

FACTORS INFLUENCING UTILIZATION OF ELECTRONIC COMMUNITY HEALTH INFORMATION SYSTEM AMONG VILLAGE HEALTH TEAMS IN OGUR HEALTH CENTER IV, LIRA DISTRICT. A CROSS-SECTIONAL STUDY

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Abstract

Background

The Electronic Community Health Information System (eCHIS) is an integrated tool designed to assist Village Health Teams (VHTs) in making decisions and providing care support to their communities. This study aims to identify the factors influencing the utilization of eCHIS among VHTs at Ogur Health Center IV in Lira District.

Methods

The study employed a cross-sectional quantitative approach using simple random sampling, with a final sample size of 37 participants, and data analysis conducted using SPSS version 20.0

Results

20/37 (54.1%) were female, 13/37 (35.1%) were aged 36-45 years, and 21/37 (56.8%) had a secondary level education. 19/37 (51.4%) reported that they do not have access to a smartphone. 37/37 (100.0%), indicating that the availability of the internet in the community influences the utilization of eCHIS. 37/37 (100.0%), agreed that active community involvement is critical for the successful adoption of eCHIS. 5/37 (94.6%), indicated that users are more satisfied with eCHIS when they find the output information accessible, 29/37 (78.4%) reported that electronic equipment for this is available at the facility, 26/37 (70.3%), indicated that there is proper maintenance of ICT equipment in healthcare facilities, 29/37 (78.4%), agreed that leadership at the facility affects the utilization of eCHIS, while a minority of 8/37 (21.6%) disagreed.

Conclusion

Age, education, and smartphone access, Internet accessibility and community involvement were found to be critical for the successful adoption of eCHIS. Availability of electronic equipment, maintenance of ICT resources, and training support significantly influenced eCHIS usage.

Recommendation

The Ministry of Health, District Health Office, and Ogur Health Center IV recommend enhancing technological skills, expanding internet access, involving communities, and fostering leadership to improve eCHIS utilization through training, monitoring, and awareness campaigns.

Keywords: Individual Factors, Community factors, Health facility factors, Utilization of Echis, VHTs at Ogur Health Center IV.

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Background

The Electronic Community Health Information System (eCHIS) is an integrated reporting tool that supports VHTs in decision-making and care support for members of their communities (MoH, 2023). The application uses digital registers to organize client records by health category and assist in planning home visits. Over the years, health records were stored using conventional paper-based records (PBRs), which include data entry forms, admission registers, nursing

process records, punch cards, case notes or case files, photographs, and cadets (Garavand et al., 2016). Other methods of storage have, however, evolved, especially with the development of advanced electronic devices, computers, and the Internet. In developed nations, it is not uncommon to have patients' records stored electronically with backups available on various electronic storage devices and media. This is because EHRs' ability to exchange health information electronically can assist users in providing

higher quality and safer care for patients while creating tangible enhancements for the organization (Essuman et al., 2020). In a study conducted in Ghana, the level of utilization of electronic community health information systems was 59% among healthcare professionals (Essuman et al., 2020). In Ethiopia, the eCHIS initiative has been extensively implemented. Health extension workers have been trained to use mobile platforms for managing health extension programs. Studies indicate a high acceptance rate of 67% of the system among healthcare workers, driven by its perceived usefulness and ease of use (Tariku Nigatu & Hermens, 2023). In Kenya, the Ministry of Health, in collaboration with Medic Mobile and the USAID-supported CHISU program, developed the eCHIS app. Launched in June 2023, the app aims for nationwide scale-up by 2024-2025. Its goal is to support the collection and utilization of community-level health data in electronic format, thereby enhancing the quality and availability of primary-level health information (USAID, 2023). The electronic community health information system has been implemented in Uganda to support health service delivery by community health workers. Despite its wide usage and benefits, this system continues to face numerous challenges associated with inadequate access to and usage of information technology, low level of literacy, limited budget, and many other factors, which significantly affect the performance of the system at both the local and national levels. Therefore, the study aims to identify the factors influencing the utilization of electronic community health information systems amongst village health teams in Ogur Health Center IV, Lira district.

Methodology

Study design and rationale

This was a cross-sectional study that used a quantitative approach to determine factors influencing the use of eCHIS among the village health teams in Ogur Sub County, Lira district. The selected design was optimal for data collection at a specific moment in time since the data was collected at a specific point.

Study setting and rationale

The study was conducted in Ogur Health Center IV in Ogur Sub County, Lira district, located in the northern part of Uganda, East Africa, and Africa. Lira district is located approximately 337 kilometres (209 mi) by road north of the city of [Kampala](#), the capital and largest city in the country. The coordinates of the Lira district are 2°14'50.0"N 32°54'00.0" E (Latitude: 02.2472; Longitude: 32.9000). The district lies at an average elevation of 1,063 meters (3,488 ft) above sea level. Ogur Health Center IV is headed by a medical officer and provides preventive, promotive, outpatient, curative, maternity, inpatient, laboratory, ultrasound, emergency, blood transfusion, and mortuary services. It consists of 144 VHTs attached to the facility that

are reporting using eCHIS. The health center was selected because the VHTs were enrolled on eCHIS before other facilities in the district, hence they are more experienced and conversant with the system.

Study population

The study was conducted among the village health teams who had been trained, enrolled, and activated on eCHIS attached to Ogur Health Center IV in Ogur Sub County, Lira district.

Sample Size Determination

In this study, the sample size was calculated using a formula that was originally developed by Yamane (1967)

Where;

n- the sample size

N- the population size, i.e, number of active VHTs attached to the facility

The acceptable sampling error

(95% confidence level and $p = 0.05$ are assumed)

Therefore, the study population was 37 participants

The study involved 37 participants, which is above the minimum number required by the Uganda Nurses and Midwives Examination Board (UNMEB).

Sampling procedures

A simple random sampling method was employed to choose participants for the study, ensuring that every individual in the sampling frame had an equal opportunity to be included or excluded. The researcher achieved this by writing "YES" and "NO" on separate pieces of paper, folding them, placing them in a sealed container, shaking them, and then having participants draw a piece of paper from the container. Those who drew a "YES" were invited to join the study. This procedure was repeated until the desired number of participants for the day was reached.

Inclusion Criteria

The study included all VHTs who were trained and reporting digitally in Ogur Sub County attached to Ogur HC IV at the time of the study.

Exclusion criteria

VHTs who were not willing to consent were excluded from the study.

Critically ill VHTs were also excluded from the study.

Definition of variables

Independent variable

The factors influencing, i.e, individual, community-based, and health facility factors

Dependent variable

Utilization of an electronic community health information system

Research instrument

A structured questionnaire was used to gather information on the factors affecting the use of the electronic community health information system. The questionnaire was divided into four sections: Part 1 - Introduction, Part 2 - Individual Factors, Part 3 - Community-Based Factors, and Part 4 - Health Facility Factors.

To ensure reliability, a pilot study was conducted using simple random sampling with five participants from a neighboring facility. Any errors identified were corrected in collaboration with the supervisor.

Data Collection Procedures

The researcher obtained a letter of introduction from the Jerusalem School of Nursing and Midwifery and presented it to the in-charge at Ogur Health Centre IV to seek permission to conduct the study at the facility. Once permission was granted, the researcher introduced the researcher to the prospective respondents, to whom the researcher then introduced herself before beginning the sampling process. The researcher explained the procedure to the participants and administered the structured questionnaire, which took about 10-15 minutes to complete. Data collection took place for four days, with ten respondents being surveyed each day.

Data management.

The data collected in raw form was edited, coded, and reviewed daily for accuracy, consistency, and completeness, and this was done immediately before the respondent disappeared. The questionnaires were stored under lock and key, only accessible to the researcher, and will be destroyed after three years of report submission. Analyzed data on the flash disk, and the computer was protected from access by using a personal password.

Data analysis

During the study, the collected data were cleaned by filling in missing information from respondents, compiling the

data, and assigning appropriate codes to make sense of the responses. The compiled data was then analyzed using the Statistical Package for the Social Sciences (SPSS) and later presented in the form of graphs, charts, and tables.

Ethical consideration

Approval

Approval to conduct the study was obtained from the research committee of the Jerusalem School of Nursing and Midwifery. A formal letter was issued by the institution and presented to the In-Charge of Ogur Health Centre IV before commencing data collection..

Consent

A written informed consent form, detailing the purpose of the research, its benefits, risks, and participants' rights, was read to all respondents. They were then asked to provide their consent after confirming that they understood and agreed to participate in the study. Consent was obtained either through a written signature or a thumbprint for those who might not have been able to write.

Privacy protection

Privacy was ensured by conducting interviews with respondents in a private location that was inaccessible to others. All information and data collected were entered into SPSS and immediately secured with a password.

Confidentiality

Data collection was carried out by the researcher and stored in a location with restricted access. To maintain confidentiality, all information obtained from participants was recorded using initials instead of full names. Only the research team had access to the collected data.

RESULTS

Individual factors of the respondents

Table 1: Below shows the gender of the respondent

	Frequency	Percent	Valid Percent	Cumulative Percent
Female	20	54.1	54.1	54.1
Male	17	45.9	45.9	100.0
Total	37	100.0	100.0	

In Table 1, the majority of the respondents were female, 20/37 (54.1%), while slightly less than half were male, 17/37 (45.9%).

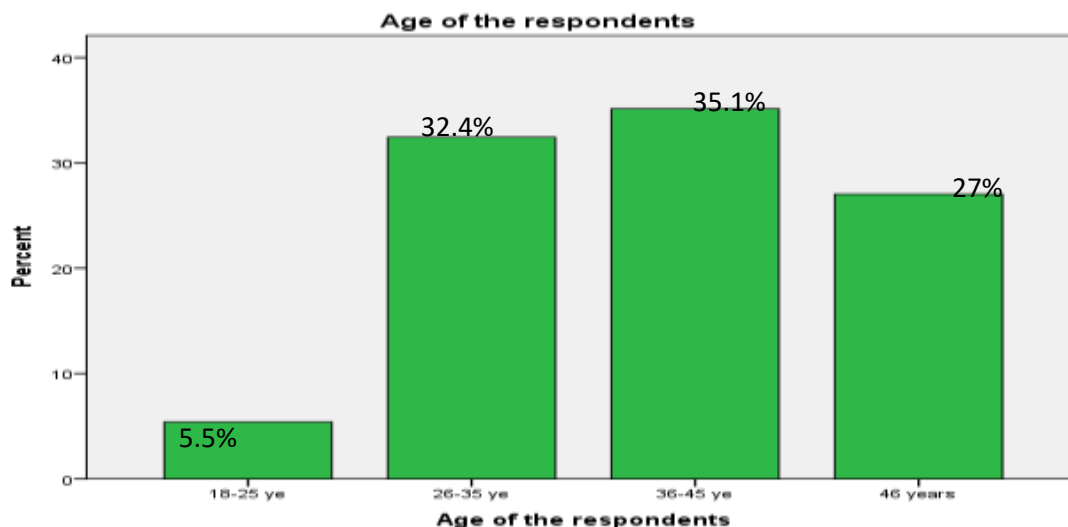


Figure 1: The above shows the ages of the respondents.

From the Figure, the largest proportion of respondents, 13/37 (35.1%), were aged 36-45 years, and a small minority of 2/37 (5.4%) were aged 18-25 years.

Table 1: Below shows the level of education of the respondents

	Frequency	Percent	Valid Percent	Cumulative Percent
Primary	16	43.2	43.2	43.2
Valid Secondary	21	56.8	56.8	100.0
Total	37	100.0	100.0	

Table 2 shows that the majority of respondents, 21/37 (56.8%), had a secondary level of education, while 16/37 (43.2%) had a primary level of education.

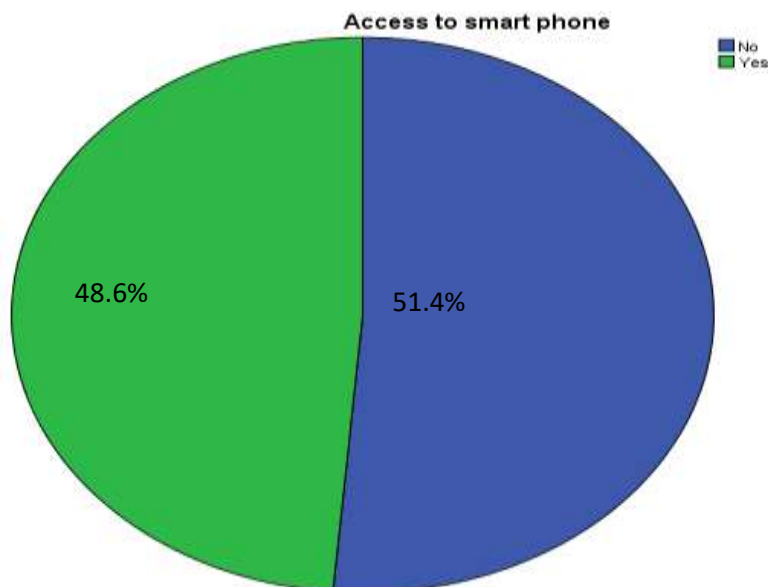


Figure 2: The above shows access to smartphones by the respondents

From figure 2, the slight majority of respondents, 19/37 (51.4%), reported that they do not have access to a smartphone, while 18/37 (48.6%) indicated that they do have access.

Table 2: Below shows whether the respondents know how to use smartphones

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	19	51.4	51.4	51.4
Yes	18	48.6	48.6	100.0
Total	37	100.0	100.0	

From table 3, the slight majority of respondents, 19/37 (51.4%), indicated that they do not know how to use a smartphone, while 18/37 (48.6%) reported that they do know how to use one.

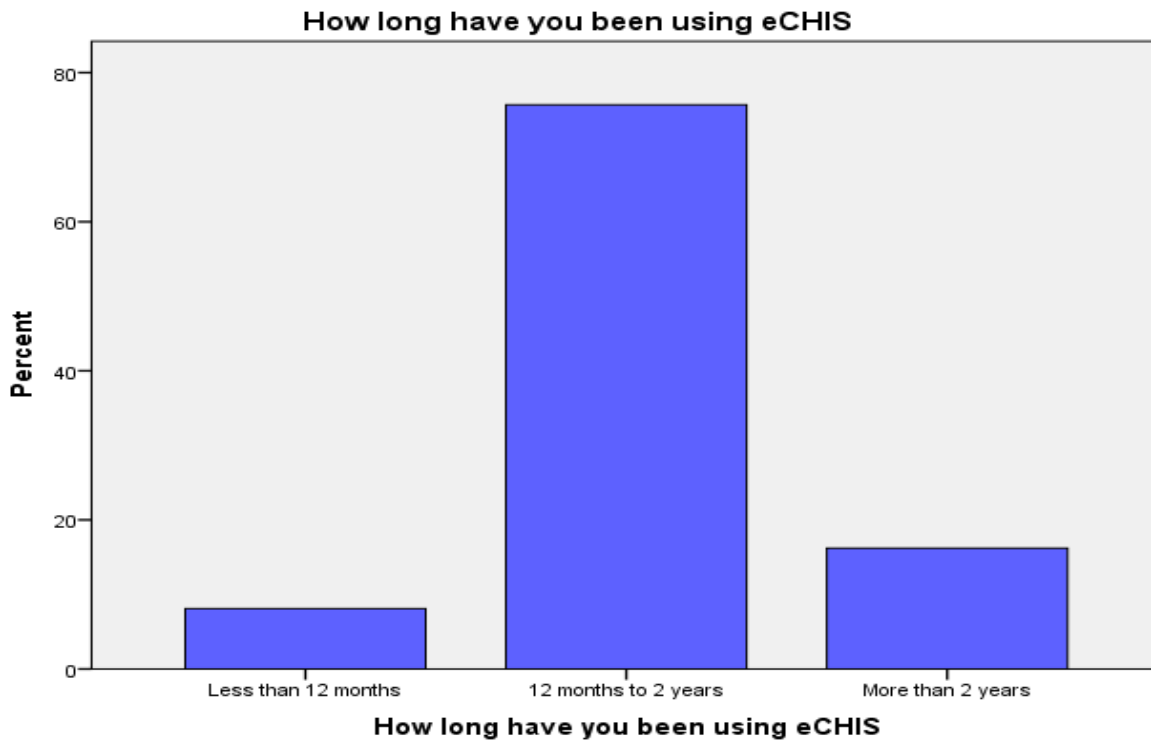


Figure 3: Above shows how long the respondents have been using eCHIS

From Figure 3, the majority of respondents, 28/37 (75.7%), have been using eCHIS for 12 months to 2 years, and a small minority of 3/37 (8.1%) have been using it for less than 12 months.

Table 3: Below shows attitude towards the utilization of eCHIS

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Positive	37	100.0	100.0	100.0

Table 4, All respondents, 37/37 (100.0%), expressed a positive attitude towards the utilization of eCHIS.

Community-based factors of the respondents

Table 4: Below illustrates how internet accessibility within the community impacts the use of eCHIS

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	37	100.0	100.0	100.0

Table 5, All respondents, 37/37 (100.0%), indicated that the availability of internet in the community influences the utilization of eCHIS.

Table 5: Below shows whether community involvement is critical for the successful adoption of eCHIS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	37	100.0	100.0	100.0

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Table 6, All respondents, 37/37 (100.0%), agreed that active community involvement is critical for the successful adoption of eCHIS.

Table 6: Below shows whether users are more satisfied with eCHIS when they find the output information accessible

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	2	5.4	5.4	5.4
	Yes	35	94.6	94.6	100.0
	Total	37	100.0	100.0	

From table 6, the vast majority of respondents, 35/37 (94.6%), indicated that users are more satisfied with eCHIS when they find the output information accessible, while a small minority of 2/37 (5.4%) disagreed.

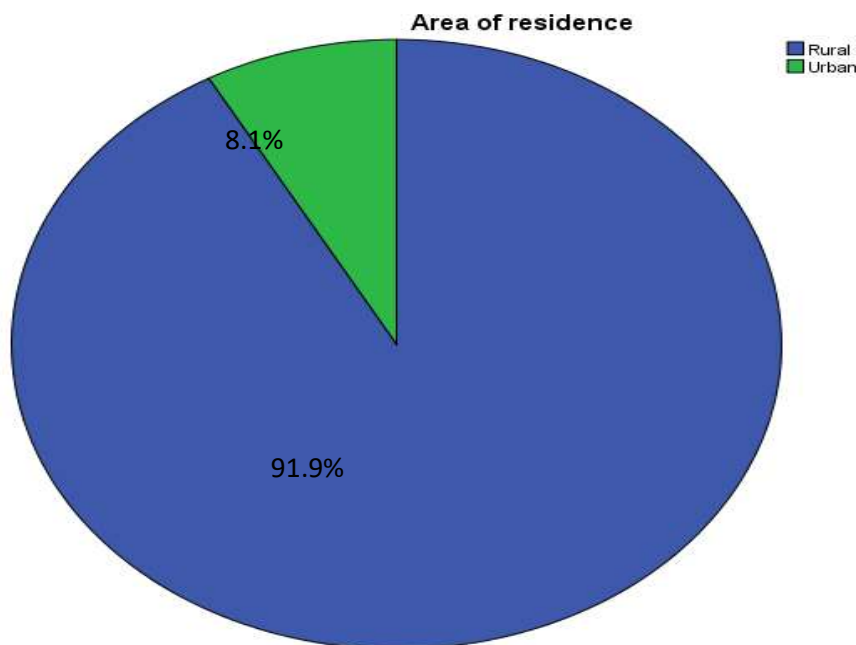


Figure 4: above shows the area of residence of the respondents

Figure 4. The vast majority of respondents, 34/37 (91.9%), resided in rural areas, while only 3/37 (8.1%) lived in urban areas.

Health facility-based factors of the respondents

Table 7: Below shows the availability of electronic equipment for eCHIS at the facility

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	8	21.6	21.6	21.6
	Yes	29	78.4	78.4	100.0
	Total	37	100.0	100.0	

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From the table 8, majority of respondents, 29/37 (78.4%), reported that electronic equipment for eCHIS is available at the facility, while a minority of 8/37 (21.6%) indicated that it is not available.

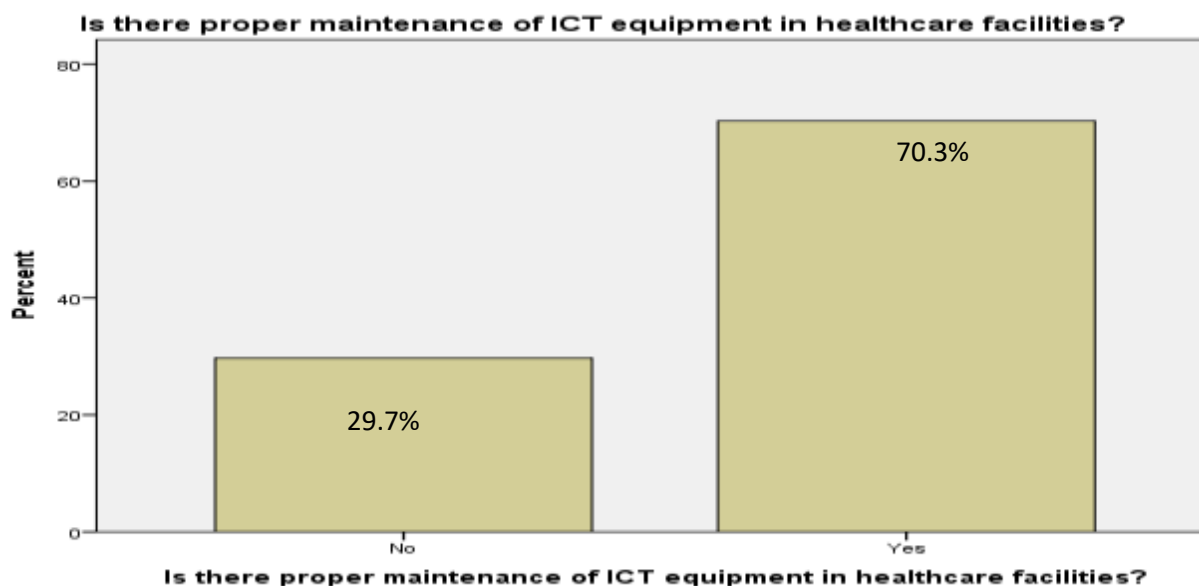


Figure 5: above shows whether there is proper maintenance of ICT equipment at the facility

From figure 5, majority of respondents, 26/37 (70.3%), indicated that there is proper maintenance of ICT equipment in healthcare facilities, while a minority of 11/37 (29.7%) reported that there is not.

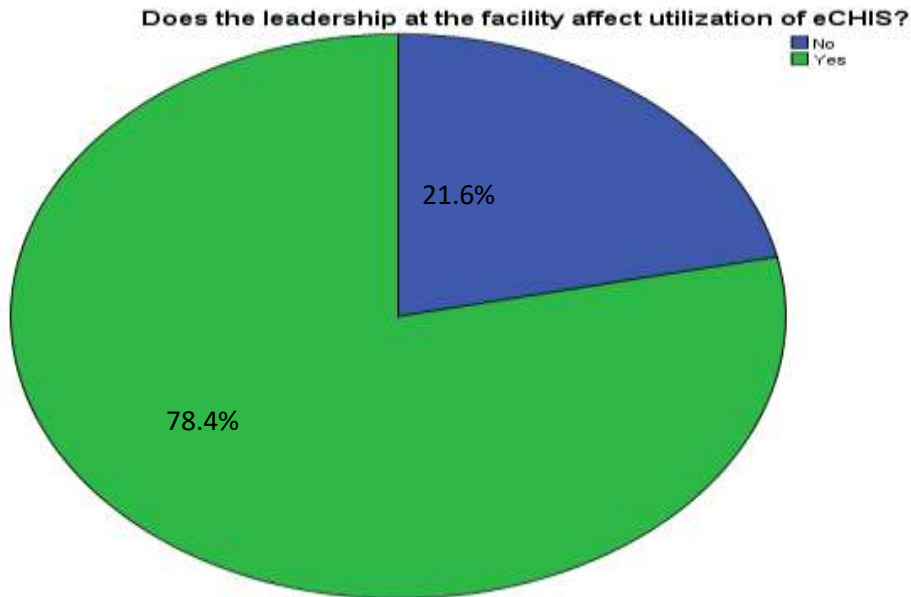


Figure 6: Above shows whether leadership at the facility affects eCHIS utilization

From Figure 6, the majority of respondents, 29/37 (78.4%), agreed that leadership at the facility affects the utilization of eCHIS, while a minority of 8/37 (21.6%) disagreed.

Table 8: Below shows whether proper training, follow-up, and supervision are done by the facility

	Frequency	Percent	Valid Percent	Cumulative Percent
No	9	24.3	24.3	24.3
Yes	28	75.7	75.7	100.0
Total	37	100.0	100.0	

From Table 9, the majority of respondents, 28/37 (75.7%), indicated that proper training, follow-up, and supervision are conducted by the facility, while a minority of 9/37 (24.3%) reported that they are not.

DISCUSSION

Individual factors influencing utilization of the eCHIS

The findings indicated a gender disparity in the utilization of electronic health records, with females being more likely to engage with eCHIS, which aligns with Love et al. (2023), suggesting that factors such as technological familiarity, training opportunities, or organizational culture may influence this trend, highlighting the need for targeted interventions to promote equitable access and usage among male VHTs in similar settings. The demographic distribution of respondents indicated that the majority fall within the 36-45 and 26-35 age brackets, which contrasts with findings from Bogale et al. (2023), where younger

health extension workers exhibited higher utilization of eCHIS; this discrepancy suggests that age-related factors, such as technological adaptability or access to training, may impact the engagement levels of older health workers, thus underscoring the necessity for tailored training programs to enhance digital health tool usage across all age groups. The unanimous positive attitude towards eCHIS among respondents reflects findings from Zhang et al. (2019), which highlighted that healthcare workers with favorable views on digital transformation are more inclined to adopt eCHIS; this suggests that fostering positive perceptions of digital tools may enhance their utilization, indicating that efforts to address skepticism and promote the perceived benefits of eCHIS are crucial for successful implementation and acceptance in healthcare settings.

Community-based factors influencing utilization of the eCHIS

The unanimous acknowledgment of internet availability as a critical factor influencing eCHIS utilization aligns with Love et al. (2023), which demonstrated that a significant majority of participants recognized its impact; this indicates that ensuring reliable internet access is essential for maximizing the effectiveness of electronic health systems, thereby emphasizing the need for infrastructure development in healthcare settings to facilitate broader adoption of digital health tools.

The study findings revealed that a significant majority of respondents (91.9%) resided in rural areas, with only a small proportion (8.1%) living in urban areas. This demographic distribution aligns with research by Bogale et al. (2023), which found that urban residents were more likely to utilize the electronic community health information system (eCHIS), as 68.8% of health extension workers in their study were from rural backgrounds. This suggests that rural healthcare workers may face unique barriers to eCHIS utilization, such as limited access to technology and training opportunities, highlighting the need for targeted interventions to enhance eCHIS adoption in rural settings and address the digital divide between urban and rural health services.

The unanimous agreement among respondents (100.0%) on the importance of active community involvement for the successful adoption of eCHIS supports findings by Israel et al. (2015), which highlighted that community participation in health initiatives enhances outcomes and system utilization; this underscores the necessity of integrating community members into the planning and implementation phases of eCHIS, as their engagement fosters trust and promotes higher acceptance and utilization of digital health systems.

Health facility-based factors influencing utilization of the eCHIS

The findings revealed that a substantial majority of respondents (70.3%) believed there is proper maintenance of ICT equipment in healthcare facilities, contrasting with Mukuria et al. (2023), where only 51% of participants in a Kenyan study affirmed similar maintenance standards; this difference may suggest varying levels of resource allocation and infrastructure support across healthcare settings, emphasizing the importance of consistent maintenance practices and adequate resources to ensure the effective operation of electronic health systems in diverse contexts.

The findings indicate that a significant majority of respondents (78.4%) reported the availability of electronic equipment for eCHIS, which aligns with Bogale et al. (2023), who found that access to well-maintained electronic gadgets positively influences the utilization of eCHIS among health extension workers in Ethiopia; this suggests

that ensuring the availability and functionality of electronic resources is crucial for maximizing the effectiveness and acceptance of digital health systems in various healthcare settings.

The findings showed that a substantial majority of respondents (75.7%) reported that proper training, follow-up, and supervision were conducted at their facility, which contrasts with Yehuda et al. (2023), where only 59.3% of health professionals in northwest Ethiopia indicated receiving supervision that facilitated their use of eCHIS; this discrepancy highlights the importance of ongoing support and training in enhancing eCHIS utilization, suggesting that facilities prioritizing comprehensive training programs may achieve better outcomes in the adoption of electronic health systems.

Conclusions

Individual Factors Influencing eCHIS Utilization

Age, education, and smartphone access were the key individual factors affecting eCHIS utilization. Most respondents were female, displaying a positive attitude toward the system. However, older health workers face challenges in engaging with digital tools.

Community-Based Factors Influencing eCHIS Utilization

Internet accessibility and community involvement were found to be critical for the successful adoption of eCHIS. All respondents recognized the importance of reliable internet access, particularly in rural areas.

Health Facility-Based Factors Influencing eCHIS Utilization

Availability of electronic equipment, maintenance of ICT resources, and training support significantly influenced eCHIS usage. Most respondents reported positive experiences regarding maintenance and training at their facilities. Variations in resource allocation across healthcare settings highlighted the need for consistent support.

Limitations of the study

The study was conducted in only one sub-county (Ogur Sub-County) in Lira district, which may not have presented adequate opportunities to understand the contextual issues in the district. This was influenced by inadequate resources and limited time to conduct the study.

Low literacy levels among the village health teams limited the use of data collection tools like self-administered questionnaires, which led to delays in the research.

Recommendations

Ministry of Health (MoH)

Develop and implement targeted training programs to enhance technological skills among healthcare workers, especially focusing on male nurses and older healthcare workers.

The Ministry of Health should design a system that enables facility health workers to give feedback to VHTs.

MoH should design a system that allows the VHTs to get fed when patients/ clients reach the facility for proper follow-up.

Collaborate with telecommunications companies to expand internet infrastructure in rural areas, ensuring reliable access for healthcare facilities and communities.

District Health Office (DHO)

Advocate for and allocate resources for ongoing training sessions at local health facilities to ensure all staff are proficient in using eCHIS and related technologies.

Allocate budget for repairing (maintaining) and replacing damaged phones/gadgets that would be needed for eCHIS.

Liase with service providers to white list the application so that data collected by CHTs are synchronized at zero cost.

Ogur Health Center IV

Conduct regular support supervision, workshops, and training sessions to ensure all staff are proficient in using eCHIS and fostering a culture of continuous learning.

Updating VHT phones since the phones require regular updates for them to function effectively and perform their recommended functions.

Promote strong leadership practices within the health center to support the implementation and ongoing use of eCHIS, ensuring staff feel supported and equipped to utilize these systems effectively.

Implications for nursing practice

Nurses will need to develop and enhance their technological skills to effectively use eCHIS, necessitating ongoing training and education in digital health tools.

Nurses can play a key role in engaging the community in health initiatives, using eCHIS to gather and relay health information and feedback from community members.

Nurses working in rural areas can leverage eCHIS to identify and address specific health needs in their communities, promoting health equity and accessibility.

eCHIS also helps in avoiding data losses since information is synchronized and can be retrieved whenever needed

The implementation of eCHIS can reduce paperwork and administrative burdens, allowing nurses to focus more on direct patient care and community health activities.

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List of abbreviations

eCHIS:	Electronic Community Health Information System
MoH:	Ministry of Health
PBRs:	Paper-Based Records
EHRs:	Electronic Health Records
VHTs:	Village Health Teams
USAID:	United States Agency for International Development
ICT:	Information and Communications Technology
SPSS:	Statistical Package for the Social Sciences
UNMEB:	Uganda National Examinations Board

Source of funding

The study was not funded.

Conflict of interest

The author did not declare any conflict of interest.

Author contribution

Amito Grace collected data and drafted the manuscript of the study

Olinga Michael Albert supervised the study from data collection to manuscript writing

Olinga Michael Albert was the overall supervisor of the study

Data availability

Data is available upon request.

Author Biography

Amito Grace is a student with a diploma in midwifery at the Jerusalem School of Nursing and Midwifery.

Olinga Michael is a tutor at the Jerusalem School of Nursing and Midwifery.

Olinga Michael is the principal of Jerusalem School of Nursing and Midwifery.

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