

# Factors affecting Utilization of Electronic Medical Records Systems in Improving Quality of Care for HIV clients -Case study Eastern Uganda

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## Abstract:

Just as the adoption of information technology (IT) to support the delivery of healthcare has now been recognized for many years as an essential tool in improving patient care, the study aimed at investigating the factors affecting the Utilization of Electronic Medical Records Systems (EMR) in improving the quality of care among clients receiving Ante Retroviral Therapy (ART) in Eastern Uganda. This study was conducted in 15 districts of Budaka, Bududa, Bukwo, Bulambuli, Butaleja, Butebo, Kapchorwa, Kibuku, Kween, Manafwa, Mbale, Namisindwa and Pallisa, Sironko, Tororo and Mbale City with a total of 160 Government Health Facilities offering ART services. Data was collected using a structured and pretested research assistant-administered questionnaire. A total of 107 respondents were interviewed using the questionnaire making a response rate of 75%. Deductively, 95% of the healthcare workforce are strong direct contributors to harnessing and improving technology in Health Care especially using EMR to improve the Quality of Services offered to ART clients in East Uganda. Government presence in the sphere of providing Human Resources for Health with Computer Skills and electronic medical records training is untapped hence a contributing factor to the under-utilization of EMR required in improving the Quality of Care of ART patients. The study deduced that there are no specific or known Government Policies towards improving, governing, and guiding IT in Health Care this in turn promotes reluctance to the utilization Electronic Medical Records Systems. Finally, the study concluded that most of the Human Resources for Health staff are underpaid way below the average African monthly salary average for health care professionals, yet studies have proven that well-motivated staff will endeavour to put in all their efforts towards ensuring enhanced output as opposed to a less motivated staff. The research findings suggest that EMR is a valuable tool for improving the Quality of care of patients receiving ART. Its Utilization in Improving Patient Quality of Care includes reminding the patient and clinicians when clients are for Viral Load bleeding, reminding clients to go for their ARV drug refills, and any services they are eligible for.

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**Keywords:** Electronic Medical Records Systems, Information Technology, Health Care, ART, HIV/AIDS, Management, HMIS.

## **Introduction**

The adoption of information technology (IT) to support the delivery of healthcare has now been recognized for many years as an essential tool in improving patient care (Alotaibi & Federico, 2018) and (MacKinnon & Wasserman, 2009). It is also widely agreed that IT has the potential to improve the quality and cost management of the health sector (Thomas & Chalkidou, 2016). Information Technology has been successfully employed in hospitals for billing, scheduling, management of patients' medical record, laboratory reporting, diagnostic systems, and computerized physician order entry (CPOE). Hospital management information systems (HMIS) are integrated systems that support the comprehensive information requirements of hospitals, including patient, clinical, ancillary, and financial management (Endriyas et al., 2019). In the USA, electronic medical records (EMR) systems helped to save up to \$80 billion in 2003 in healthcare costs annually, while improving the quality of healthcare (Hillestad et al., 2005) and have the potential to save more (Swartz, 2005). HMIS holds the potential for cutting costs and reducing medical errors, yet success depends on physicians' acceptance and usage (Nordin et al., 2022).

However, underdeveloped nations like Uganda have not yet fully embraced information technology to advance medical procedures. Even though financially stable hospitals are adopting premium EMRs, smaller hospitals are apprehensive because of the low return on investment (Driessen, 2013). Another factor is the absence of government support (Endriyas et al., 2019).

The study sought to investigate the factors affecting the Utilization of EMR or Health Management Information Systems in improving the quality of care among clients receiving Ante Retroviral Therapy in Eastern Uganda. Interest: The study was motivated by the challenges that come with managing HIV clients. The challenges include failure to track patients, late detection of adverse events, and inadequate monitoring of patient outcomes. Desire: The adoption of EMR is expected to help solve these problems by providing timely and accurate information that would lead to improved quality of care. Action: Implementing Electronic Medical Records Systems in health facilities is therefore critical in improving the quality of care among HIV clients.

## **Methodology**

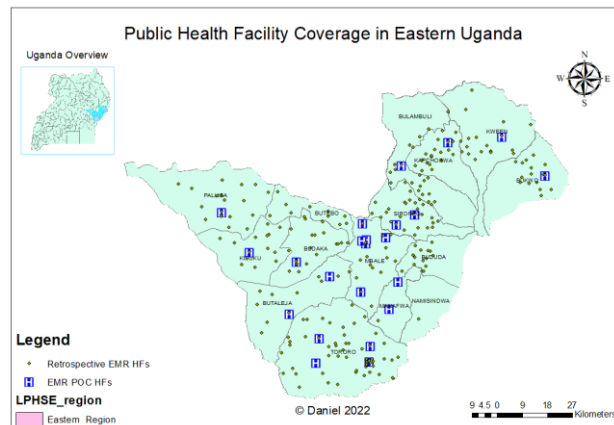
This section describes the methods and materials used in the study. It incorporates; research study design, study population, sample size, sampling method, data collection instruments, data management/ data analysis, ethical considerations.

## **Research Design**

This paper presents an exploratory study based on quantitative and qualitative surveys. The focus is to analyse the factors which potentially affect the utilization of EMR in

Government Hospitals. These challenges were identified through a literature review followed by brainstorming sessions with experts in Uganda EMR or used and then the knowledge will be transformed into a questionnaire. Data will be collected from doctors, nursing, management, Data officers, Data assistants and IT staff employed in eight different hospitals in Eastern Uganda Samples will include input from males as well as females

## Geographical scope



**Figure 1.** Map of the study region

The study was conducted in 15 districts of Budaka, Bududa, Bukwo, Bulambuli, Butaleja, Butebo, Kapchorwa, Kibuku, Kween, Manafwa, Mbale, Namisindwa, Pallisa, Sironko, Tororo and Mbale City with a total of 160 Government Health Facilities offering ART services.

## Research Population

The study population comprised of working adults (18+ years) doctors, nurses, management staff, Data officers, Data clerks, Data assistants and IT staff employed in the sampled Public Health Facilities in Eastern Uganda. The Sample size included males as well as females from 160 Health Facilities.

## Data analysis

The dataset from Kobo Collect was downloaded, cleaned in Ms Excel, and exported to STATA 15 Data analysis software. Data has been presented using frequency, proportions, and summary statistics to describe the study variables and factors under study. To answer objectives 1 and 2, the bivariable analysis will be carried out to identify variables candidates for multivariable analysis. Variables whose p-value are less than 0.20 in the bivariate analysis will be included in multivariable logistic regression. Multi-Collinearity will be diagnosed using standard error and Hosmer-Lemes will be performed to test for model fitness. The odds ratio along with 95% CI was estimated to measure the strength of the association. Variables were interpreted as

having a statistically significant association when  $p\text{-value} < 0.05$  and determine the factors affecting the Utilization of EMRs.

## Results

### Government efforts in supporting ART services

Government of Uganda through the Ministry of Health, a cabinet-level government ministry of Uganda. It is responsible for planning, delivering, and maintaining an efficient and effective healthcare delivery system, including preventive, curative, and rehabilitative services, in a humane, affordable, and sustainable manner. Based on this background, the study sought to establish the support Ministry of Health extends to the Public Health Facilities in Eastern Uganda offering ART services.

### Payment of Human Resources for Health

The study established the fraction of the Human Resources for Health is compensated by different players in Health Care.

The study found that Non-Governmental Organisations operating in the Eastern Uganda region including USAID, CDC, IntraHealth International Inc, RHITES-E, Baylor-Uganda, and Uganda Cares (AHF) pay up to 55% (59/107) of the HRH, Government of Uganda pays 41% of the HRH and the rest are either volunteers or interns who are not paid.

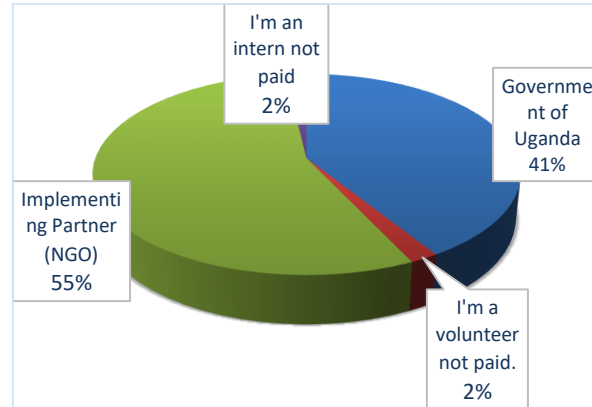


Figure 2. Payment of Human Resources for Health

This, therefore, calls for the Government and the Ministry of Health to engage and pay more Human Resources for Health who directly support ART clinics to realize good Quality of Care for the clients.

### Net Salary Paid<sup>1</sup>.

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<sup>1</sup> 1USD=3500UGX (USAID)

Salary or wages are known to be motivating factors for personnel undertaking assignments that power service delivery often result from poorly motivated staff or employees.

**Table 1.** Showing Salary /Wages paid to Human Resources for Health

Net Monthly Salary/Wages	Paid by			Total	%
	Government of Uganda	Implementing Partner (NGO)	I'm a volunteer not paid.		
<b>1m+</b>	15	1	-	16	15%
<b>201-500K</b>	18	47	-	65	61%
<b>501-1m</b>	11	8	-	19	18%
<b>Less 200K</b>	0	3	2	7	7%

The study revealed that 61% of the HRH staff are paid between USD 57-143 monthly, 18% are paid between USD 144-289, 15% in the categories of Facility In charges or hospital administrators are paid above USD 290 and Notably, 7% HRH like Volunteers, Interns and low skilled staff like Cleaners are compensated ranging from nothing to maximum of USD 56 only monthly.

### Investment in IT Systems for HIV & ART services

Electronic Medical Records system- Uganda EMR requires computer hardware to run. The study established the following findings shown in Table 4.4 regarding the procurement and supply of Computers to Public Health Facilities.

**Table 2.** Investment in Computers for ART data capture

Who provided the computer?	Does the Facility have a computer?			
	No	Yes	Do not Know	Total
Do not have a computer	14	0	0	14
Implementing Mechanism(s)	0	88	0	88
N/A	0	0	5	5
<b>Total</b>	<b>14</b>	<b>88</b>	<b>5</b>	<b>107</b>

The study revealed that 100% (88/88) of Health Facilities with EMR have received Computers supplied by Implementing partners USAID /RHITES-E to capture ART data. 13% (14/107) of Public Health Facilities did not have a computer hindering data capture which eventually compromised the Quality of Care due to insufficient or not

readily available data and 5% of respondents did not know whether their facilities had or did not have a computer.

### Correlation analysis

Results reveal that there is a significant correlation between knowing how to use a computer and EMR giving ART clients reminders for Viral Load bleeding ( $r=0.216$ ,  $p\text{-value} > 0.05$ ). This implies that an increase in computer use knowledge is associated with EMR.

Findings further revealed that EMR giving clients missed appointment reminders is significantly related to Knowledge on Computer use ( $r=0.216$ ,  $p\text{-value} > 0.05$ ). This implies that further grasping and increasing EMR reminders for client services is associated with improving the Quality of Care offered to ART clients.

**Table 3.** Correlation Matrix

Correlations <sup>2</sup>		
Quality of Care Indicators		Do you know how to use a computer?
EMR should /give reminder for ART patient Viral Load bleeding	Pearson Correlation	.216*
	Sig. (2-tailed)	0.025
	N	107
EMR should /give reminder for ART patient patients who missed appointments	Pearson Correlation	.216*
	Sig. (2-tailed)	0.025
	N	107
EMR should /give reminders for services the client requires	Pearson Correlation	-0.110
	Sig. (2-tailed)	0.261
	N	107

### Statements on Data Quality Dimensions

The respondents indicated their level of agreement with the study questions which were on a Likert scale<sup>3</sup> of between 1 and 5. *Where 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree.*

The scores were calculated to mean scores which were interpreted as

<sup>2</sup> Pearson Rank Correlation

<sup>3</sup> Linkert Scale – 5 Scale

- 4.5 - 5.0 strongly agree.
- 3.4- 4.4 agree.
- 2.5 - 3.4 Neutral.
- 1.5 - 2.4 disagree, and
- 0.0 - 1.4 strongly disagree.

**Table 4.** Statements on Data Quality Dimensions

Data Quality Dimensions	Mean	STD
Does your facility report on time?	2.99	0.96
Does your facility submit quality reports?	2.93	0.88
Does your facility submit accurate reports?	2.91	0.87
Does your facility submit reliable reports?	2.95	0.87
Does your facility review the report before submission?	2.29	0.74

From the data collected and summarised in the table above, it is evident that facilities surveyed do not review their reports before submission with a mean of 2.29, while reporting on time, submission of quality reports, submission of accurate reports and submission of reliable reports recorded means of 2.99, 2.93, 2.91 and 2.95 respectively; all falling in the range of neutrality (2.5-3.4) It is worth noting that Quality and reliable data is used to inform government decisions, clinical and medical interventions (Lisa, 2008).

**Table 5.** Statements on Knowledge indicators

	Mean	STD
<b>EMR is hard to use</b>	2.39	0.84
<b>EMR Computer consumes a lot of electricity</b>	2.2	0.6
<b>I am confident I can use EMR</b>	3.17	1.31
<b>The government/Ministry of Health Provides training on EMR</b>	2.09	0.44
<b>IP/NGO Provides training on EMR</b>	3.69	0.9
<b>Do you know any Government policies towards improving IT in Health Care</b>	2.24	0.49
<b>Do you know how to use EMR</b>	3.05	1.32

From the data analysis, there is consensus that Electronic Medical Records Systems are not hard to use with a mean of 2.39 disagreeing, also there's consensus that EMR computer does not consume a lot of electricity. Respondents also acknowledged that

they disagreed with the statements ‘Government/Ministry of Health Provides training on EMR’ with a mean of 2.09.

The study further revealed that the respondents did not know any Government Policies towards improving IT in Health Care with a mean of 2.24 and a standard deviation of 0.49.

Respondents agreed that Implementing partners or National Governmental Organisations provide training on EMR use with a mean of 3.69

## **Discussion**

This section discusses the main findings of the study regarding training, Investment in ART services, Government policies, and how they affect the Utilization of EMR in Improving the Quality of Care for HIV clients -Case study Eastern Uganda.

### **Field of specialization**

For the main sample, most of the respondents specialized in Health care, Medical Records, statistics, Computing/Information Technology, Counselling & Psychology and Monitoring & Evaluation.

Deductively,95% of the healthcare workforce are strong direct contributors to harnessing and improving technology in Health Care especially using EMR to improve the Quality of Services offered to ART clients in Eastern Uganda. This finding supports that of (Bensidoun,2008) who found that The Nature of employee Specialization Matters for Growth.

### **Training in EMR**

Most respondents in the main sample reported that NGOs or Not for Profit entities have put in place relevant effort to provide the training which gives the Human Resources for Health a better understanding of Basic Computing and EMR systems and these staff training programs are usually conducted by experienced NGO staff. This agrees with (Audet et al., 2004)who proposed that an employee requires training in a specific speciality or office after being hired into a company. This instruction is that which is given off-campus. In other publications, he further argues that training changes attitudes taken by workers toward organizational goals or methods of

accomplishing goals. This is designed to help HRH feel more at ease and competent in what he or she is to perform, (Dartey-Baah, 2010) said that even if an employee has both high commitment towards accomplishing a particular piece of work, and a well-formed strategy about how to go about doing it, the implementation of the plan cannot be constructed or may be terminated if he does not know how to carry it out, or if he knows but is incapable of doing so.

### **Investment in IT Systems for HIV & ART services**

Electronic Medical Records system- Uganda EMR requires computer hardware to run. The study revealed that all Health Facilities with EMR have received Computers supplied by Implementing partners to capture ART data. A considerable number of Public Health Facilities did not have a computer hindering ART data capture which eventually compromised the Quality of Care due to insufficient or not readily available data.

### **Government Policy towards IT in Health Care**

The study revealed that the respondents did not know any Government Policies towards improving IT this concurs with Chadwick *B. Fletcher (2008)* who argues that implementing specific policies can accelerate the utilization of Electronic Medical Records Systems.

### **Motivation, Salary, and wages**

The study reveals that most of the Human Resources for Health staff are paid below USD 143 monthly way below the average African monthly salary average of USD 758 (*humancaptialhub.com*) for healthcare professionals. (Michael Ogungbenle, 2021) said in whatever form: monetary, appreciation, recognition, ample staff welfare et cetera, the impacts of the ultimate results either positive or negative on staff performance

based on how these are dispensed. A well-motivated staff will endeavour to put in all their efforts towards ensuring enhanced output as opposed to a less motivated staff.

### **Conclusions**

The study deduced that the healthcare workforce is a strong direct contributor to harnessing and improving technology in Health Care especially using EMR to improve the Quality of Services offered to ART clients in Eastern Uganda.

The study also deduced that the Government's presence in the sphere of providing Human Resources for Health with Computer Skills and Electronic Medical Records training is untapped hence a contributing factor to the under-utilization of EMR required in improving the Quality of Care of ART patients in Eastern Uganda.

The study also concluded revelations that all Health Facilities with EMR have received Computers supplied by Implementing partners to capture ART data (Menachemi & Collum, 2011). While a considerable number of Public Health Facilities did not have a computer hindering ART data capture which eventually compromised the Quality of Care due to insufficient or not readily available data.

The study deduced that there are no specific or known Government Policies towards improving, governing, and guiding IT in Health Care this in turn promotes reluctance to utilization of Electronic Medical Records Systems.

Finally, the study concluded that most of the Human Resources for Health staff are underpaid way below the average African monthly salary average for health care professionals, yet studies have proven that well-motivated staff will endeavour to put in all their efforts towards ensuring enhanced output as opposed to a less motivated staff.

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