RESEARCH ARTICLE

Stakeholder Engagement to Drive Iterative Software Development of the ART-Access Web-Based Application for Community Pharmacy Dispensing of Anti-Retroviral Therapy

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Introduction: Significant advances in combination anti-retroviral therapy have been instrumental in improving the quality of lives and life expectancy for people living with HIV. However, in the absence of a cure, sustained investment and innovation is required to improve adherence and quality of life for people living with HIV. We developed ARTAccess, a web-based application that links patient information on anti-retroviral therapy and viral load to an algorithm that guides a private community pharmacist on anti-retroviral therapy refills without the need for an additional nurse in the pharmacy. The aim of this paper is to describe the present the development process of the ARTAccess application and the exploration of the perceptions about its use by end users.

Methods: Between October–December 2018, we conducted a qualitative observational study to document the processes of the ART-Access™ application development. Using theoretical frameworks of participatory action research and human-centred design, we undertook structured and unstructured observations of the application development review meetings. We observed and had interactions in 12 stakeholder meetings. Three observers attended each development meeting and independently drafted a reflective narration of the transcript and separately conducted their own analyses. ARTAccess was launched in January 2019 and in March 2019, three in-depth interviews were conducted with the nurse dispensers running the refill program at the three pharmacies where ARTAccess was piloted.

Results: The ARTAccess application development meetings generated emerging themes. Introduction of a mHealth application for efficiency introduced job insecurity fears of health workers which needed to be addressed, to allow for increased engagement by health worker stakeholders. Stakeholder meetings provided important perceived gaps and needs for improvement at each stage of the ARTAccess application development. The user-centred design process led to five application versions; three more than the two originally planned; the feedback on the ARTAccess application became more positive as later versions were presented to stakeholders.

Conclusions: The study provides evidence that participatory action research in a human-centred design approach enhanced the application development process of a new technology for health. In resource limited settings, where digital technologies may be used to support overstretched health systems, health workers need re-assurance that digital tools being developed will not threaten their employment.

Keywords: ARTAccess, application, pharmacy refill, perceptions, mhealth, Uganda, qualitative research

Background

Over the past few decades, access to HIV treatment (anti-retroviral therapy; ART) has transformed HIV from a fatal illness into a chronic condition. The public health approach to HIV treatment introduced by the World Health Organization means that of the 37.9 million people living with HIV in 2021, 24.5 million of these were accessing antiretroviral therapy (ART)[1]. Significant advances in ART have been instrumental in improving the quality of lives and life expectancy for people living with HIV (PLHIV). Furthermore, adherence to HIV treatment prevents transmission of HIV to others through achievement of virological suppression[2]. In the absence of a cure for HIV, achieving community virological suppression through sustained investment and innovation is required to continue focus on advances to improve adherence and quality of life for PLHIV.

The Joint United Nations Program on HIV/AIDS (UNAIDS) has a flagship strategy of 95-95-95, which sets targets to end the HIV epidemic by 2030 through achieving 95% of the population knowing their HIV status, 95% on treatment and 95% with an undetectable viral load[3]. UNAIDS has built expectations of continued innovations into its projections and the strategy warns that without this progress, we may see a progressive expansion of the HIV burden globally[4]. One of the key opportunities for extending HIV care is to have as many people living with HIV (PLHIV) as possible in differentiated service delivery (DSD) models. DSD is a person-centered approach to allow PLHIV to access their medication where it is most convenient for them. This reduces time and cost of travel for the PLHIV to a Ministry of Health facility and reduces burden on health facilities; while increasing adherence, reducing loss to follow up and minimizing PLHIV and health care resources needed for service delivery[5].

Within Kampala, the capital of Uganda, there are approximately 215,000 PLHIV. However, as with other high HIV burden countries, there is a high PLHIV-health care worker ratios, congestion and PLHIV frustration due to long clinic waiting times. Consequently, this translates into barriers to client retention and adherence to treatment. 94% (202,000) of the PLHIV in Kampala are stable with suppressed viral loads. These PLHIV are stable on treatment, leading busy productive lives and don't need to be seen by their primary HIV care physician so frequently and so DSD is an important option to support these PLHIV.

At the Infectious Diseases Institute (IDI) in Kampala, Uganda, new models of care have been developed and tested over the last 10 years. These include DSD models such as pharmacy refills, electronic medical records that in part allowed for task shifting, development of specialist clinics, and a co-pay out of hours service[6]. In November 2016, the IDI supported Kampala Capital City Authority (IDI-KCCA) in a pilot project funded by the United States Presidents Emergency Fund for AIDS Relief (PEPFAR) programme to commence a community-based ART care model called the Community Medicine Refill Program (CMRP). Four KCCA facilities were implementing the program; Kiswa, Kisenyi, Kawaala, and Kitebi Health Centres. They were linked to six selected community pharmacies. The community pharmacies provided low frequency, high quality HIV services (including ART refill) for eligible stable clients under IDI-KCCA care. Under this program, each patient's medicines are regularly sourced from their respective primary KCCA health facility and delivered to the community pharmacy of patient choice. Each client is attached to one pharmacy and each pharmacy is annexed to one particular KCCA health facility. At their respective community pharmacy, each client was attended to by IDI-supported nurse dispensers who provided the services. Each PLHIV returned to the KCCA clinic every six months as shown in figure 1. Data at the community pharmacy was captured manually on designated paper records by the nurse dispenser. They returned to the main IDI offices every Friday to transcribe this data to the main database.

Figure 1: ART Visit Type by Visit Number for CMRP

Visit	Visit type and services
Facility refill visit (start)	Review of inclusion criteria
	Doctor visit.
	Counselor visit (counseling about refill program, adherence)
	Refillable prescriptions (prescription for 2 months of drugs)
Visit 2	Community pharmacy refill visit (dispense 2 months of drugs)
Visit 3	Community pharmacy refill visit (dispense 2 months of drugs)
Visit 4 (Facility refill visit)	Doctor visit.
	Lab investigations
	Refillable prescriptions (prescription for 2 months of drugs)
Visit 5	Community pharmacy refill visit (dispense 2 months of drugs)
Visit 6	Community pharmacy refill visit (dispense 2 months of drugs)

Community pharmacy refill using ARTAccess. In order to decrease the reliance on an additional nurse in the community pharmacies, and the paperwork associated with the CMRP, the ARTAccess application was developed between 2017 and 2019 supported by funding from the UK Medical Research Council. ARTAccess is a web-based application that links patient information on ART and viral load to an algorithm which guides a private community pharmacy on ART delivery with real-time data entry and client clinical monitoring. The application captures the patients' demographics, unique identifier, current ART regimen, current viral load, treatment adherence score, clinical complaints, follow-up outcomes and reasons for missing appointments. This is then stored at a staging/central point for validation before being uploaded to the cloud servers.

While there is potential for ART ACCESS to transform HIV service delivery through the DSDM model, many electronic or e-Health and/ or mobile or m-Health related interventions in Sub-Saharan African have not moved past the pilot stage to scale[7]. Lack of user input/participation in the conceptualisation and development of mHealth tools has been shown as a significant factor in high failure rates of mHealth tools[8].

The aim of this paper is to document the used a user guided/human centred design approach that was taken in the iterative design and piloting of the application. We undertook a qualitative study alongside the design process and the objective of the study was to document the process, barriers and successes of this approach. This paper uses the qualitative data collected to describe the overall development and stakeholder engagement process of the ARTAccess tool development.

Methods
The study had two closely linked qualitative research activities. Activity one involved a general ethnography predominantly relying on structured and unstructured observations of participants during design meetings and the second activity focused on in-depth interviews of stakeholders on precise aspects of the tool. We aimed to generate an in-depth exploration and detailed understanding of the process involved in the development of this new technology. Also, we explored the interactions between different members of the development team with the end users and how this affected the development process.

Data collection methods. The mhealth application was in development and piloting between October 2017 and January 2019, with an early version ready in October 2018. Between October and December 2018, we conducted a qualitative observational study to document the late stage testing process of the ARTAccess application. Using a theoretical framework of human-centred design[9] and community engagement for mHealth development[10], we organised 13 meetings to engage stakeholders. Stakeholders for these meetings were purposefully selected to include a representation of all health workers and support staff who are likely to use the tool (including Kampala Capital City Authority health management staff, information system staff, KCCA health facility staff, private pharmacy nurses, technicians, IDI-KCCA staff not involved in software development). Stakeholder meetings were chaired by ARTAccess research co-ordinator and attended by project staff and software developers working on the application at the IDI offices in Kampala. Later stakeholder meetings included ARTAccess

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application demonstrations at the three pharmacies and in four health facilities, table 1). At each stakeholder meeting, the study coordinator presented the ART Access application in a powerpoint slide presentation (Microsoft Windows 2018) and live demonstration. The different parts of the application and how they were integrated were presented in a flow chart with differences from the current paper system highlighted (appendix 1). Questions were encouraged from the stakedholders and feedback was solicited from stakeholders by the ARTAccess project team on whether the application was feasible, time saving and how the team could improve the application.

ARTAccess was piloted in three pharmacies (Shubh, Cedars and Hefra) in the KCCA-IDI CRDP system in starting January 2019, with three pharmacies (Oak, Alyeen and Aster) which continued to use the paper system. In March 2019, three in depth interviews were conducted with the nurse dispensers running the refill program and attending to clients at the three pharmacies where ARTAccess Application was piloted, who also had previous experience with the paper based system. A topic guide was developed (appendix 2) .

Analysis. Three observers attended each development meeting and independently drafted a reflective narration of the transcript and conducted their own analyses. Themes explored included: first impressions of ART-Access user requirements for ART-Access; and interactions between study staff and developers, implementers, pharmacy and health facility staff (end users). Reflections from stakeholder meetings suggested how to improve the application tool. Audio recordings of in-depth interviews were transcribed and typed verbatim and cross-checked by team members for accuracy. Data was analysed thematically and by content using Nvivo version 12. Themes analysed included: Nurse dispenser challenges with the community pharmacy re-fill programme, perceptions of how the ARTAccess App would address the IDI-KCCA community pharmacy refill program challenges and challenges that would affect the use of ARTAccess application and proposed solutions.

Ethical approval This study was approved by Makerere University School of Public Health Higher Degrees Research and Ethics Committee (HEDREC) and Uganda National Council of Science and Technology (UNCST). All Participants signed consent forms before start of interviews and received explanation regarding audio recording.

Table 1: Participants in ARTAccess development meetings and key informats interviewed

Category of meeting	Number of participants	Designation of participants in App Development	Date of presentation	Version of tool
1. Preparatory/Planning meeting	16	App developers (2), Investigators (2),Other IDI staff (7) Health Economists (2), JCRC Staff (1), Observers (2)	6th AUG 2018	1.0
2. Implementers of the Application	13	App developer (1) Investigators (2), Other IDI Staff (7), Observers (3),	8th OCT 2018	1.0
3. ARTAccess Intergration	10	App developers (2), IDI staff (5), Observers (3)	10th OCT 2018	1.1
4. End-Users	16	App developers (2), Nurse dispensers (6), Pharmacy staff (2), IDI staff (3),Observers (3)	19th OCT 2018	2.0
5. Alyeen Pharmacy	6	Pharmacy staff (2), IDI staff (2),Observers (2),	12th NOV 2018	3.0
6. Aster Pharmacy	7	Pharmacy staff (3), IDI staff (2), Observers (2).	12th NOV 2018	3.0
7. Shubh Pharmacy	7	Pharmacist staff (4), IDI staff (1), Observers (2).	15th NOV 2018	3.0
8. Kawaala HC IV	7	Health facility staff (2), IDI staff (2) , Observers (3).	19th NOV 2018	3.0
9. Kisenyi HC IV	9	Health facility staff (5), IDI staff (2), Observers (2).	20th NOV 2018	3.0
10. Kiswa HC IV	7	Health facility staff (3), IDI staff (2), Observers (2).	22th NOV 2018	3.0
11. Kitebi HC IV	6	Health facility staff (2), IDI staff (2), Observers (2).	21st NOV 2018	3.0

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12. Kampala City Council Authority (KCCA) Staff.	19	KCCA staff (15), IDI staff (2), Observers (2).	31st MAY 2019	5.0
13. In-depth Interviews	3	Pharmacy Nurse Dispensers (3)	29th MAR 2019	4.0
TOTAL participants	**125**			

Results

Stakeholder Meetings

This first section of results includes impressions of ART Access application and interactions with staff and stakeholders during stakeholder engagement meetings.

First impressions of ARTAccess application At each stakeholder meeting, the study coordinator presented the ART Access application in order to to get feedback from stakeholders on whether the application was feasible, time consuming and how we were going to demonstrate to users its importance. As ARTAccess was being presented positive and negative expressions with lots of nods, laughter and sometimes total silence followed by numerous questions and concerns were observed. Most participants concurred that for the application to be used, stakeholders needed to understand it better. The contribution of health economists and other experts in improving ARTAccess was also considered important. The stakeholder positive opinions on usability of ARTAccess and the speed of understanding of utility of the tool by stakeholders increased as each iteration of the tool was presented.

Most common key responses from stakeholders One of the frequent first responses of the the stakeholders was concern that the ARTAccess application could take over the role of nurses and put their livelihoods at risk. There was also concern that there would be insufficient documentation of PLHIV data. It was expained that the ARTAccess application was like a "mirror" and would be a digital copy of the current paper records. This point was well received as portrayed by the facial expressions showing understanding from participants. Provision of an "off line" version of ARTAcess was a frequent question in many stakeholder meetings due to the intermittant internet service and high data costs in Uganda during the time of the application development.

Patient specific concerns Multiple patient safety issues were raised and examples of these are shown in figure 2.

Figure 2 – Patient safety concerns with ARTAccess Application

- Identification of client
- Pregnancy screening (date of last menstrual period)
- Updating system after medication switch
- Capture of client discontinuation or death
- Appointments on specific drug refil dates
- How to monitor for client not attending or coming on wrong date
- How to manage drug stock outs
- How to reschedule clients
- How quality control of pharmacies will be managed

Data collection and synchronisation issues Stakeholders provided a lot of feedback related to data collection and sharing. In early version presentations it was questioned whether the ARTAccess application would send any data to the health facility and if a hard copy of the data would be retained. The project team was tasked to ask how data would be shared between facility, pharmacy and if there would be a central database at IDI. Stakeholders asked about who was going to enter data, whether the eligibility form was going to be filled manually and what would happen if there was a delay in filling data. There were worries raised about possible corruption at a pharmacy level, and the need for systems in place to ensure no manipulation of patient numbers. Use of bio-metrics tools such as electronic fingerprints were suggested to prevent abuse of the system.

ARTAccess application development specific guidance received The stakeholders raised the need

to interview pharmacists (as main owners of community pharmacies) and get their opinions about the Application. Additionally, the team were advised to invite health facility in-charges for stakeholder meetings and to interview patients on their feelings about picking drugs from community pharmacies.

Interactions between study staff and stakeholders The observers noted free interaction between the staff and stakeholders. This was evidenced by the ability of the stakeholders to raise concerns and be open about possible issues that might occur during ARTAccess. Body language and tone of voice indicated free communication between the teams. However, in some instances, changes in tone of voice were particularly observed as stakeholders expressed concerns about loss of jobs and feasibilty of the application.

Post stakeholder meetings the project team including co-ordinator, study nurse and software developers worked to update the application using feedback from the meetings. Most of the concerns highlighted were addressed in subsequent developments of the application. Overall there were five iterations of the tool with changes as shown in table 1.

Nurse Dispenser Feedback during pilot phase of ARTAccess use

The nurses using the ARTAccess tool in the pilot were able to highlight some benefits of the tool as compared to the paper system and those still using the paper system highlighted some the challenges they hoped that the ARTAccess tool would fix. The most reported benefits of the ARTAccess application were supporting communication between facility and pharmacy, less lost to follow up risk, time saving, better record keeping and better planning of daily activities. The identified challenges included lack of computers, internet failures and system restrictions to the users.

Benefits of the ARTAccess system
Bridging the communication gap between facilities staff and Nurse Dispensers Nurses felt there was a communication gap between the nurse dispensers in the community pharmacies and the health workers at the facilities using the paper system.
"…..*there is a communication gap between the nurses at community pharmacies and the health workers at the facility. In case a client has a high viral load that client has to be terminated from the community pharmacy program but health workers at the facility don't inform us*" (*Nurse Dispenser*)

This sometimes led to the patients getting refills from both the facility and pharmacy. It also created unnecessary work for the nurse tracing a client to see why they have not attended the pharmacy for refill, when they have attended the facility. The nurse dispensers expressed hope that the ARTAccess Application would allow both facility health workers and nurse dispensers at pharmacies to see information about clients.
"*There is a new tool which was introduced to us …. if you attend to a client, the health workers at the facility are able to see that client's details for example the type of drugs given to the client, client's next appointment etc*" (*Nurse Dispenser*).
A nurse further explained that this will make it easy to track client appointments from both facility and pharmacy.
"*any client who comes back without a six months' appointment from the facility we have to refer that client back to the facility; we don't dispense to that client yet the client is still active in the community pharmacy program since the health workers forget to record on the client's card so that is why I bring in the app system to help us track client's facility appointments.*" (*Nurse Dispenser*)

Improved client management. With the manual system of registers and books, clients who miss their appointments may not be easily identified for follow up. Nurses highlighted that the ARTAccess application automatically displays the clients who missed appointments once they fail to attend on their scheduled date, as well as those who have not attended for 30 days and have not attended for 90 days of scheduled date. This is displayed on all the three application interfaces (pharmacy, facility and IDI server) making it easy for all parties to be notified and follow up as soon as possible.
"*The app shows you the list of clients lost to follow up and clients who have missed their appointments. So, you can go through the list and get to know how many have missed and then you inform the facility*" (Nurse Dispenser)
ARTAccess can displays the daily list of expected clients at the pharmacy and facility. It can also be used to generate a list of expected clients for any desired future date. This makes it easy to make necessary preparations including preparation of medication and making appointment reminder calls since the clients' regimen and telephone numbers are displayed automatically.
"*It helps you to know your client's schedule and plan for them earlier. It helps you to know the clients who are coming to the pharmacy the next day and the day after.*" (Nurse Dispenser)

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Time saving It was clear that the community pharmacies offer time saving services to clients compared to facilities where congestion is still a challenge. The ARTAccess application is expected to further reduce the overall amount of time the client spends at the pharmacy but also the nurse dispenser spends attending to a client.

"I know it would be fast and clients wouldn't take long. There would be no need of filling in the registers or no need of updating client's next appointment so the app would be easy because everything would be completed there and then yet when using registers, you have to attend to a client then later you have to update other registers." (Nurse Dispenser)

In the manual system, the nurse dispensers pointed out that they have to travel to IDI offices with their registers to update the program data base with the week's transactions every Friday. The ARTAccess application will eliminate the back and forth movements and clients could be served throughout the week as it will be managed by pharmacy staff.

Better record keeping Given the growing numbers of patients for chronic HIV care at various health facilities, there is accumulation of client files with limited storage space and poor storage structures. The nurses reported that sometimes results into files getting misplaced or completely lost. With the development of ARTAccess, all clients' files and information will be stored in digital form and access is quick with guaranteed security of client records.

Challenges identified

Lack of program computers During the pilot, the nurses used existing computers at the pharmacies with approvals from pharmacy owners. The computers were assessed to make sure they were able to run the program before installations. However, there was competition for the computers.

"Although we were given permission to use the pharmacy computer, there were times when I had to wait for the pharmacy staff to first use the computer then I use it later and sometimes I might forget where I stopped and I end up filling in wrong data." (Nurse Dispenser)

To enable smooth running of program and in the event of scaling up to other pharmacies, nurses suggested that the program provide computers to the nurse dispensers. *".... we need personalized computers" (Nurse Dispenser)*. Since phones are cheaper and easier to use, the mobile based version was suggested as an option during scale up as many Kampala based health workers own smart phones.

Discussion

Results from emerging digital technologies to support global HIV engagement in care reveal that programs that enhance communication between healthcare providers and patients can improve treatment adherence. However, large gaps remain in development and testing of technology interventions for linkage, retention, and ART initiation[11]. This study documented the interaction between possible end users and developers of a digital health application through a consultatory iterative design process and subsequent piloting of the application. The overall objective was to document the interplay between the developers and stakeholders in achieving a functioning and useful tool, and to gather information on perceptions, facilitators and barriers to use of the tool when piloted. The aim was to design the most useful and user-friendly application possible to increase the likelihood of the adoption of the ARTAccess application countrywide. This process led to five versions of the tool, each incorporating feedback from the most recent stakeholder sessions. We had originally anticipated two, maximum of three versions, but had we stopped at this point, ARTAccess would not have been so user friendly. By continuing through to version five, the number of new issues or potential challenges of the tool raised by stakeholders was reducing, and so we felt confident to move to piloting ARTAccess as a user-friendly tool.

One of the most important findings in the stakeholder engagement was that the tool was perceived as a threat to job security for stakeholders. This had to be resolved multiple times in order to allay any fears, and lead to a constructive stakeholder discussion. In resource limited settings, where digital technologies may be used to support overstretched health systems, health workers need reassurance that digital tools being developed will not threaten their employment to ensure that they engage openly and thoughtfully without focussing on a perceived threat. Once this was discussed, their voices heard and fears allayed, the stakeholders were then able to give constructive feedback and helpful suggestions for the development process.

Other aspects of the feedback raised awareness to the team of structural constraints that were likely to arise during implementation, such as access to hardware and lack of data. Whilst these could not be solved by the development team, having an awareness of these potential issues and being able to come up with mitigation strategies helped to engender confidence of the tool in the users during the pilot.

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We then aimed to explore the experiences of the first users of the tool during a pilot phase. The expanded Andersen's Behavioural Model of Health Service Use (ABM) used for understanding health services provides a conceptual framework for understanding how patient and environmental factors affect health behaviours and outcomes[12]. The health care environment includes factors such as clinic experiences, types of pharmacy services, and patient-provider relationships; while the external environment relates to the physical, political, and economic factors unrelated to the health care environment[13]. In our study, the ARTAccess application was perceived to address some of the mentioned healthcare environment challenges such as patient provider relationship and types of pharmacy services.

Between January and April 2019 during the pilot, 4892 clients were transferred from the paper based system to ARTACCESS system in three pilot pharmacies on the refill program. Feedback from early within the pilot did lead to some small changes to the tool, however, these have been limited. In December 2020, the Uganda Ministry of Health requested to use the ARTACCESS tool for national scale up of the community pharmacy refill model in Uganda. This programme started in September 2021 and as of 30th September 2022, ARTACCESS was being used in 56 facilities and 95 pharmacies to support 30,090 clients to receive their refills from private community pharmacies.

Stakeholder feedback both during the design process and during the pilot also helped the team to develop the sensitisation and training materials required for the pilots and also for the national scale up. By pre-empting concerns of end users and providing solutions allowed for smoother sensitisation sessions, and also for end users to share their concerns more freely during the trainings.

Therefore, we believe that the ease of the pilot and subsequent scale up with limited changes requested was due to the iterative design process with multiple stakeholder engagements. We would encourage others working in this space to follow a similar engagement pattern to ensure update of their health innovations.

Strengths and limitations to the study

A strength of the study was the observational ethnographic component that we have not seen used in development of other mHealth tools. However, this led to a limitation of the study as the observers provided feedback after the stakeholder meetings to the ARTAccess application project team on how to engage more with their stakeholders if they saw communication gaps. For example building rapport between the study team and stakeholders was identified as important and when this was observed to be poorer than expected the observers provided feedback to the study team. Ideally the observers should not have commented on the process in order to preserve the objectivity of the study, but their intervention helped developers to engage better with stakeholders and led to greater improvement of the application.

Although technology has expanded globally, there is concern that interventions developed in one setting may not be generalizable to other settings with fewer resources, varying access to technology and the Internet, and persons with different cultural and social perspectives or lower eHealth literacy[14]. This may be an issue with the ARTAccess application considering that internet access is still a major challenge in Uganda especially in rural settings. Furthermore, the social and cultural dynamics in embracing the application in different parts of the country have not been explored.

Finally, this study concentrated on the health care providers as stakeholders since they are the ones using the tool and not the end beneficiaries of the application, ie the PLHIV clients. The interaction of the stakeholders and clients, and the client responses to receiving their medication in pharmacies is an important area to be explored, and a qualitative study would bring important findings to support scale up of the application.

Conclusions

Differentiated service delivery models for HIV care allow for decongestion of health facilities, improved patients' adherence and retention in care. However, ensuring communication and documentation is a challenge when these are paper based. The ARTAccess tool has helped alleviate some of the challenges faced by a paper based CRDDP model, including communication gaps, improving patient follow up, offering time saving services, improving record keeping and daily activity planning. We believe that the process of repeated stakeholder engagement during development and early solicitation of feedback in the pilot process has led to a tool that is fit for national scale up and urge others developing digital tools for health to engage with user centred design.

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SUPPLEMENTARY MATERIAL

APPENDIX 1. POWER POINT PRESENTATION (please double tap to open)

The IDI-KCCA Community Pharmacy ART refill Application- ART access APP

**Presentation to private pharmacy nurses
12th November 2018**

APPENDIX 2: TOPIC GUIDE FOR THE IN-DEPTH INTERVIEWS WITH NURSE DISPENSERS, HEALTH FACILITY STAFF AND IDI STAFF.

Introduction

How are you? My name is _____ and I want to thank you for joining us today. I am helping to coordinate this study on ART Access system. We are conducting this research to identify your views about the COMMUNITY PHARMACY REFILL PROGRAMME". I would like to say that there is no right or wrong answer in our discussion. We will simply be discussing your views, opinions and experiences on a range of topics, so please feel comfortable to say what you honestly feel. I would like to tape record the whole session. Please do not be concerned about this: all measures will be taken by the researchers to maintain confidentiality of the discussions. Information you tell us will ONLY be used for this research project. As we are tape recording the discussion, we ask that you refrain from using names or identifying information of yourself. If at any time during the interview you feel uncomfortable you can ask for a break, refuse to answer any question, and are always free to leave. Do you have any questions before we start?

Create rapport: How have you been?

Questions

1. What is your position in this organization/Health Facility/Pharmacy etc.?
2. What is your job description or what work do you do?
3. _a) What challenges **do health care providers** who attend to HIV patients surviving and seeking chronic HIV care from the KCCA Health facilities face? (*Interviewer: In case the respondent has not mentioned any of these, probe for any challenges with heavy work load, data collection from patients, record keeping, congestion at the healthy facilities, etc)*

b) Suggest ways to address those challenges?

4. a) What challenges do HIV patients surviving and seeking chronic HIV care from the KCCA Health facilities face?

b) How can those challenges be addressed?

5. Are you involved with the "IDI-KCCA COMMUNITY PHARMACY REFILL PROGRAM?"
    a) If yes, tell us what you know about the activities of this program.

6. Of what benefit/advantage has the "IDI-KCCA COMMUNITY PHARMACY REFILL PROGRAM" been in helping HIV patients seeking chronic HIV care from the KCCA Health facilities?
    a. How has it addressed any of the challenges mentioned in Question 3a?
    b. How has it addressed any of the challenges mentioned in Question 4a?

7. a) Are there any challenges that the IDI-KCCA COMMUNITY PHARMACY REFILL PROGRAM has encountered in its operations? If, so what are these challenges?
(*Interviewer: In case the respondent has not mentioned any of these, probe for any challenges faced by i) health care providers; ii) Nurses at the Private Community Pharmacies; iii) HIV patients/clients enrolled in this program etc.*)

b) Suggest ways how those challenges can be addressed.

8. In what ways can or will this new technology/ART Access App address :
    a) The challenges mentioned in Question 3a?
    b) and the challenges mentioned in Question 7 (a)?

9. a) What challenges/problems do you foresee with the use of the new technology/ART Access App?
    c) Suggest solutions to those challenges.

10. Do you have any questions regarding this new technology?

11. a) Regarding the Supply Chain, do you think the National Medical Stores (NMS) can deliver the drugs for HIV patients directly to the pharmacies?
    b) What would you see to be the benefits?
    c) What challenges do you foresee?

12. What would you comment about the idea/suggestion of the pharmacies charging or getting payment directly from the patients?
 b) What challenges do you foresee?

13. What about for Non-Communicable Diseases (NCDs) like diabetes and high blood pressure?

THANK YOU VERY MUCH FOR YOUR TIME AND THE INFORMATION YOU HAVE GIVEN