

# Adoption of e-health for community monitoring of HIV/TB services and its predictors among staff of Non-Government Organisations in Kampala, Uganda

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**KEYWORDS:** eHealth, adoption and use, community monitoring, HIV/TB

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## ABSTRACT

**Introduction:** The use of electronic data capture and digital health technologies can greatly improve patient healthcare outcomes, through augmenting diagnosis, prescription and treatment, and patient-centred care. The global strategy on digital health (2020-2025) by the World Health Organization promotes the use of eHealth as important for the achievement of health goals. However, adoption by Non-governmental organisations (NGO) staff meant to primarily use it to capture data is still sub-optimal. This study sought to assess the factors associated with eHealth adoption and use for community monitoring of HIV/TB services and its predictors among NGO staff in Kampala. **Methods:** A mixed-methods cross-sectional study was carried out among 110 staff who used eHealth in nine clinics from five NGOs providing HIV/TB services in Kampala. Interviewer-administered questionnaires were used to collect quantitative data. A key informant interview guide was used to collect qualitative data from 9 persons. Quantitative data were analysed using STATA version 14. Logistic regression was used to determine the factors associated with the adoption of eHealth at 95% CI. Qualitative data were analysed using a thematic analysis approach. **Results:** The respondents were predominantly female (60.9%), and the mean age was 33.6 years (SD=7.6). More than half of them were aged between 18 to 34 years (63.6 %). Slightly over half, 60/110 (54.5%) were in union, 46/110 (48.2%) were diploma holders, 34/110 (30.9%) had worked for their respective organisations for more than 5 years. Factors associated with eHealth use included data accuracy (AOR:0.04, 95% CI: 0.00-0.63) and interoperability (AOR: 0.26, 95% CI: 0.08-0.90). Therefore, lower perceived data accuracy and poor interoperability were barriers to eHealth adoption. This could be due to concerns about the reliability of digital records, challenges in integrating systems, or increased workload due to data inconsistencies. Other factors facilitating adoption and use included gender, readiness to use, user-friendliness, operation awareness, having features customised to HIV/TB data capture, training, real-time support and collegial support. Although female providers appeared more likely to adopt eHealth, this association was only suggestive and not statistically significant. **Conclusion:** eHealth adoption and use were influenced by a combination of interpersonal, technological, and external factors. Technological aspects such as data accuracy, interoperability, and system customization played a critical role in shaping user confidence and system efficiency. Interpersonal factors, including operational awareness and user-friendliness, affected individual willingness and capacity to engage with eHealth tools. Additionally, external enablers like training, real-time support, and broader organizational readiness facilitated adoption by improving competence and trust in the system. These findings highlight the need for a holistic approach to eHealth implementation, addressing both technical and human-centred challenges to ensure sustained adoption.

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## Introduction

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Uganda faces a high burden of both Human Immunodeficiency Virus (HIV) and Tuberculosis (TB), which remain leading causes of morbidity and mortality. As of 2021, Uganda had an estimated 1.4 million people living with HIV, with an adult prevalence of 5.4%, and approximately 22,000 AIDS-related deaths [1]. The country also ranks among the 30 high-burden TB countries globally, with an estimated incidence rate of 100-299 per 100,000 population [2]. Despite significant progress in scaling up HIV and TB care, challenges persist in ensuring timely diagnosis, treatment adherence, and retention in care, particularly at the community level.

The integration of HIV and TB services at different healthcare levels—including community-based interventions—has been a critical strategy in bridging service delivery gaps [3]. Non-governmental organizations (NGOs) play a significant role in complementing government efforts, often providing services such as community testing, linkage to care, adherence support, and treatment follow-up [4]. However, ensuring continuity of care and effective monitoring of patient outcomes remains a challenge, particularly due to gaps in data collection and reporting at the community level. Many NGOs still rely on paper-based records or fragmented electronic systems, which limit real-time data access, interoperability, and efficient decision-making [5].

eHealth, defined by the World Health Organisation (WHO) as “the use of Information and Communications Technologies (ICT) for health”, has been recognised as a transformative tool for improving health outcomes [6]. WHO has emphasised the role of digital health technologies in strengthening health systems through its Global Strategy on Digital Health (2020–2025), positioning eHealth as a key enabler in achieving Universal Health Coverage (UHC) [7]. The adoption of eHealth in HIV and TB service delivery has the potential to improve healthcare quality by enhancing real-time patient monitoring, adherence tracking, data-driven decision-making, and efficiency in service delivery [8]. Digital systems allow healthcare providers to access patient records seamlessly, reducing errors in diagnosis and treatment while ensuring continuity of care [9]. Moreover, eHealth can support early detection of treatment failure,

facilitate rapid response to clinical deterioration, and improve reporting mechanisms for program evaluation [10]. These improvements directly impact key health indicators such as mortality rates, treatment success rates, retention in care, and loss-to-follow-up rates [8].

In Uganda, the government has taken significant steps toward digitizing health systems, with initiatives such as the Uganda National eHealth Policy and Strategy and the Digital Health Atlas guiding implementation efforts [11]. The Uganda Electronic Medical Records (Uganda EMR) system has been rolled out in several health facilities to streamline patient data management [12]. Despite these efforts, eHealth adoption remains uneven, particularly in community-based and NGO-led healthcare programs [13]. Barriers such as limited digital infrastructure, lack of interoperability between systems, inadequate technical support, and human resource challenges hinder full-scale implementation [14]. Additionally, readiness for eHealth adoption varies across healthcare facilities, influenced by factors such as staff digital literacy, availability of necessary hardware, and institutional commitment to integrating technology [15]. The implementation of eHealth systems follows a phased approach, often requiring continuous training, adaptation to specific program needs, and alignment with national health information systems [16]. However, evidence on the actual readiness of NGO staff to adopt and use eHealth, particularly in HIV/TB service delivery, remains scarce.

Despite the growing emphasis on eHealth adoption, there is limited documentation on how NGO staff providing HIV/TB services engage with digital health tools. Existing literature has largely focused on government health facilities, leaving a gap in understanding eHealth utilization in NGO settings [17]. Moreover, while national policies emphasize digital transformation in healthcare, challenges specific to community-based service delivery—such as data collection at the grassroots level, linkages to facility-based care, and the role of frontline healthcare workers in digital health adoption—remain underexplored [18]. This study therefore aimed to explore the staff-related, technology-related, and institutional factors associated with eHealth adoption and use among NGO workers providing HIV/TB services in Kampala. Findings from this study will provide evidence to inform policy decisions, enhance digital health strategies,

and improve the integration of eHealth solutions in community-based HIV/TB care.

## Methods

### Study design and area

This study employed a mixed-methods design with cross-sectional elements as a temporal framework to explore factors influencing eHealth adoption and use. It was sequential and explanatory in nature. This consisted of two distinct phases: quantitative, followed by qualitative [19]. In this design, the researcher first collected and analyzed the quantitative data. Qualitative data were then collected and analysed, and helped explain the quantitative results obtained in the first phase [20]. Quantitative data were collected through structured surveys administered to staff using eHealth systems across various organizations, capturing a snapshot of key determinants and usage patterns at a specific point in time. Qualitative data were obtained through in-depth interviews with key informants, providing contextual insights into the challenges and facilitators of eHealth implementation. The study was conducted in nine clinics from five Non-Government Organizations (NGOs) offering HIV/TB services in Kampala city.

### Study population

For the quantitative part of the study, the study population included staff in the selected Non-Governmental organizations whose job description is to capture and/or use electronic data capture tools and systems for HIV/TB service delivery. The qualitative study population included facility in-charges, HIV/TB focal persons, data managers and administrative staff.

### Inclusion criteria

We included NGOs that provided HIV/TB services, had adopted eHealth for use in HIV/TB service delivery, and staff above 18 years that had worked at the organization for at least 3 months.

The qualitative component of the study included Key Informants (i.e., in-charges, HIV/TB focal persons, data managers and administrative staff) who were in their positions for at least 6 months since they were perceived to have enough information on the adoption of eHealth for TB and HIV service delivery.

### Exclusion criteria

We excluded organizations whose management declined participation and staff who were unwilling to participate. Staff who had limited exposure to eHealth—such as those who had not actively used the system in their work—222 were also excluded, as their input may not have been relevant for assessing factors influencing eHealth adoption and use. Similarly, part-time employees and temporary staff were excluded to maintain consistency in responses, as their interaction with eHealth systems may have been intermittent or insufficient for meaningful contribution.

### Sample size determination and sampling procedure

**Quantitative sample size calculation:** The sample size for this study was calculated using the Kish Leslie (1965) formula for single proportions, which is given as:

$$n = \left[ \frac{Z^2 \sigma_x^2}{\delta^2} \right] = \left[ \frac{Z^2 PQ}{\delta^2} \right]$$

Where:  $n$  = required sample size,  $Z$  = standard normal deviate corresponding to a 95% confidence level (1.96),  $P$  = estimated prevalence of eHealth use among HIV/TB service providers (50%, chosen to maximize sample size in the absence of prior data) and  $\sigma$  = margin of error (5%).

Substituting the values:

$$n = \frac{(1.96)^2 \times 0.5 \times (1-0.5)}{(0.05)^2} = 384$$

To account for non-response (2%), the adjusted sample size was computed using this formula:

$$N = \frac{n}{1 - \text{non-response rate anticipated}}$$

$$N = \frac{384}{1-0.02}$$

equivalent to 392 participants. However, given that the total population of eligible staff using eHealth was only 148, a finite population correction was applied using this formula:

$$n = \frac{n_1}{1 + \frac{n_1 - 1}{N}}$$

Where  $n$  = required sample size  $n_1$  = previously calculated sample size (392) and  $N$  = finite sample size (148)

$$n = \frac{392}{1 + \frac{392 - 1}{148}}$$

giving a corrected sample size of 110 participants.

The study employed systematic random sampling to ensure an unbiased selection of participants from the study population. First, a sampling frame was generated at each selected NGO by compiling a complete list of all staff who actively used eHealth. To ensure proportional representation, proportionate-to-size sampling was applied, meaning that the number of participants selected from each NGO was determined based on its relative share of the total eHealth user population. Once the required number of participants per NGO was established, the sampling interval ( $k$ ) was calculated using the formula  $k = N/n$ , where  $N$  was the total number of eligible staff at a particular NGO, and  $n$  was the number of participants to be selected from that NGO. A random starting point was then chosen between 1 and  $k$  using a lottery method or a random number generator, ensuring that the selection process remained unbiased. From this starting point, every  $k$  (th) person was systematically selected until the required sample size was reached. In cases where the calculated interval was not a whole number (e.g., 1.33), selection alternated between rounding up and down to maintain fairness. To address potential non-responses, if a selected participant was unavailable or declined participation, the next individual on the list was selected as a replacement while maintaining the systematic process.

The study population was clustered within five NGOs providing HIV/TB services in Kampala. Since staff within each NGO share similar working environments and experiences with eHealth, clustering effects could lead to intra-cluster correlation, potentially reducing the effective sample size. However, given the relatively small number of clusters (5 NGOs), standard adjustments for design effect were not applied. Proportionate-to-size sampling was used to ensure that organizations with more eHealth users contributed more participants.

The leading providers of HIV/TB services were purposively selected and approached; these were 12 in total. Nine of these facilities had adopted eHealth systems for TB/HIV service delivery. Of the nine eligible facilities, five consented to participate and were therefore included in the study. These five facilities were among the leading NGOs in Kampala with established eHealth platforms and serving large client populations.

**Qualitative sample size:** For the qualitative study, maximum variation sampling was used. This involved purposefully picking a wide range of variation on dimensions of interest to obtain information about the significance of various circumstances. To minimize selection bias in the purposive sampling, first, predefined selection criteria were used, ensuring that informants were chosen based on their experience with eHealth systems, decision-making roles in HIV/TB service provision, and direct involvement in program implementation or policy formulation. This helped avoid selecting only individuals with similar viewpoints. Additionally, key informants were drawn from different NGOs to capture a broad range of organizational perspectives, ensuring varied insights. The selection process was also documented for transparency, ensuring that individuals were chosen based on expertise rather than convenience or personal connections.

### Study variables

The independent variables included staff-related, technology-related, and institutional-related characteristics. Staff-related characteristics were gender, employment status, marital status, level of education, and years of eHealth use. Technology-related features included feature customization, user friendliness, navigability, interface characteristics,

interoperability, compatibility of technology with work patterns, face to face interaction capability, and accuracy of records in eHealth. Institutional-related characteristics included trainings, managerial support for eHealth use, technical support, collegial support, technology infrastructure availability, and organizational policy. Socio-demographic characteristics such as age were measured as continuous variables and later categorized. Gender, employment status, marital status, and level of education were measured as categorical variables. The dependent variable for this study was eHealth adoption and use and was measured as frequency and duration of eHealth tool usage. Participants were asked to rate statements on individual, technology-related, and organizational characteristics on a 5-point Likert scale ranging from “Strongly disagree” (1), “Agree” (2), “Undecided” (3), “Disagree” (4), and “Strongly disagree” (5). The Unified Theory of Acceptance and Use of Technology (UTAUT), developed by Venkatesh et al. (2003), is the theoretical framework that informed and supported the choice of the independent variables of this study.

### **Data collection procedures**

Data were collected between August 2022 to February 2023. Face-to-face interviews were administered using an interviewer-administered questionnaire with closed-ended responses for the quantitative data. The interviews were conducted in privacy, and each took approximately 30-45 minutes. A structured questionnaire uploaded onto Survey CTO Collect was used. Key informant interviews were open-ended to generate opinions from administrators of the sampled organizations. An interview guide was used, and the interviews were audio recorded.

### **Pretest**

A pretest was conducted to ensure that the questionnaire and data collection instruments were structured appropriately to capture the required information. The pretest focused on evaluating the flow, adequacy, consistency, and relevance of the questions in relation to the research objectives. To assess the reliability of the questionnaire, Cronbach's alpha ( $\alpha$ ) was calculated for different sections of the tool. A Cronbach's alpha value of  $\geq 0.7$  was considered acceptable for internal consistency. Additionally, test-retest reliability was evaluated by administering the questionnaire twice to a subset of

pretest participants (at a two-week interval), and Pearson's correlation coefficient ( $r$ ) was computed to measure the consistency of responses over time. A correlation coefficient of  $r \geq 0.7$  indicated strong reliability. For validity, content validity was ensured through expert review, where specialists in eHealth, HIV/TB service delivery, and research methods assessed the questionnaire for relevance and comprehensiveness. Construct validity was evaluated using exploratory factor analysis (EFA) to check whether related items grouped together as expected. Items with weak factor loadings ( $< 0.4$ ) were revised or removed to improve the instrument's overall validity.

The data collection tools were pretested at one NGO facility in Kampala that was not part of the final study sample. The pretest was conducted by the principal investigator with two trained research assistants and involved 10 respondents. Based on pretest findings, minor modifications were made to improve question clarity, response format, and alignment with study objectives. After refinement, the final study tools were adopted for actual data collection.

### **Statistical analysis**

Data were analyzed using STATA 14 software package. Missing data were excluded from the analysis. Analysis was done at univariate, bivariable and multivariable levels.

Univariate analysis was used to present respondent characteristics. The categorical variables were summarized as proportions, and continuous variables such as age, duration worked at facility, were summarized as mean with their standard deviation and then later categorized. Bivariable analysis was used to examine the association between two variables at a time (the dependent and each independent) with p-values less than 0.05 considered statistical significant.

Multivariable analysis was used to measure the association between adoption and the staff, technology, and organization characteristics. Logistic regression with p-values less than or equal to 0.05 ( $p \leq 0.05$ ) for statistical significance was used. Independent variables that were statistically significant during bivariable analysis ( $p < 0.05$ ) and those considered plausible from literature though not significant were included in the model.

The multicollinearity of the independent variables was tested before considering factors for multivariable analysis using the Variance Inflation Factor. Variables that showed collinearity with other factors, as well as confounders, were excluded from the model.

Audio recordings were transcribed verbatim and transcripts were subjected to thematic analysis. An inductive approach to coding was used to obtain emerging codes by a thorough reading of data. Qualitative data were presented using themes and backed up by relevant quotations. Themes included electronic systems used and their functionality, intra-personal, technology-related and organizational determinants of adoption and challenges to adoption of e-Health.

### **Ethical considerations**

This study was reviewed by Makerere University School of Public Health Higher Degrees Committee (protocol No. 066). Administrative clearance was obtained from the respective organizations. Written informed consent was sought from study participants before interviews. Privacy and confidentiality were maintained during the data collection process and in reporting findings. Since the COVID-19 infection risk was still apparent, standard operating procedures were observed, particularly social distancing and the use of face masks and hand sanitizers.

### **Results**

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A total of 110 participants were interviewed for the quantitative component of the study, while 9 key informants participated in the qualitative interviews. The participants were predominantly female (60.9%, 67/110), with a mean age of 33.6 years (SD=7.6). More than half of the respondents were aged between 18 to 34 years (63.6 %, 70/110). More than half of the participants, 60/110 (54.5%), were in union, 46/110 (48.1%) were diploma holders, 34/110 (30.9%) had worked for their respective organisations for more than 5 years (Table 1). For the qualitative component, most of the key informants were female (5/9) and had been in their position for more than two years (7/9).

### **Electronic system usage at the community level**

Among the participants, 43 out of 110 (39.1%) reported that their organizations used electronic systems at the community level. Four out of the five sampled NGOs had adopted eHealth for community-level use. Various systems, including the Uganda EMR, had been integrated with features such as ART Access, offline functionality, and mobile versions. A key informant reported that:

*“As an NGO, we introduced another system called CHAMP but it was more or less like getting the MOH tools and making them digital. Like for testing at community level, we got the MOH tool for screening and put it into a tablet so that as people test, they input the data into the system. But other than that, when it comes to community, the information is entered into manual registers and reentered into the available systems”* (KII, Facility In charge)

### **Inconsistency in the use of eHealth and related factors**

Participants that reported digress from electronic system use were 45.5% (50/110). Of these, the 29.1% (32/110) mentioned that it was due to connectivity challenges. The key informants reported several challenges affecting the adoption and use of eHealth systems. These challenges were categorized into technical, infrastructure, and operational barriers.

#### **Technical Barriers**

**System failures and errors:** Some eHealth systems were prone to errors, particularly after updates, affecting data accuracy.

*“Sometimes we have errors coming up, especially with new versions. As developers, we may not anticipate all scenarios.”* (KII, System Developer)

**System slowness:** The Uganda EMR was reported to slow down at specific hours, disrupting workflow and data entry.

*“There are times Uganda EMR goes off at around 4pm.”* (KII, M&E Officer)

**Delayed technical support:** Resolution of system issues sometimes took two to three days, slowing down service delivery. Some support was provided via WhatsApp, which was not always real-time.

#### **Infrastructure Barriers**

**Power shortages:** Participants reported power outages affecting system use, despite the availability of backup power in some cases.

*“They tell you power went off; the system was slow. For the power going off, we have a backup but for the system*

*slowing down, that one is actually a major issue.* (KII, M&E officer)

**Lack of sufficient devices:** Some facilities lacked enough computers and digital tools, requiring staff to share devices, which delayed data entry.

*“We have to share the computer. On a day when we have the HIV and TB clinic, we fight over who should take it.”* (KII, TB Focal Person)

### **Operational Barriers**

**Heavy workload and double entry:** Staff were required to enter information both in paper-based records and eHealth systems, which was time-consuming.

*“On days when the clinic is heavy, I honestly cannot do both. If I see 100 clients, that’s almost 3 hours of data entry.”* (KII, TB Focal Person)

**Limited trained personnel:** Some facilities had only one trained staff member responsible for eHealth data entry, leading to delays in updating records.

*“We need extra support. All that information has to be entered by one person.”* (KII, TB Focal Person)

**Concerns about data security in community settings:** Some participants hesitated to use electronic devices in the field due to concerns over gadget safety, leading them to collect data on paper and later transfer it to the system.

### **Factors associated with the adoption and use of e-health**

#### **Quantitative findings**

The study identified several factors influencing eHealth adoption and use at the intrapersonal, technological, and institutional levels.

#### **Intrapersonal factors**

At the bivariable level, factors significantly associated with eHealth adoption included age, awareness about eHealth operations, computer literacy, and prior electronic medical records (EMR) experience. Participants aged 35 years and above were four times more likely to adopt eHealth compared to their younger counterparts (COR=4.0, 95% CI: 1.62-9.89). Awareness about the operation of eHealth systems increased the likelihood of adoption by 3.6 times (COR=3.60, 95% CI: 1.01-12.81), while being computer literate increased the likelihood by 2.26 times (COR=2.26, 95% CI: 1.02-5.03). Staff with more than 3 years of eHealth experience had 70% lower odds of using it (COR=0.30, 95% CI: 0.11-0.84).

### **Technology-related factors**

At the bivariable level, the technology-related factors found to be associated with adoption of eHealth were language modification, interoperability and accuracy. eHealth tools without language modification features had 75% reduced likelihood of being used (COR=0.25, C.I 0.10-0.61). Tools that lacked interoperability had 85% reduced likelihood to be used compared to those that allow for interoperability (COR=0.15, 95% CI 0.62-0.38). Tools that do not allow for data accuracy had 89% reduced likelihood of being used. (COR=0.11, 95% CI 0.01-0.99).

### **Institutional factors**

Institutional support played a crucial role in adoption. At the bivariable level, collegial support was significantly associated with eHealth adoption, with staff who received support from colleagues being 1.93 times more likely to adopt eHealth (COR=1.93, 95% CI: 1.24-3.00).

### **Multivariable Analysis**

After adjusting for age, operation awareness, computer literacy, EMR experience, language modification and collegial support, the factors found to be associated with eHealth adoption and use included interoperability and data accuracy. Systems that were not interoperable were 74% less likely to be adopted and used (AOR=0.26, 95% C.I 0.08-0.90). Also, systems that do not ensure data accuracy were 96% less likely to be adopted and used (AOR=0.04, 95% CI: 0.00-0.63)(Table 2).

### **Qualitative findings on factors supportive of ehealth adoption and use**

#### **Intrapersonal Factors**

Key informants perceived female staff to adopt eHealth more readily than male staff. Readiness to embrace new technologies introduced by the organization was also seen as a crucial factor influencing adoption. Some staff members lacked awareness of how eHealth systems operated, which slowed down adoption. One key informant highlighted the enthusiasm of staff in pushing for more digital systems, stating:

*“They are very eager; actually, they push for the other remaining sections to be made electronic.”* (KII, M&E officer)

### **Technology-Related Factors**

Key informants emphasized that user-friendliness, data accuracy, and system customization for HIV/TB services were crucial in facilitating adoption and use. Systems that mirrored existing paper-based tools (e.g., Uganda EMR having the same coding system as paper registers) were reported as easier to adopt. The same applied to systems like CHAMP that has the same components as the HIV blue card and eCBSS that captures HMIS registers.

One key informant noted:

*“The system is not that complicated, it is user friendly. I did not take much time to make them understand the system. With CHAMP i can say there was a general training and after that, people did not come to me, they had picked up. The reason it was easy to adopt; everything the HIV blue card has, the system has; so there won’t be anything new; it will just take you days to understand. The hard copy of the card is what the system has; the same codes you see on the card are the same you are going to see on the Uganda EMR”.* (KII, M&E officer)

### **Institutional Factors**

Participants highlighted training, real-time support, and collegial support as key institutional enablers of eHealth adoption. Training was provided to new staff for new program introductions and when challenges were reported. Real-time technical support was also available from both internal teams and external sources, ensuring that staff had continuous guidance. A facility in-charge stated:

*“When you are starting, you are trained; when a new program is introduced, there is training; and when challenges are reported, we train. It depends on those three aspects—new employee, new program, and when challenges have been reported.”* (KII, Facility In-Charge)

### **Discussion**

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Interoperability emerged as a key factor influencing the adoption and use of electronic systems. The ability of different platforms to exchange and integrate data seamlessly has been widely recognised as a crucial technological feature of eHealth that facilitates adoption and use. A mixed-method study conducted in Botswana in 2021 found that limited interoperability between mHealth applications and eRecord systems, creates inefficiencies in data sharing and continuity of care [21]. Similarly, a study in the United States highlighted that lack of interoperability between different electronic health

record (EHR) systems, telemedicine platforms, and mobile health applications hinders the seamless exchange of patient data [22].

Female healthcare providers were more likely to adopt eHealth and this notion was supported by key informants. However this association was only borderline significant ( $p = 0.051$ ) suggesting a potential trend rather than a definitive conclusion, indicating that gender differences in eHealth adoption require further investigation in larger studies. Given that the finding was not statistically significant at the conventional threshold ( $p < 0.05$ ), it was not included as a major determinant in the final analysis, and should be interpreted cautiously. However, previous research suggests that gender-related factors may still play a role in technology adoption. Studies in sub-Saharan Africa have indicated that female healthcare workers often engage more in documentation and reporting tasks, which may make them more inclined to adopt digital record-keeping systems [23, 24]. Other studies have suggested that female clinicians may be more meticulous in data entry and more open to training on new systems, potentially contributing to higher eHealth adoption rates [25]. Conversely, some research suggests that healthcare professionals often view electronic health records (EHRs) as contributing to increased administrative tasks, potentially leading to reduced engagement with eHealth platforms [26].

Readiness to use technology was identified as a major facilitator of eHealth adoption in this study, supported by qualitative findings. This aligns with findings from Tanzania, where healthcare workers who perceived themselves as technologically competent were more likely to engage with. Our qualitative findings further revealed that user-friendly system interfaces play a crucial role in adoption. Key informants emphasized that systems designed with intuitive workflows and interfaces are more likely to be used consistently. In a study conducted in Nigeria, system usability was identified as a primary determinant of EMR adoption, with poorly designed interfaces being a major cause of user frustration and abandonment [28]. Highly usable technological platforms have also been found to increase adoption in other studies [29, 30]. We found that having features customised to HIV/TB data capture and use increased adoption and use of eHealth. Customization improved system usability

by aligning electronic records with existing paper-based forms, making data entry more intuitive and reducing errors. This finding is similar to a study in Canada which found that the presence of features customized for the same purpose increased adoption of eHealth in chronic care [31]. Our findings also align with studies in Malawi and Zambia, where tailoring eHealth platforms to reflect existing paper-based reporting structures improved adoption and reduced data entry errors. The implementation of WHO's SMART Guidelines—Digital Adaptation Kits (DAKs)—in countries like Malawi and Zambia involved customizing digital tools to reflect national programs and existing workflows. This structured approach facilitated smoother integration and acceptance of digital systems among healthcare workers [32].

From an institutional perspective, routine training on issues related to the use of eHealth is one of the most recurrently determined as being significant in influencing eHealth adoption [33, 34, 35]. Similarly, qualitative findings from our study indicated that offering training to first time system users as well as routine trainings increased their likelihood of adoption and use. The study showed that offering real time technical support increased system use. Studies in Kenya, Canada and [36, 37] similarly focused on the importance of technical support in improving eHealth adoption. They found that the provision of technical support aimed at enabling better use of eHealth technologies improved adoption. A systematic scoping review identified organizational support as a significant facilitator for the adoption of digital health technology (DHT) in cardiovascular care. This support encompasses the provision of technical assistance, which is crucial for integrating DHT into clinical workflows. The study emphasized that when healthcare organizations offer robust technical support, clinicians are more likely to adopt and effectively use digital tools [38]. Other than technical support, this study also found collegial support to influence electronic system usage. Other studies reported that support from technology consultants and mentors improved EMR use [39, 40, 41]. Technology infrastructure availability was found to influence adoption. This finding is supported by the qualitative findings of this study, where most of the key informants indicated that having the required technology infrastructure in place facilitates adoption of eHealth even at community level. Since the use of eHealth requires

not only software but also hardware, some studies have reported that some of the barriers to eHealth adoption are related to infrastructure and hardware availability. Participants in a study reported that they did not have computers and hardware to run EMR software and that it affected the wide adoption of the technology [42].

This study was not without limitations. First, two NGOs declined to take part in the study, and this limited the study population. After initial contact and follow-up to include them in the study, no positive feedback was obtained. This study also focused on staff who used eHealth, which could have introduced some selection bias.

The study included NGOs and therefore, the findings cannot be generalizable to government institutions/facilities, given the different contexts. Additionally, the geographical scope of this study was limited to Kampala city. Further more, the study employed a cross-sectional design, which limits the ability to infer causality between the identified factors and eHealth adoption. Finally, although the framework used included the organizational context, there are several studies in all industries that point out the importance of the environmental context upon the adoption of information technology [34].

## **Conclusion**

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The study identified multiple interpersonal, technological, and organizational factors influencing eHealth adoption and use in HIV/TB service delivery. Technological factors included data accuracy, interoperability, and user-friendliness, all of which affect the efficiency and usability of eHealth systems. Individual and behavioral factors, such as gender, readiness to use technology, and operational awareness, played a role in determining engagement with eHealth tools. Additionally, organizational support factors, including training, real-time support, and system customization for HIV/TB data capture, facilitated adoption by ensuring that users had the necessary skills and infrastructure to integrate eHealth into their workflows.

These findings underscore the need for targeted capacity-building programs, emphasizing training, real-time technical support, and awareness campaigns to enhance user confidence and engagement. Strengthening interoperability between

different eHealth platforms can improve data sharing and efficiency, while system customization for disease-specific needs ensures that digital tools align with the realities of clinical practice. Furthermore, organizations should invest in user-centered design approaches to improve ease of use, particularly for frontline healthcare workers. Policymakers and health system planners can leverage these insights to optimize eHealth implementation strategies, ensuring that technology is not just adopted but effectively integrated to enhance patient management, adherence to treatment, and overall healthcare quality.

### What is already known about the topic

- It is evident that whereas many studies have assessed eHealth adoption, a lesser number have reported its predictors. Most of the studies reviewed were exploratory or descriptive, implying that even though there are several barriers to adopting eHealth, their findings were based on views, opinions, or descriptive data.

### What this study adds

- The study contributes to scientific evidence on eHealth use for HIV/TB service delivery among NGOs and factors associated with adoption and use of eHealth for community programming, in the context of HIV/TB.

### Competing Interest

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The authors of this work declare no competing interests.

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### Authors' contributions

IKW and AS wrote the study protocol. IKW carried out the investigation and supervised the data collection process. IKW conducted the data analysis and wrote the initial manuscript. IKW & AS reviewed drafts of the manuscript. The manuscript was revised and approved by all authors.

### Tables & Figures

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**Table 1:** Participant's socio-demographic characteristics

**Table 2:** Logistic regression of intrapersonal, technology and institutional factors associated with adoption and use of eHealth

### References

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1. Uganda Population-Based HIV Impact Assessment (UPHIA). Uganda Summary Sheet 2020-2021 [Internet]. Kampala (Uganda): UPHIA; 2022 Aug [cited 2025 Sep 18]; 4p. Available from: <https://phia.icap.columbia.edu/wp-content/uploads/2022/08/UPHIA-Summary-Sheet-2020.pdf> Download PDF to view full text
2. World Health Organization (WHO). Global Tuberculosis Report 2022 [Internet]. Geneva (Switzerland): WHO; 2022 Oct 27 [cited 2025 Sep 18]; 68p. Available from: <https://www.who.int/publications/i/item/9789240061729> Download PDF to view full text
3. Uganda AIDS Commission. National HIV and AIDS Strategic Plan 2020/21 – 2024/25 [Internet]. Kampala (Uganda): Uganda AIDS Commission; 2020 Aug [cited 2025 Sep 18]; 85p. Available from: [https://uac.go.ug/index.php?option=com\\_content&view=article&id=24:hiv-prevention-1123&catid=8&Itemid=101](https://uac.go.ug/index.php?option=com_content&view=article&id=24:hiv-prevention-1123&catid=8&Itemid=101) Download PDF to view full text
4. Sanadgol A, Doshmangir L, Majdzadeh R, Gordeev VS. Engagement of non-governmental organisations in moving towards universal health coverage: a scoping review. *Global Health* [Internet]. 2021 Nov 16 [cited 2025 Sep 18];17(1):129. Available from: <https://globalizationandhealth.biomedcentral.com/articles/10.1186/s12992-021->

- [00778-1 https://doi.org/10.1186/s12992-021-00778-1](https://doi.org/10.1186/s12992-021-00778-1)
5. Bogart LM, Naigino R, Maistrellis E, Wagner GJ, Musoke W, Mukasa B, Jumamil R, Wanyenze RK. Barriers to linkage to HIV care in Ugandan fisherfolk communities: a qualitative analysis. *AIDS Behav* [Internet]. 2017 Oct 1 [cited 2025 Sep 18];20(10):2464–76. Available from: <https://link.springer.com/10.1007/s10461-016-1331-z> <https://doi.org/10.1007/s10461-016-1331-z>
  6. World Health Organization (WHO). Digital health [Internet]. Geneva (Switzerland): WHO; c2025 [cited 2025 Sep 18]; [about 3 screens]. Available from: [https://www.who.int/health-topics/digital-health#tab=tab\\_1](https://www.who.int/health-topics/digital-health#tab=tab_1)
  7. World Health Organization (WHO). Global strategy on digital health 2020-2025 [Internet]. Geneva (Switzerland): WHO; 2021 Aug 18 [cited 2025 Sep 18]; 60p. Available from: <https://iris.who.int/bitstream/handle/10665/344249/9789240020924-eng.pdf?sequence=1> Download PDF to view full text
  8. Adekunle Oyeyemi Adeniyi, Jeremiah Olawumi Arowoogun, Rawlings Chidi, Chioma Anthonia Okolo, Oloruntoba Babawarun. The impact of electronic health records on patient care and outcomes: a comprehensive review. *World J Adv Res Rev* [Internet]. 2024 Feb 28 [cited 2025 Sep 18];21(2):1446–55. Available from: <https://wjarr.com/content/impact-electronic-health-records-patient-care-and-outcomes-comprehensive-review> Download PDF to view full text
  9. Blaya JA, Fraser HSF, Holt B. E-health technologies show promise in developing countries. *Health Affairs* [Internet]. 2010 Feb [cited 2025 Sep 18];29(2):244–51. Available from: <http://www.healthaffairs.org/doi/10.1377/hlthaff.2009.0894> <https://doi.org/10.1377/hlthaff.2009.0894>
  10. Castelnuovo B. A review of compliance to anti tuberculosis treatment and risk factors for defaulting treatment in Sub Saharan Africa. *Afr Health Sci* [Internet]. 2010 Dec;10(4):320–4. Available from: <https://www.ajol.info/index.php/ahs/article/view/63835/51652> Download PDF to view full text
  11. Ministry of Health (MoH) Uganda. Uganda National eHealth Strategy 2017 – 2021 [Internet]. Kampala (Uganda): MoH; [cited 2025 Sep 18]. Available from: [https://health.go.ug/sites/default/files/National%20e\\_Health%20Strategy\\_0.pdf](https://health.go.ug/sites/default/files/National%20e_Health%20Strategy_0.pdf) Download PDF to view full text
  12. Ministry of Health (MoH) Uganda. Health Sector Digitization Report [Internet]. Kampala (Uganda): MoH; 2023 Oct [cited 2025 Sep 18]. Available from: <https://library.health.go.ug/sites/default/files/resources/Health%20Sector%20Digitization%20Bulletin.pdf> Download PDF to view full text
  13. Namatovu HK, Semwanga AR, Kiberu VM, Ndigezza L, Magumba MA, Kyanda SK. Barriers and facilitators of eHealth adoption among healthcare providers in Uganda – a quantitative study. In: Sheikh YH, Rai IA, Bakar AD, editors. *e-Infrastructure and e-Services for Developing Countries* [Internet]. Cham: Springer International Publishing; 2022 May 26 [cited 2025 Sep 18]; p. 234–51. Available from: [https://link.springer.com/10.1007/978-3-031-06374-9\\_15](https://link.springer.com/10.1007/978-3-031-06374-9_15) [https://doi.org/10.1007/978-3-031-06374-9\\_15](https://doi.org/10.1007/978-3-031-06374-9_15)
  14. Scott RE, Mars M. Principles and framework for ehealth strategy development. *J Med Internet Res* [Internet]. 2013 Jul 30 [cited 2025 Sep 18];15(7):e155. Available from: <http://www.jmir.org/2013/7/e155/> <https://doi.org/10.2196/jmir.2250>
  15. Khoja S, Durrani H, Nayani P, Fahim A. Scope of policy issues in eHealth: results from a structured literature review. *J Med Internet Res* [Internet]. 2012 Feb 17 [cited 2025 Sep 18];14(1):e34. Available from: <http://www.jmir.org/2012/1/e34/> <https://doi.org/10.2196/jmir.1633>
  16. Kovačić M, Mutavdžija M, Buntak K. E-health application, implementation and challenges: a literature review. *Business Systems Research Journal* [Internet]. 2022 Jun 1 [cited 2025 Sep 18];13(1):1–18. Available

- from: <https://www.sciendo.com/article/10.2478/bsrj-2022-0001> <https://doi.org/10.2478/bsrj-2022-0001>
17. Asimwe C, Gelvin D, Lee E, Amor YB, Quinto E, Katureebe C, Sundaram L, Bell D, Berg M. Use of an innovative, affordable, and open-source short message service-based tool to monitor malaria in remote areas of Uganda. *The American Society of Tropical Medicine and Hygiene* [Internet]. 2011 Jul 1 [cited 2025 Sep 18];85(1):26–33. Available from: <https://www.ajtmh.org/view/journals/tpmd/85/1/article-p26.xml> <https://doi.org/10.4269/ajtmh.2011.10-0528> Subscription or purchase required to view full text
18. Ge L, Yip WF, Yan AHH, Seng ECS, Pei CCP, Onn ILY, Yiwen EC, Tham S, Moon-Ho RH, Tan WS. Perceived roles and barriers in delivering community-based care: a qualitative study of health and social care professionals. *Int J Integr Care* [Internet]. 2023 Oct 18 [cited 2025 Sep 18];23:5. Available from: <https://account.ijic.org/index.php/u-p-j-ijic/article/view/7617> <https://doi.org/10.5334/ijic.7617>
19. Creswell JW, Plano Clark VLP. *Designing and Conducting Mixed Methods Research*. 3rd ed. Thousand Oaks (CA): SAGE Publications; 2017 Aug 21; 520p.
20. Greene JC, Caracelli VJ, Graham WF. Toward a conceptual framework for mixed-method evaluation designs. *Educational Evaluation and Policy Analysis* [Internet]. 1989 Sep [cited 2025 Sep 18];11(3):255–74. Available from: <https://journals.sagepub.com/doi/10.3102/01623737011003255> <https://doi.org/10.3102/01623737011003255> Subscription or purchase required to view full text
21. Ndlovu K, Scott RE, Mars M. Interoperability opportunities and challenges in linking mhealth applications and eRecord systems: Botswana as an exemplar. *BMC Med Inform Decis Mak* [Internet]. 2021 Aug 21 [cited 2025 Sep 18];21(1):246. Available from: <https://bmcmedinformdecismak.biomedcentral.com/articles/10.1186/s12911-021-01606-7> <https://doi.org/10.1186/s12911-021-01606-7>
22. Weinstein RS, Lopez AM, Joseph BA, Erps KA, Holcomb M, Barker GP, Krupinski EA. Telemedicine, telehealth, and mobile health applications that work: opportunities and barriers. *The American Journal of Medicine* [Internet]. 2014 Mar [cited 2025 Sep 18];127(3):183–7. Available from: <https://linkinghub.elsevier.com/retrieve/pii/S0002934313009194> <https://doi.org/10.1016/j.amjmed.2013.09.032>
23. Khairat S, Coleman C, Ottmar P, Bice T, Koppel R, Carson SS. Physicians' gender and their use of electronic health records: findings from a mixed-methods usability study. *Journal of the American Medical Informatics Association* [Internet]. 2019 Aug 28 [cited 2025 Sep 18];26(12):1505–14. Available from: <https://academic.oup.com/jamia/article/26/12/1505/5555874> <https://doi.org/10.1093/jamia/ocz126> Subscription or purchase required to view full text
24. Kachimanga C, Zaniku HR, Divala TH, Ket JCF, Mukherjee JS, Palazuelos D, Kulinkina AV, Abejirinde IOO, Akker TVD. Evaluating the adoption of mhealth technologies by community health workers to improve the use of maternal health services in sub-saharan Africa: systematic review. *JMIR Mhealth Uhealth* [Internet]. 2024 Sep 24 [cited 2025 Sep 18];12:e55819. Available from: <https://mhealth.jmir.org/2024/1/e55819> <https://doi.org/10.2196/55819>
25. Malacon K, Touponse G, Yoseph E, Li G, Wei P (Janet), Kicielinski K, Massie L, Williamson T, Han S, Zygorakis C. Gender differences in electronic health record usage among surgeons. *JAMA Netw Open* [Internet]. 2024 Jul 23 [cited 2025 Sep 18];7(7):e2421717. Available from: <https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2821393> <https://doi.org/10.1001/jamanetworkopen.2024.21717>
26. Cho H, Nguyen OT, Weaver M, Pruitt J, Marcelle C, Salloum RG, Keenan G. Electronic health record system use and documentation burden of acute and critical

- care nurse clinicians: a mixed-methods study. *Journal of the American Medical Informatics Association* [Internet]. 2024 Sep 11 [cited 2025 Sep 18];31(11):2540–9. Available from: <https://academic.oup.com/jamia/article/31/11/2540/7755390> <https://doi.org/10.1093/jamia/ocae239>
27. Mwogosi A, Mambile C. Insights into the current state of electronic health records adoption and utilisation in Tanzanian public primary healthcare facilities: a survey study. *RMJ* [Internet]. 2024 Aug 14 [cited 2025 Sep 18];35(1):75–93. Available from: <http://www.emerald.com/rmj/article/35/1/75-93/1242946> <https://doi.org/10.1108/RMJ-04-2023-0023>
  28. Sawyer-George O, Eyerinmene Friday J. Adoption of electronic medical records in tertiary health care centres: a survey of federal medical centres in South-South Nigeria. *AJIST* [Internet]. 2023 Mar 15 [cited 2025 Sep 18];13(1):25–34. Available from: <https://ajist.co/index.php/ajist/article/view/3481> <https://doi.org/10.51983/ajist-2023.13.1.3481>
  29. Zahra F, Hussain A, Mohd H. Usability factors of mobile health application for chronic diseases. *AIP Conf. Proc* [Internet]. 2016 Aug 12 [cited 2025 Sep 18];1761:020108. Available from: <https://pubs.aip.org/aip/acp/article/694070> <https://doi.org/10.1063/1.4960948>
  30. Ventola CL. Mobile devices and apps for health care professionals: uses and benefits. *PT* [Internet]. 2014 May [cited 2025 Sep 18];39(5):356–64. Available from: <https://pubmed.ncbi.nlm.nih.gov/24883008/> Subscription or purchase required to view full text
  31. Paré G, Raymond L, Guinea AOD, Poba-Nzaou P, Trudel MC, Marsan J, Micheneau T. Electronic health record usage behaviors in primary care medical practices: A survey of family physicians in Canada. *International Journal of Medical Informatics* [Internet]. 2015 Oct [cited 2025 Sep 18];84(10):857–67. Available from: <https://linkinghub.elsevier.com/retrieve/pii/S1386505615300228> <https://doi.org/10.1016/j.ijmedinf.2015.07.005> Subscription or purchase required to view full text
  32. Muliokela RK, Banda K, Hussien AM, Malumo SB, Kashoka A, Mwiche A, Chiboma I, Barreix M, Nyirenda M, Sithole Z, Ratanaprayul N, Endehabtu BF, Telake HA, Weldeab A, Probert WJM, Tunçalp Özge, Maya E, Woldetsadik M, Tilahun B, Guure C, Senya K, Say L, Tamrat T. Implementation of WHO smart guidelines-digital adaptation kits in pathfinder countries in Africa: processes and early lessons learned. *JMIR Med Inform* [Internet]. 2024 Apr 22 [cited 2025 Sep 18];13:e58858. Available from: <https://medinform.jmir.org/2025/1/e58858> <https://doi.org/10.2196/58858>
  33. Tsai HYS, Rikard RV, Cotten SR, Shillair R. Senior technology exploration, learning, and acceptance (STELA) model: from exploration to use – a longitudinal randomized controlled trial. *Educational Gerontology* [Internet]. 2019 Nov 18 [cited 2025 Sep 18];45(12):728–43. Available from: <https://www.tandfonline.com/doi/full/10.1080/03601277.2019.1690802> <https://doi.org/10.1080/03601277.2019.1690802> Subscription or purchase required to view full text
  34. Landis-Lewis Z, Manjomo R, Gadabu OJ, Kam M, Simwaka BN, Zickmund SL, Chimbwandira F, Douglas GP, Jacobson RS. Barriers to using eHealth data for clinical performance feedback in Malawi: A case study. *International Journal of Medical Informatics* [Internet]. 2015 Oct [cited 2025 Sep 18];84(10):868–75. Available from: <https://linkinghub.elsevier.com/retrieve/pii/S1386505615300204> <https://doi.org/10.1016/j.ijmedinf.2015.07.003>
  35. Young HM, Nesbitt TS. Increasing the capacity of primary care through enabling technology. *J Gen Intern Med* [Internet]. 2016 Nov 28 [cited 2025 Sep 18];32(4):398–403. Available from: <http://link.springer.com/10.1007/s11606-016-3952-3> <https://doi.org/10.1007/s11606-016-3952-3>
  36. Ngugi PN, Were MC, Babic A. Users' perception on factors contributing to electronic medical records systems use: a

- focus group discussion study in healthcare facilities setting in Kenya. *BMC Med Inform Decis Mak* [Internet]. 2021 Dec 26 [cited 2025 Sep 18];21(1):362. Available from: <https://bmcmedinformdecismak.biomedcentral.com/articles/10.1186/s12911-021-01737-x> <https://doi.org/10.1186/s12911-021-01737-x>
37. Jones M, Talebi R, Littlejohn J, Bosnic O, Aprile J. An optimization program to help practices assess data quality and workflow with their electronic medical records: observational study. *JMIR Hum Factors* [Internet]. 2018 Jan 19 [cited 2025 Sep 18];5(4):e30. Available from: <http://humanfactors.jmir.org/2018/4/e30/> <https://doi.org/10.2196/humanfactors.9889>
  38. Whitelaw S, Pellegrini DM, Mamas MA, Cowie M, Van Spall HGC. Barriers and facilitators of the uptake of digital health technology in cardiovascular care: a systematic scoping review. *European Heart Journal – Digital Health* [Internet]. 2021 Feb 4 [cited 2025 Sep 18];2(1):62–74. Available from: <https://academic.oup.com/ehjdh/article/2/1/62/6128570> <https://doi.org/10.1093/ehjdh/ztab005>
  39. Watt R. Does customized in-practice support improve EMR meaningful use in primary Care? Evidence from a retrospective mixed methods evaluation [Master's thesis]. Victoria (BC): University of Victoria; 2014 Aug 19 [cited 2025 Sep 18]; 62p. Available from: <https://dspace.library.uvic.ca/server/api/core/bitstreams/112bcece-cbce-4b1d-b4da-932a0265e762/content>
  40. Lee J, Lynch CA, Hashiguchi LO, Snow RW, Herz ND, Webster J, Parkhurst J, Erundu NA. Interventions to improve district-level routine health data in low-income and middle-income countries: a systematic review. *BMJ Glob Health* [Internet]. 2021 Jun 11 [cited 2025 Sep 18];6(6):e004223. Available from: <https://gh.bmj.com/content/6/6/e004223> <https://doi.org/10.1136/bmjgh-2020-004223>
  41. Mukred M, Yusof ZM, Alotaibi FM, Mokhtar UA, Fauzi F. The key factors in adopting an electronic records management system (ERMS) in the educational sector: a UTAUT-based framework. *IEEE Access* [Internet]. 2019 Mar 12 [cited 2025 Sep 18];7:35963–80. Available from: <https://ieeexplore.ieee.org/document/8666112/> <https://doi.org/10.1109/ACCESS.2019.2904617>
  42. Oliveira T, Thomas M, Espadanal M. Assessing the determinants of cloud computing adoption: An analysis of the manufacturing and services sectors. *Information & Management* [Internet]. 2014 Jul [cited 2025 Sep 18];51(5):497–510. Available from: <https://linkinghub.elsevier.com/retrieve/pii/S0378720614000391> <https://doi.org/10.1016/j.im.2014.03.006> Subscription or purchase required to view full text

<b>Table 1: Participant's socio-demographic characteristics</b>		
<b>Characteristic</b>	<b>Frequency (n=110)</b>	<b>Percentage (%)</b>
<b>Sex</b>		
Male	43	39.1
Female	67	60.9
<b>Age (Mean=33.6, SD=7.6)</b>		
18–34 years	70	63.6
35 years+	40	36.4
<b>Marital Status</b>		
In union	60	54.5
Not in union	50	45.5
<b>Level of Education</b>		
Certificate	6	5.4
Diploma	53	48.2
Bachelor's degree and above	51	46.4
<b>Cadre/Job Title</b>		
M&E/Data Officer	10	9.1
Data Assistant/Clerk	16	14.5
Medical Doctor	3	2.7
Medical Clinical Officer	8	7.3
Nurse	14	12.7
Counselor	26	23.6
Lab Technician	4	3.6
Pharmacy Assistant	5	4.5
ART Aide	6	5.5
Community Worker	18	16.4
<b>Duration Worked at the Facility</b>		
3–6 months	9	8.2
7–11 months	18	16.4
1–2 years	23	20.9
3–5 years	26	23.6
Above 5 years	34	30.9

**Table 2: Logistic regression of intrapersonal, technology and institutional factors associated with adoption and use of eHealth**

Characteristic	eHealth use at community level		Total	Crude OR (95% CI)	p-value	Adjusted OR (95% CI)	p-value
	Yes (N=67)	No (N=43)					
<b>Intrapersonal factors</b>							
<b>Gender</b>							
Male	22	21	43	1.00			
Female	45	22	67	1.77 (0.81–3.91)	0.150	2.87 (0.99–8.29)	0.051
<b>Age (years)</b>							
18–34	35	35	70	1.00			
35+	32	8	40	4.0 (1.62–9.89)	0.003*	2.62 (0.82–8.47)	0.106
<b>Operation awareness</b>							
Moderate/Low	63	35	98	1.00			
High	4	8	12	3.60 (1.01–12.81)	0.048*	0.43 (0.11–1.67)	0.227
<b>Computer literacy</b>							
Moderate/Low	35	14	61	1.00			
High	32	29	49	2.26 (1.02–5.03)	0.045*	2.23 (0.76–6.62)	0.146
<b>EMR experience (years)</b>							
0–3	57	34	91	1.00			
3+	10	9	19	0.30 (0.11–0.84)	0.022*	0.43 (0.11–1.67)	0.227
<b>Technology-related factors</b>							
<b>System allows for language modification</b>							

**Table 2: Logistic regression of intrapersonal, technology and institutional factors associated with adoption and use of eHealth**

Characteristic	eHealth use at community level		Total	Crude OR (95% CI)	p-value	Adjusted OR (95% CI)	p-value
	Yes (N=67)	No (N=43)					
Strongly agree/Agree	35	13	48	1.00			
Neutral	14	6	20	0.61 (0.20–1.91)	0.404	0.78 (0.16–3.85)	0.767
Disagree/Strongly disagree	18	24	42	0.25 (0.10–0.61)	0.002*	0.56 (0.16–1.93)	0.360
<b>System allows for interoperability</b>							
Strongly agree/Agree	48	16	64	1.00			
Neutral	8	3	11	0.88 (0.21–3.76)	0.873	1.32 (0.19–9.03)	0.773
Disagree/Strongly disagree	11	24	35	0.15 (0.62–0.38)	0.000*	0.26 (0.08–0.90)	0.034*
<b>System ensures data accuracy</b>							
Strongly agree/Agree	58	32	90	1.00			
Neutral	8	6	14	0.74 (0.24–2.31)	0.599	1.29 (0.27–6.23)	0.746
Disagree/Strongly disagree	1	5	6	0.11 (0.01–0.99)	0.049*	0.04 (0.00–0.63)	0.022*
<b>Institutional factors</b>							
<b>Collegial support</b>							
Few/some support	9	13	22	1.00			
Very supportive	58	30	88	1.93 (1.24–3.00)	0.003*	0.31 (0.09–1.07)	0.064

