and we probed for more information under the main sections of the guide.¹⁷ Both IDIs and FGD data tools included demographic characteristics data for each participant. (Additional File 1)

These semi-structured questions allowed us to collect detailed data over a short period.¹⁸ The interview guides were designed in English and Chichewa and were also done in the same languages as per the participant's preference. Chichewa and English are the national languages in Malawi and Chichewa is the local language used in the area where we studied. To enhance the credibility of our findings, we summarized the key findings after each interview with the participant as a form of member checking. We had multiple discussions among the researchers during data collection and analysis to achieve dependability of our results and our detailed description of the setting of the study and procedures for EID of HIV services enhanced transferability of the study.⁴

Conceptual Framework

This study used the Theoretical Framework of Acceptability (TFA) which is a multi-faceted construct that reflects the extent to which people delivering or receiving multiple healthcare interventions consider it to be appropriate based on anticipated or experiential cognitive and emotional responses to the intervention.¹⁹ The TFA guided the study in designing the study guides, analysis of the data, and developing themes. The tenets

of this theory are: affective attitudes which are about an individual's reaction to intervention and was used to assess people's attitude toward acceptability of the healthcare intervention; the burden was used to assess the perceived amount of efforts that would be required for one to participate in the intervention; ethicality assessed the extent to which EID of HIV integrated into VHCs has a good fit with an individual's value system and if an intervention was morally good and correct. Intervention coherence was assessed by detailing out a participant's understanding of the intervention, how it works, and measure the representation of the recipient or participants while opportunity cost was assessed among mothers and health care workers to highlight the benefits, profits, or values that would be given up while engaging in the intervention. Perceived effectiveness assessed how the mothers and health care workers perceived the intervention as likely to achieve its purpose and while remaining effective.¹⁹

Data Analysis

The TFA guided the data analysis which followed a thematic approach as outlined by Braun and Clarke.²⁰ All audio data were transcribed verbatim and simultaneously translated from Chichewa into English for interviews not done in English. Researchers familiarized themselves with the data by re-reading several times the transcribed data and also listening to the audios to gain a deeper understanding of the data and to ascertain that there were no transcription errors. During the process of listening, we took notes of the codes that were standing out to appreciate the breadth of codes, and then we applied a deductive approach by using the tenets of the TFA as the major thematic areas for deductively categorizing our data.^{21,22} We grouped similar codes under respective tenets²³ and reviewed all collated themes and developed a thematic map that was used in reviewing applicability and fit of the codes under each theme. Similar codes were retained under an overarching theme and those that were not a perfect fit were re-assigned appropriately.²⁴ Thereafter we reviewed the themes after a set of candidate themes, which involved refinement and review of the validity of the individual themes with the data set and this resulted in the themes and their quotes as they are presented in this analysis. The process of analyzing the data was iterative and the researchers held multiple discussions to realize a better fit for the results and to validate the themes.

Ethics and Consent Statement

Before data collection commenced, we sought authorization from Ntcheu district health Office to conduct the study and we obtained ethical approval from the College of Medicine Research Ethics Committee (COMREC)-P.10/18/2522. All participants were briefed about the study and provided written informed consent or thumb stamping for those who could not read or write. Informed consent forms were both in English (for participants who can read and write English) and Chichewa (for participants who can read and write in Chichewa) for easy

comprehension by all participants. No names were used during the study, during the participant's registration and all identifiers were removed from the data. Data were stored and kept in a lockable cabinet and password-protected computers. All participants consented to the publication of the study results.

Results

Demographic Characteristics of Health Care Workers

We recruited 18 HCWs in the study and we had 4 Clinicians, 4 Nurses, 2 Laboratory Technicians, 2 Environmental Health Officers, 2 Health Surveillance Assistants who serve as VHCs Providers, and 2 HIV Diagnostic Assistants (HDAs). Eleven were males, 12 had tertiary while 6 had secondary education. Each group had 9 participants.

Demographic Characteristics of the Mothers

A total of 20 mothers were interviewed. The mother's age ranged from 21 to 47 years, the median age was 28 (IQR 24-39) years. Of the 20 mothers, 14 had a primary school education, 3 had secondary education and 3 were not educated. Fifteen of the mothers were married, 2 were single and 3 were widows. Seventeen were farmers, 2 were employed formally and one was a business person.

Findings on Acceptability of Integration of Early Infant Diagnosis of HIV Into Village Health Clinics

The participants perceived that the acceptability of integrating EID of HIV services into VHCs is influenced by the 6 constructs of TFA which are Affective Attitude, Burden, Ethicality, Intervention Coherence, Opportunity Costs, and Perceived Effectiveness. Our study did not assess self-efficacy because the intervention has not been implemented yet and that would have created challenges for the participants to determine measures in that component.

Affective attitude. This tenet describes how an individual feels about an intervention. There were both positive and negative attitudes toward integration with suggestions on how to improve the services to enhance acceptability. The ease with the geographical reach of the services was a driving factor for most mother's preference of integrating the services because it would lessen the burden incurred with long distances which is a deterrent to the utilization of services and contributes to delays in accessing results. Some mothers of both HIV-exposed and non-HIV exposed children stated that they already visit both village clinics and health centers when their children get sick.

Village clinic is easier to reach as it is within our villages, I think it will be less congested and our children can have their blood samples drawn much earlier and we can get results at home, you know some guardians are old so traveling over a long distance is a challenge. IDI Participant 15

"You see more people who are shunning away coming here at the hospital will now be taking their children to the village clinic for testing since it's near homes, we won't be spending a lot of money." IDI Participant 20

Although integration of EID of HIV services into VHCs was acceptable to the mothers, they asserted the need of raising awareness among leaders and community members for effective utilization. Participants recommended that health care workers manning VHCs be trained in EID of HIV services for them to provide optimal services which will influence clients' positive attitude toward the services.

Yes I will start to use VHC for my child's HIV services, I am looking forward to it... I am tired of walking and spending money on transport... I will go, provided government assigns well-trained staff in the village clinics. They should make people aware through meetings with traditional leaders. IDI Participant 16

Similarly, a village clinic provider indicated that they would be able to provide the services after they have been trained, mentored, and supported adequately.

I think this is a good development to us, as it will help us to be able to provide EID services apart from the other VHC services, provided we receive adequate training on EID, equipment, supplies, we should also be supported with mentorship, necessary supplies and help to sensitize the communities. FGD 1 Participant 6

Furthermore, some health care workers indicated their willingness to provide EID of HIV services at the village health clinic and emphasized on the benefits of decongesting the facilities that are currently providing the services.

"I think integration will help to decongest our hospital, therefore we need to ensure that EID of HIV is provided in VHCs and we will need to train the HSAs and provide mentorship and supervise the implementation." FGD 2 Participant 6

Burden. This refers to the perceived amount of effort to participate in the intervention. Participants shared both the burden and measures to ease them for the effective integration of EID of HIV services into VHCs. Most mothers stated stock-outs of testing kits for EID of HIV as a potential challenge that will demand adequate planning to avert it.

"The other problems could frequent stock-outs of materials or equipment, or test kits/dried blood sample bundles as is the case with routine testing" IDI Participant 20

Some mothers indicated the need for a house for the HSA who will run the service and a physical structure allocated as an integrated clinic for both under-five and EID of HIV services in the community to support service delivery.

It will be important that there is a house for the provider and the clinic so that these HSA's resides here within the community, [the HCW] should be given a bicycle to transport EID samples and results and everything [HCW] requires for these services from a hospital. IDI Participant 12

On the same, HCWs recommended planning for an adequate supply of resources, training of health providers, and community mobilization. A respondent reported as follows:

As health workers, we have to ensure that at the village clinic all necessary resources are available all the time . . . human and also different supplies . . . because it may happen that community people have accepted and started utilizing the service but you find that test kits or EID bundles are not available, even the one to conduct the testing is not there. FGD 2 Participant 4

Some mothers feared that users might be subjected to stigma and discrimination within the community if EID of HIV services is integrated into VHCs. However, they also expressed hope that with proper sensitization of the community, stigma and discrimination could be minimized. Some mothers thought self-stigma may be a problem and some husbands would bar their wives from accessing HIV services. One participant stated:

Few people discriminate against others and forcing them to avoid using nearby village clinics. However, with time if the chief can put bylaws against stigma then people will accept the service and its users just like other programs on HIV testing or voluntary male medical circumcision. IDI Participant 9

Mothers suggested the use of expert clients to share lived experiences to end stigma and discrimination.

“I think engaging expert clients in these communities to be providing motivation talks during EID services at village clinics can help to reduce stigma in the communities” IDI Participant 5

The commonly cited aspect among health care workers was the perceived increase in workload for village health clinic providers, as they will be expected to conduct the services almost daily.

For HSAs who already have other responsibilities to undertake like educating people about water hygiene and sanitation, conduct an under-five clinic and Expanded Program on Immunization therefore EID of HIV services would be an added responsibility . . . I think the workload may be high. FGD 1 Participant 8

Some health care workers while in agreement with others on the workload at VHCs, suggested proper planning and training of more providers as a measure to lessen the pressure of work.

I think the government may need to consider training more HSAs to manage village clinics so instead of having one HSA per VHC we may need to allocate two, also, with proper planning, I think can help to reduce the pressure of work because a provider will organize his work properly. FGD 2 Participant 7

Participants argued that the community’s acceptance of the intervention requires coordination and linkage with community leaders. Therefore, proper community engagement will

promote the acceptability of the integration of EID of HIV services in VHCs.

I think as we usually do with any community intervention we need to inform local leaders and lobby for their support e.g. Mobilizing their subjects for the building of the clinic, providing moral support to the HSA including ending stigma and discrimination. FGD 2 Participant 1

Ethicality. This refers to the extent to which an intervention has a good fit with an individuals’ value system

Ethicality in this study meant the alignment of the intervention with the HIV policy to increase access to HIV care services. Some of the health workers also expressed willingness to implement and support the intervention because it has the potential of reducing the workload within health facilities and likely improve uptake of EID of HIV services. Participants stated that the default rate in the service is likely to reduce if the distance is shortened.

I think on our side as a hospital I think it’s a good idea. Like we said earlier, others fail to access EID of HIV services because of distance, so I think we will be able to implement and support the intervention, this will also help to decongest health facilities workload, and following up those missing will be easy by our HSAs. FGD 1 Participant 7

Most mothers stated that integration of EID services into existing VHC would facilitate early initiation of EID of HIV to exposed infants and reduce the turn-around-times of the HIV test results.

I think our children will be tested and get results much quicker whilst healthy and start medication on time, otherwise in our villages some few children have died because their parents took them to for HIV testing and started treatment late. IDI Participant 5

Intervention coherence. This refers to the extent to which a participant understands the intervention and how it works.

Most mothers indicated that EID of HIV services and the proposed integration would promote early access which will curb mortality.

We take our children for HIV testing here at the hospital so that we should know if they have HIV or not, they are tested so that they should start medicine earlier and we should protect children as parents from getting the HIV if they are negative. IDI Participant 8

Although some mothers of HIV non-exposed infants admitted to having limited knowledge on the EID of HIV service, they expressed that integration of the services would benefit more children. This was reported as below:

“I feel it is good that this HIV services should come into our villages at VHC, we want good health for our children, getting

testing for children near homes it is a very welcome idea.” IDI Participant 5

Opportunity cost. This refers to the extent to which benefits, profits, or values must be given up to engage in the intervention.

Mothers were primarily concerned with the perceived lack of privacy from health care workers at village clinics as compared to the hospital, which may result in disclosure of their child’s HIV status.

Some health workers don’t keep information about their participants in private such that if they know of someone’s HIV status they are likely to tell others, so it’s better to consult doctors at the hospital since they are well trained if it starts I will continue coming to the hospital until I see how our privacy is maintained. IDI Participant 13.

Although integration of EID of HIV services into VHC decongests the health facilities and promotes an early collection of a blood sample for an HIV test, health care workers feared that the quality of care and sample will be compromised at the facility.

So even if the monitoring is done by the HSA and sample is being taken by them than nurses at the hospital but am not sure if samples will, be of good quality and clinical monitoring of children which we do at the clinic here will also be affected despite decongestion and reducing distance anyway I think we will need to intensify mentorship and supervisions. FGD2 Participant 7

Perceived effectiveness. This refers to the extent to which the intervention is perceived as likely to achieve its purpose.

The majority of HCWs indicated that integration of EID of HIV services into VHCs will decongest the Pediatric HIV clinic at the district hospital.

“There will be no congestion, children will be accessing EID testing earlier as mothers will be taking their children to the village clinic earlier as is close to their homes” FGD2 Participant 1

Most mothers asserted that they will learn the status of their child earlier than they currently do, and that would motivate them to adhere to EID services.

We take our children for HIV testing here at the hospital so that we should know about their bodies if they have HIV or not, we test them so that they should start medicine earlier, therefore with the same reason I will be taking my child to the village health clinic. IDI Participant 17

Integration of the services is likely to reduce morbidity and mortality rates secondary to HIV infection since services will be closer to the users which would accelerate timely utilization.

Some children are dying with HIV because of lack of access to the treatment due to the failure of the guardians to come and access the

testing especially when the guarding is old and with this poverty, people end up stop coming to the hospital with children. IDI Participant 13

These services will be good, you know a lot of children are dying of HIV? Now once this starts, all our children will be tested and initiated on ART earlier . . . if positive, definitely am sure deaths will reduce, sickness of children will drop, coughs as infants will get treatment early. IDI Participant 11

Discussion

Our study found that the acceptability of EID of HIV services integration into VHCs among mothers and HCWs is influenced by perceived benefits that result from having the service closer to the community. The benefits include a reduction in the distance covered to access EID of HIV thereby reducing the costs incurred when accessing the services, early HIV testing with a quick turn-around-time of results resulting in timely initiation of HIV care. Early access to services has the potential to reduce morbidity and mortality among HIV-exposed children. Health care workers’ acceptability of EID of HIV services integration in VHC is influenced by the likelihood of increased uptake of and retention in the EID services. Furthermore, they favored integration because it would improve operations in HIV services such as turn-around-time of results, reduction of the workload at the health facility that currently manages EID services. The factors that may impede the acceptability of integration of EID into VHCs are stigma and discrimination, inadequate supplies and, infrastructure, suboptimal planning, and documentation.

Affective Attitude

Our study showed that a positive attitude of HCWs enhances early testing of HIV exposed children in the community and promotes integrated EID services. Similar findings were reported earlier that integration of services is increasingly recognized as a case-finding strategy for children missed from prevention of mother-to-child transmission programs and as a platform for diffusing emerging technologies such as point-of-care diagnostics provided HCWs have a good attitude toward provision of the services to people in the community.²⁵ Furthermore, a Malawian study showed that community health workers are capable of conducting house visits, providing counseling, and educating people on EID of HIV services as long as they are well trained and this resulted in improved knowledge on the testing process, adherence to EID guidelines and yielded positive attitude toward EID of HIV care.²⁶

In our study, mothers were willing to have EID of HIV services within VHCs because it accelerates the time it takes for their children to have an HIV test and shortens the distance covered to access the services at health centers.²⁷ A reduction in the distance removes the burden to reach facilities by mothers thus enhancing access and use of the services.²⁸ These findings concur with a study in Kenya that reported that

provision of services at home eliminates associated transport costs, increases access, and creates an environment that normalizes HIV care and testing.²⁹

Burden

Our findings that the unavailability of supplies like testing kits or Dried Blood Spots bundles as a barrier to a successful implementation of the intervention was also reported in Uganda.³⁰ The Ugandan study further stated that the health system challenges can be addressed by continuous engagement of relevant stakeholders like District health managers, local assemblies, and Non-Governmental Organizations that support procurement and supply of HIV test kits.³⁰ As was the case in our study, an Ethiopian study earlier reported that stock-outs of supplies such as test kits impeded the use of HIV services and affected the integration of HIV-Sexual Reproductive Health Services for young people.³¹ Therefore, strengthening the supply chain system, storage, improving the quality of the data when integrating EID of HIV services into VHCs is fundamental to achieve effective results.³¹

Furthermore, there is an unintended consequence with the provision of EID of HIV services within the community which is a perceived increase in stigma, discrimination, and potential for unwanted disclosure of an HIV infected status.⁵ The fear of stigma and discrimination by people accessing EID of HIV services at VHCs, which may lead to non-uptake of services, remains consistent with previous studies.²⁸ A study in Uganda reported that community HIV services were associated with stigma and fear of disclosing an HIV status to significant others which affected access and resulted in low uptake of chronic HIV care and EID after PMTCT.³² We argue that continuous community sensitization remains key in the mitigation of stigma and discrimination.³³

Infrastructure such as clinic building and staff houses are key components for the integration of EID of HIV services in VHCs. These were also reiterated in a Ugandan study where adequate infrastructure especially clinic structures that promoted privacy, confidentiality, and quality of services were a necessary resource for service integration.³⁴ On the other hand, lack of adequate infrastructure is a key challenge when integrating EID of HIV services into VHCs.²⁸ Community-led projects could be leveraged as a viable platform where members could assist in ensuring the availability of infrastructure by constructing a house for a health care worker and a clinic.¹² As previously reported, community mobilization which includes the engagement of local leaders, orientation, and community sensitization of the intervention will promote community participation, and facilitate EID of HIV and treatment.²⁵ Availability of houses to accommodate HSAs so that they reside within the community is key and remains pre-requisites for efficient outcome EID of HIV programs.¹¹

The potential of an increased workload as reported in our study remains consistent with the nature of services in sub-Saharan countries which leads to the provision of sub-standard services to clients.³⁵ A systematic review of the

delivery of ART services identified task-shifting from health workers to other lay people as the most cost-effective approach in managing increased workload.³⁶ Malawi has adopted task-shifting in the provision of several services within the HIV program and this would not be a challenging aspect to implement. Task-shifting in Malawi has resulted in increased access to HIV services with good program outcomes despite staff shortages.³⁷ Our study reported that well-trained personnel are required to provide quality EID of HIV services which cement what an earlier study in Malawi recommended on supporting health surveillance assistants with training, supervision, and mentorship.³⁸

Ethicality

The reduced distance to access the services by mothers, early sample collection, early EID results collection and reduced loss to follow-up remain congruent with peoples' expectations to have the children access HIV services and improve health.³⁹ Our findings concurred with a study in Uganda that reported an increased uptake of EID of HIV and associated this positive outcome to reduced distance, increased collection of results, and follow-up of infants at 6 weeks.⁵ Our findings that the perceived benefits from early initiation of treatment, reduced morbidity, and mortality which in turn influenced their perceived acceptability for the service into VHCs corroborates with results from India.⁴⁰ Our study reports that having services closer to the end-users accelerate a quick turn-around-time of results thereby improving uptake of EID services and this concurs with findings from a Tanzanian study where a timely collection of samples and provision of EID improved the community's utilization of the services.⁴¹

Intervention Coherence

A clear understanding of the proposed intervention promotes access and use of the service and in this study, most mothers and health care workers understood the EID of HIV services and VHCs. These findings are similar to reports from Lesotho where they piloted very early infant diagnosis of HIV and found that mother's access to service was as a result of being knowledgeable of EID which translated into the ability of mothers to provide the appropriate care for their children coupled with appropriate measures taken to protect children from illnesses.⁴²

Opportunity Cost

Although mothers were aware of the low levels of training among Village Health Providers, they were still willing to access EID of HIV services at VHCs than a health facility. VHC providers are deemed less experienced and likely have challenges in maintaining the privacy of patients. Similarly, a study done in Uganda demonstrated that women forgo EID of HIV services provided at a health facility and opted for HIV services provided at VHCs irrespective of the quality of care.³⁸

Their greatest motivation was the ease in access and reduced costs gained.⁴³ Notably, in Uganda the community health workers, village health teams, and volunteers were adequately trained on confidentiality with emphasis on maintenance of people's privacy in the community.⁴³ To effectively implement EID of HIV in VHCs in Malawi, an investment in training of community workers would strengthen the delivery of services.

Perceived Effectiveness

Mothers and HCWs indicated that integration of services would minimize rates of loss-to-follow-up which cements earlier findings from Tanzania where loss-to-follow-up was addressed through the integration of EID services into community health systems.²⁶ Although integration of EID into community health services safeguards the lives of HIV-infected infants and children, it will require collaboration and networking among stakeholders in EID to achieve optimal service delivery.⁴⁴ Our findings on reduced congestion in HIV clinics at the hospital corroborates with findings from a study that identified models of HIV care and treatment service delivery in Tanzania, Uganda, and Zambia and found that integration and use of lay workers reduced clients load and enhanced delivery of services.⁴⁵

Study Strengths and Limitations

The strength of this study is in the triangulation of methods of data collection and sources that were employed. We employed in-depth interviews and FGDs and included women and health care workers hence soliciting broad and deep nuances on the subject from key stakeholders in EID of HIV services. Although this study was done on a smaller scale and used non-generalizable methods, the findings are beneficial to the local context as policymakers plan on measures for improving EID of HIV service and also maximizing universal health coverage. The limitation of the study was that some sampled mothers and health care workers refused to consent and take part in the study and they may have had different insights into the acceptability of the services. The fact that we only sampled from those that reported at the clinic limits our findings to such a group and may inadequately reflect those that were not or rarely used the clinic. Further research should pilot integrated services and learn the implementation strategies, outcomes, and clinical benefits of such. Our study has outlined the measures that need to be incorporated in integrating EID of HIV services in VHCs by suggesting what would hinder or facilitate the acceptability of the process. Our study has investigated this under a framework that yields a comprehensive view of the aspect. However, our study has assessed more on their perceptions which may be different from assessing the reality with the intervention in place. Nonetheless, it adds to the body of literature on the integration of EID in VHCs.

Conclusion

Mothers and HCWs accepted the integration of EID of HIV services into VHCs as it has the potential to increase the uptake of EID of HIV among HIV exposed infants, reduce morbidity and mortality among infants, and reduce time and finances associated with access to services. The integrated clinics will also reduce loss to follow up of mothers and HIV exposed infants and encourage the collection of EID results early. However, successful integration of EID and HIV into VHCs requires health systems strengthening and community awareness and involvement. More implementation studies are needed to assess the feasibility and effectiveness of the integration of EID of HIV services into VHCs.

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Availability of Data and Materials

The datasets used are available from the corresponding author on request.

Declaration of Conflicting Interests

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Supplemental Material

Supplemental material for this article is available online.

References

1. Ciaranello AL, Perez F, Keatinge J, et al. What will it take to eliminate pediatric HIV? Reaching who target rates of mother-to-child HIV transmission in Zimbabwe: a model-based analysis. *PLoS Med.* 2012;9(1):e1001156.
2. Ministry of Health and Population-Malawi. *Malawi Clinical HIV Guidelines 2018*. 3rd ed. Lilongwe; 2018: 300.
3. Slogrove AL, Powis KM, Johnson LF, Stover J, Mahy M. Estimates of the global population of children who are HIV-exposed and uninfected, 2000–18: a modelling study. *Lancet Glob Heal.* 2020;8(1):e67–e75. doi:10.1016/S2214-109X(19)30448-6

4. World Health Organisation. *HIV/AIDS Programme WHO Recommendations on the Diagnosis of HIV Infection in Infants*. WHO, editor. WHO press; 2010:10–27.
5. UNICEF Supply Division. *HIV Early Infant Diagnosis and Viral Load Point of Care Diagnostics: Market and Supply Update*. 2020; 0–12. https://www.unicef.org/supply/files/HIV_EID_VL_POC_Dx_Update_Market_Note.pdf
6. Otiso L, Mccollum R, Mireku M, Karuga R, de Koning K, Taegtmeier M. Decentralising and integrating HIV services in community-based health systems: a qualitative study of perceptions at macro, MESO and micro levels of the health system. *BMJ Global Health*. 2017;2(1):e000107.
7. Ministry of Health and Population-Malawi. *Government of Malawi Ministry of Health-Integrated HIV Program Report June 2017*. Lilongwe; 2017.
8. National AIDS Commission. *Malawi AIDS Response Progress Report 2015*. Lilongwe; 2015.
9. Harries A, Nyirenda R, Musopole O, Mtika C, Sinyiza F, Yu KL. Early infant diagnosis and outcomes in HIV-exposed infants at a central and a district hospital, Northern Malawi. *Public Heal Action*. 2017;7(2):83–89.
10. Thiha S, Shewade HD, Philip S, et al. Early infant diagnosis of HIV in Myanmar: call for innovative interventions to improve uptake and reduce turnaround time. *Glob Health Action*. 2017; 10(1):1319616. <https://doi.org/10.1080/16549716.2017.1319616>
11. Nsona H, Mtimuni A, Daelmans B, et al. Scaling up integrated community case management of childhood illness: update from Malawi. *Am J Trop Med Hyg*. 2012;87(Suppl 5):54–60.
12. Zembe-Mkabile WZ, Jackson D, Sanders D, et al. The “community” in community case management of childhood illnesses in Malawi. *Glob Health Action*. 2016;9(1):29177.
13. Lenka SR, Bitra G. Integrated health service delivery: why and how? *Natl J Med Res*. 2013;3(3):297–299.
14. Measured Evaluation. *Integrated Service Delivery in Malawi a Case Study Integrated Service Delivery in Malawi a Case Study*. 2015.
15. Ministry of Health and Population-Malawi. *Government of Malawi Ministry of Health Integrated HIV Program Report-September 2018*. Lilongwe; 2018.
16. Ciaranello AL, Park J, Ramirez-Avila L, Freedberg KA, Walensky RP, Leroy V. Early infant HIV-1 diagnosis programs in resource-limited settings: opportunities for improved outcomes and more cost-effective interventions. *BMC Med*. 2011;9(59):1–15.
17. Jennings GR. Qualitative research methods. In: *Handbook of Research Methods in Tourism: Quantitative and Qualitative Approaches*. 2012. doi:10.4337/9781781001295
18. Thomas DR. A General inductive approach for analyzing qualitative evaluation data. *Am J Eval*. 2006;27(2):237–246.
19. Sekhon M, Cartwright M, Francis JJ. Acceptability of healthcare interventions: an overview of reviews and development of a theoretical framework. *BMC Health Serv Res*. 2017;17(1):88. doi:10.1186/s12913-017-2031-8
20. Anderson CA, Bushman BJ, Bandura A, et al. Using thematic analysis in psychology using thematic analysis in psychology. *Psychiatr Q*. 2014;0887(1):37–41. <http://www.ncbi.nlm.nih.gov/pubmed/11752478>
21. Burla L, Knierim B, Barth J, Liewald K, Duetz M, Abel T. From text to codings. *Nursing Res*. 2008;57(2):113–117. doi:10.1097/01.nnr.0000313482.33917.7d
22. Schadewitz N, Jachna T. Comparing inductive and deductive methodologies for design patterns identification and articulation. In: *International Design Research Conference IADSR 2007 Emerging Trends in Design Research*, 12-15 November 2007, Hong Kong, 2007.
23. Breimaier HE, Heckemann B, Halfens RJG, Lohrmann C. The Consolidated Framework for Implementation Research (CFIR): a useful theoretical framework for guiding and evaluating a guideline implementation process in a hospital-based nursing practice. *BMC Nurs*. 2015;14(1):43. doi:10.1186/s12912-015-0088-4
24. Harding T, Whitehead D. Analysing data in qualitative research Thomas. *J Am Vet Med Assoc*. 1988;193(5):565.
25. Bobrow EA, Yemaneberhan AG, Phiri M, et al. Barriers, facilitators and recommendations for the early infant diagnosis and treatment (EIDT) cascade: a qualitative study in Malawi. *S Afr J Child Health*. 2016;10(2):116–120.
26. Dube Q, Dow A, Chirambo C, et al. Lessons from the implementing early infant diagnosis of HIV infection at the primary care level: experiences and challenges in Malawi. *Bull World Health Organ*. 2012;190(9):699–704.
27. Ministry of Health and Population-Malawi. *Government of Malawi Ministry of Health Integrated HIV Program Report*. Lilongwe; 2017.
28. Ahumuza SE, Rujumba J, Nkoyooyo A, Byaruhanga R, Wanyenze RK. Challenges encountered in providing integrated HIV, antenatal and postnatal care services: a case study of Katakwi and Mubende districts in Uganda. *Reprod Health*. 2016;13:41. doi:10.1186/s12978-016-0162-8
29. Hassan AS, Sakwa EM, Nabwera HM, et al. Dynamics and constraints of early infant diagnosis of HIV infection in rural Kenya. *AIDS Behav*. 2012;16(1):5–12.
30. Hart D, Musinguzi M, Ochen R, Katushabe J, Rujumba J. Closing the gap in HIV prevention and care for children: early insights from a model that links communities and health care facilities in Uganda. *Vulnerable Child Youth Stud*. 2016;11(3):281–285. doi:10.1080/17450128.2016.1198855
31. Kebede B, Gebeyehu A, Jain S, Sun S, Haubrich R. Delay in early infant diagnosis and high loss to follow-up among infant born to HIV-infected women in Ethiopia. *World Journal of AIDS*. 2014; 4(04):402–412.
32. Mugasha C, Kigozi J, Kiragga A, et al. Intra-facility linkage of HIV-positive mothers and HIV-exposed babies into HIV chronic care: rural and urban experience in a resource limited setting. *PloS One* 2014;9(12):e115171.
33. Kim MH, Ahmed S, Buck WC, et al. The Tingathe programme: a pilot intervention using community health workers to create a continuum of care in the prevention of mother to child transmission of HIV (PMTCT) cascade of services in Malawi. *J Int AIDS Soc*. 2012;15(Suppl 2):1–11.
34. Jani IV, Meggi B, Mabunda N, et al. Accurate early infant HIV diagnosis in primary health clinics using a point-of-care nucleic acid test. *JAIDS*. 2014;67(1):1–4.

35. Ambia J, Mandala J. A systematic review of interventions to improve prevention of mother-to-child HIV transmission service delivery and promote retention. *J Int AIDS Soc.* 2016;19(1):20309.
36. Fulton BD, Scheffler RM, Sparkes SP, Auh EY, Vujicic M, Soucat A. Health workforce skill mix and task shifting in low income countries: a review of recent evidence. *Hum Resour Health.* 2011;9(1):1. <http://www.human-resources-health.com/content/9/1/1>
37. Bemelmans M, Van Den Akker T, Ford N, et al. Procurer l'accès universel à la thérapie antirétrovirale à Thyolo, au Malawi, par la délégation des tâches et la décentralisation des soins VIH/SIDA. *Trop Med Int Heal.* 2010;15(12):1413–1420.
38. Izudi J, Auma S, Alege JB. Early diagnosis of HIV among infants born to HIV-positive mothers on option-B plus in Kampala, Uganda. *AIDS Res Treat.* 2017;2017:4654763.
39. Paranjpe SM, Phakade RS, Ingole NA, Mehta PR. Early infant diagnosis (EID) of HIV: an experience at a tertiary care hospital in India. *World Journal of AIDS.* 2012;2012:1–5.
40. Hanna LE, Siromany VA, Annamalai M, Karunaianantham R, Swaminathan S. Challenges in the early diagnosis of HIV infection in infants: experience from Tamil Nadu, India. *Indian Pediatr.* 2015;52(4):307–309.
41. Nance N, McCoy S, Ngilangwa D, Masanja J, Njau P, Noronha R. Evaluating the impact of community health worker integration into prevention of mother-to-child transmission of HIV services in Tanzania. 2017. http://www.3ieimpact.org/media/filer_public/2017/07/14/ie61-health-services-tanzania.pdf
42. Gill MM, Mofenson LM, Phalitse M, Tukei V, Guay L, Nchephe M. Piloting very early infant diagnosis of HIV in Lesotho: acceptability and feasibility among mothers, health workers and laboratory personnel. *PLoS One.* 2018;13(2):1–11. doi:10.1371/journal.pone.0190874
43. Namukwaya Z, Barlow-Mosha L, Mudiope P, et al. Use of peers, community lay persons and Village Health Team (VHT) members improves six-week postnatal clinic (PNC) follow-up and Early Infant HIV Diagnosis (EID) in urban and rural health units in Uganda: a one-year implementation study. *BMC Health Serv Res.* 2015;15:555. doi:10.1186/s12913-015-1213-5
44. David AS, Steve OK. Overcoming the challenges of Early Infant Diagnosis of HIV in low- and middle-income settings. *Int J Nov Res Life Sci.* 2015;2(3):16–26.
45. Tsui S, Denison JA, Kennedy CE, et al. Identifying models of HIV care and treatment service delivery in Tanzania, Uganda, and Zambia using cluster analysis and Delphi survey. *BMC Health Serv Res.* 2017;17(1):811.