

The Implementation of iClinicSys in Rural Health Units

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Abstract— In this 21st century, using information systems is not new especially when delivering telemedicine in the health sector. Using an exploratory sequential method, this study was made to determine the implementation of iClinicSys in rural health units specifically in Sorsogon City as well as the the gaps and issues in the utilization of iClinicSys and the enhancement program that could be implemented to improve iClinicSys.

The study used mixed methods with structured survey forms/questionnaire, encompassing checklists, and interviews as instruments. The respondents for the study are the three (3) rural health units of Sorsogon City from its different districts namely; East, West, and Bacon as well as the main office of the Sorsogon City Health Office. This cohort will encompass both CHO/RHU's IT personnel and encoders for iClinicSys with the sum of 18 participants.

Results show that while there are areas for improvement, the overall implementation of iClinicSys appears promising. Consistent training, user support, and data accuracy are key to maximizing its benefits in RHUs. The strategies employed were important for the effective delivery of health services to their clientele.

Based on the findings and observations, the following conclusions are drawn: The implementation of iClinicSys in RHUs is still in its early stages of implementation in many rural areas. The level of implementation of iClinicSys to the RHUs is highly effective. The main gaps and issues identified are not enough staff/IT personnel and encoders to input patient demographics in iClinicSys as the most crucial problem, and there is no regular feedback from healthcare professionals and patients which is essential for refining iClinicSys and addressing gaps, as well as regular maintenance, bug fixes, and system upgrades, are not done which results in outdated features and security vulnerabilities. The solutions offered by the respondents are hiring or assigning additional encoders as well as investing in training programs to empower employees with the necessary skills to navigate iClinicSys effectively, regular feedback from healthcare professionals and patients that can provide insights into the system's functionality, identify any gaps, and suggest improvements, and timely maintenance and updates.

Keywords— iClinicSys, Implementation, Rural Health Units

INTRODUCTION

It is not a new idea to use information and communications technology to deliver digital health interventions that help people stay healthy and live better lives. However, digital health platforms, healthcare systems, and related technology continue to gain significance and develop in response to widespread issues such as aging, child illness and mortality, epidemics and pandemics, high costs, and the effects of poverty and racial discrimination on access to healthcare (Bernstein, 2021).

Digital health, according to Deloitte Insights, uses more than simply tools and technologies; it also emphasizes the importance of “radically interoperable data, artificial intelligence (AI), and secure platforms as central to the promise of more patient-centered, prevention-oriented care”. Deloitte predicts that AI will “enable major scientific breakthroughs, accelerating the development

of new therapies and vaccines to fight diseases”. AI-enabled digital therapeutics and personalized recommendations will empower consumers to prevent health issues from developing. AI-generated insights will influence diagnosis and treatment choices, leading to safer and more effective treatments.

According to Precedence Research, the global market for digital health will develop at a compound annual growth rate (CAGR) of 27.9% between 2020 and 2027, when it is expected to reach \$833.44 billion. An increase in the number of healthcare apps, claims an Ottawa-based market research organization, is driving this surge. Due to factors like a growing older population, a high rate of smartphone usage, and a push to create applications and digital healthcare platforms to cut costs, North America holds the share of the global market for digital health. Government-sponsored health insurance plans like in the United States which is the

Affordable Care Act (ACA) brought about fresh innovations in digital health, such as raising the standard of EHRs and utilizing computer modeling to monitor healthcare costs (Sutner, 2017). Through the use of technology and data, healthcare professionals can review new programs, seek potential areas for development within the healthcare industry, and incorporate new technologies into medicine which is done by using healthcare informatics.

Medical records are becoming more and more patient-accessible as a result of legal and technological developments. Similar legal initiatives are underway in Canada, the United Kingdom, Ireland, South Africa, and Australia. The Federal Health Insurance Portability and Accountability Act of 1996 (HIPAA) mandates that “patients must be able to see and get copies of their records and request amendments” (Lutkevich, 2020). Information technology gives patients the ability to check their records even simpler. Convenience and cost saving for individuals, health insurance providers, and healthcare professionals are the advantages of this trend.

The most important set of data in the healthcare system is patient information kept in electronic medical records. It helps medical professionals give their patients with high-quality care. Electronic medical records that are kept in hospitals or other healthcare facilities often include sensitive data about patients. The name, gender, contact information, and address of a patient are all included. It also includes the diagnosis, steps taken, therapies administered, x-ray images, test findings, and other medical interventions (Innab, 2021). Sensitive patient information is contained in medical records at healthcare organizations. Because patient data is increasingly being stored and made available online, these organizations must maintain information security. A well-organized structure of sensitive information in health services seeks to provide excellent opportunities for healthcare based on the provision of proper information since patient information is sensitive (Innab, 2021). Electronic medical records for a patient could be shared across parties to ensure data uniformity and streamline the treatment procedure. Without adequate security protocols in place, the patient's privacy and information security may be at risk, and the healthcare provider, insurance companies, or any other organization or party interested in accessing this information for personal use, may misuse the electronic medical record data.

A patient-accessible medical record has the potential to enhance healthcare in many ways, including by fostering better doctor-patient contact. The Institute of Medicine's "Crossing the Quality Chasm" report made the case that improving communication between patients and healthcare professionals might lower mistakes and raise quality. However, medical professionals have expressed concerns about frequently providing patients with access to written materials that are not meant for others and that may include pertinent information but should not be shared with the patient. There are ethical justifications for both patient access to the record (such as respect for autonomy and the right to informed consent) as well as for limiting access (such as the right not to know medical information that would damage one's self-esteem, employability, or insurability).

The confidentiality and integrity of electronic medical records are maintained by maintaining the security of the health information system. A privacy risk arises whenever sensitive information is gathered and kept in any manner, or whenever personally identifiable information is included. The security of the health information system guards against fraud, intrusion, and viruses for electronic medical records. The fundamental challenge of maintaining the privacy of electronic medical records is protecting the patient's identifiable information while sharing this information with multiple medical practitioners in different departments or locales (Sher, et al., 2017). Information privacy ensures that only authorized parties can access it. This is done via a variety of methods, including data masking, encryption, and authentication.

After a decade of higher public investment in healthcare, the health system in The Philippines is still changing. The industry is distinguished by a private healthcare sector that coexists with the public sector. The vast nation of more than 7,000 islands has a very decentralized system of government, which is mirrored in how the health care system is run and organized. The majority of the nation's governmental and private healthcare infrastructures are located in the Manila Capital Region (MNC) and on the island of Luzon, which also serves as the nation's economic hub (Orange Health Consultants, 2021). The prevalence of disease is shifting more and more in favor of non-communicable illnesses like cancer, diabetes, and cardiovascular disorders. Additionally, on the rise are respiratory

illnesses, accidents, injuries, and some infectious disorders such as measles and dengue.

The adoption of the Universal Health Care Bill in early 2019 is regarded as a crucial step towards addressing healthcare disparities. For the first time, PhilHealth, the nation's health insurer, provides insurance to everyone. Reforms also place a strong emphasis on service delivery networks, gatekeeping through family doctors and general practitioners, boosting adherence to clinical practice guidelines, and bringing healthcare closer to the public through the use of mobile clinics, funding to cover patient transportation costs, and telemedicine (World Health Organization, 2019). Public-private partnerships (PPPs) have been used in the Philippines' healthcare system since 2012. PPPs in the healthcare industry are mostly utilized to finance developments in dialysis, labs, and imaging facilities (Banzon, et al., 2013). During the COVID-19 Pandemic, e-health saw growth: high-quality products from the EU and the USA, such as those used in advanced diagnostic imaging; the majority of immediate job prospects for diagnostic and imaging are in the private sector; and the National Council for Disaster Risk Reduction and Management. Modernizing Emergency Medical Services is necessary in a sector where e-health is growing quickly. This opens up possibilities in the following areas: patient registration and record-keeping; telemedicine; and calculation of disease and other hazards. Additionally, for supplemental health insurance markets, there are E-billing; software for hospitals, laboratories, and pharmacies; clinical decision support services; and stocking, distribution, and prescription of medicines (Orange Health Consultants, 2021).

The United Nation's Sustainable Development Goals establish an ambitious agenda for a healthier society, according to the United Nations Development Programme Capacity Development for Health (UNDP-CDH). To achieve the goals, it will be necessary to use trustworthy data, comprehend the scope of the work that needs to be done, and make wise choices regarding health priorities and resource allocation for the best possible outcomes. For the timely notification of all pertinent parties for planning, evaluation, program monitoring, and overall quality assurance and development of all parts of the health system, a well-operating health information system is crucial. It will take investments in strong health information systems to achieve these objectives. The Philippines adheres to this goal by adopting an integrated clinic information system

called iClinicSys which is primarily made to produce the necessary national health statistics. It is an electronic medical record and health information system that helps primary healthcare facilities, such as Rural Health Units (RHUs), Health Centers (HCs), and Barangay Health Stations (BHS), perform their functions (Cassion, 2016). To monitor patient care efficiently and effectively in the medical facility, it strives to automate service delivery operations. It is a hybrid piece of software that can function both offline and online. It creates electronic medical records for patients which let medical professionals follow their data. The system is built by national health data standards for interoperability with the Philippine Health Insurance Corporation, the Department of Health, and other governmental agencies reporting needs. Considering the national scope of the implementation of such an information system, the researcher aims to determine the implementation of iClinicSys in Rural Health Units.

II. OBJECTIVES

This study determined the Implementation of iClinicSys in Rural Health Units.

Specifically, it identified How is iClinicSys implemented in RHU's. The level of implementation of iClinicSys to the RHU's. The gaps and issues in the implementation of iClinicSys and enhancement program could be implemented to improve iClinicSys.

III. METHODOLOGY

This research study focused on investigating the implementation of iClinicSys in RHUs. The study adopted an exploratory sequential mixed method design and systematically integrates the qualitative and quantitative findings to gather, analyze, and interpret data.

The respondents for the present study were the three (3) rural health units of Sorsogon City from its different districts namely; East, West, and Bacon as well as the main office of the Sorsogon City Health Office. This cohort encompassed both CHO/RHU's IT personnel and encoders for iClinicSys with the sum of 18 participants. The selection of these participants were conducted through a randomized procedure, securing a diverse, and inclusive sample from the intended population.

The research instruments employed in this study consisted of structured survey forms/questionnaire, encompassing checklists, and interviews. These

meticulously selected instruments serve as the primary means for data collection, enabling the comprehensive gathering of relevant information about the research objectives.

The process of statistical treatment of data in this study involves the analysis of gathered data through thematic analysis to examine the qualitative data collected from the survey. This analysis involved identifying, analyzing, and interpreting patterns, themes, and meanings within the data.

IV. RESULTS AND DISCUSSION

The data that are generated from the respondents. The data are analyzed in this part. Interpretation of the data are also done in this chapter.

1. How iClinicSys is implemented in Rural Health Units

Ease of Information Retrieval

The iClinicSys, an innovative electronic health record (EHR) system, has significantly transformed healthcare service delivery in rural regions. Analysis of the data pointed out the following key findings based on the results of the interview conducted: According to participant 14, “an kagayunan sadi na health record system kay madali hanapon an mga kaipuhan na impormasyon manunggod sa health”. (The beauty of this health record system is that it is easy to find needed information concerning health). The public is provided seamless access to medical records, and iClinicSys facilitates telemedicine consultations. Healthcare professionals can retrieve patient information swiftly, enabling efficient remote diagnosis and treatment planning.

Accuracy of Information

Similarly, the answer provided by participant 1 emphasized that “sakto sakto an impormasyon kay hali mismo sa pasyente an impormasyon”. (The information is accurate because the information is directly from the patient). The system captures essential details directly from patients, streamlining data entry. This patient generated

According to one of the participants, who has been using iClinicSys for their telemedicine practice, the system has been a game-changer for them. They mentioned that with iClinicSys, they can retrieve patient information swiftly, enabling efficient remote diagnosis and treatment planning. This has not only saved them time

but has also improved the accuracy of their diagnosis and treatment plans.

In traditional in-person consultations, healthcare professionals have access to the patient's medical records, which helps them make an informed decision. However, in telemedicine, this access is limited, and healthcare professionals have to rely on the patient's verbal account of their medical history. This can often lead to errors and misdiagnosis. But with iClinicSys, healthcare professionals can access the patient's medical records in real-time, providing them with a more comprehensive and accurate view of the patient's health status.

The iClinicSys also offers a secure platform for the exchange of patient information. This is crucial, especially in the case of telemedicine, as patient data needs to be protected from cyber threats. With iClinicSys, healthcare professionals can be assured that their patient's information is safe and secure, complying with all privacy regulations. In addition to providing seamless access to medical records, iClinicSys also offers other features like telemedicine scheduling, e-prescriptions, and electronic lab ordering, making it a one-stop solution for all telemedicine needs. The system is also user-friendly, making it easy for healthcare professionals to adapt to it quickly.

Efficient Record Generation and Report

Consolidation

Additionally, participant 1 claimed that iClinicSys allows easy retrieval of patients' historical records. Clinicians can quickly access past check-ups, diagnoses, and treatment plans, leading to informed decision-making. “Madalio lang makagenerate san records kay sa iClinicSys, ang consolidation of reports madalio makuwa nan makita kapag nabutang na ang impormasyon san pasyente”. (It is easier to generate records because, in iClinicSys, the consolidation of reports is easily detected when the patient's information is provided.) Participant 1, further stated that the platform simplifies administrative tasks, monitoring, and record-keeping. Healthcare providers spend less time on paperwork and more time focusing on patient care. Moreover, with iClinicSys, healthcare providers can easily monitor the progress of their patients.

Comprehensive Data Input:

In line with these, participant 1, who has been using iClinicSys for their telemedicine practice stated

that “makainput didto san doctor's order, chief complaint, vital signs, prescription”. (Doctor’s order, chief complaint, vital signs, and prescriptions can be inputted). The platform offers real-time updates on a patient's vital signs, lab results, and other health information. This allows clinicians to track their patient's health status and make necessary adjustments to their treatment plans. It also enables them to identify any potential issues or complications early on, leading to timely interventions and better patient outcomes.

In addition to simplifying administrative tasks and monitoring, iClinicSys also offers a secure and centralized platform for record-keeping. With the increasing cases of data breaches and cyber-attacks in the healthcare industry, ensuring the security and confidentiality of patient information is of utmost importance. iClinicSys employs the latest security measures to protect patient data, giving healthcare providers peace of mind knowing that their patient's information is safe and secure. According to iClinicSys ver 2 User Manual, page 14; The login page is used to set the “Username” and “Password” to implement system security. Only authorized users can access the iClinicSys. Each reporting health facility or user is given a unique username and password with a corresponding security access level.

User-Friendliness of the System.

Participant highlights that the system is easy to use and user-friendly, meaning it doesn’t cause fatigue in following instructions. This is a crucial aspect of any system as it directly impacts user experience and efficiency. A user-friendly system can significantly enhance productivity and reduce the likelihood of errors, leading to better outcomes. However, it’s important to continue refining the system based on user feedback to ensure it remains intuitive and easy to use. Please note that these are high-level insights and the actual implementation would depend on various factors such as resources, budget, and organizational policies. It’s always best to consult with a healthcare IT professional or consultant for personalized advice.

As observed by participant 15: kadali dali lamang san system kay ka user friendly lain ka mapapagalan san pagsunod san instruction. (The system is easy to use because it’s user-friendly and it is not hard for you to follow the instructions.). The Department of Health’s Central Office Systems Administrator is the only person

who has complete access to the iClinicSys system and data (i.e. add, view, edit, and delete).

One of the greatest advantages of iClinicSys is its user-friendly interface. The platform is designed to be intuitive and easy to use, making it accessible to all healthcare providers, regardless of their technological proficiency. This means that healthcare providers can quickly adapt to the platform and start utilizing its features without any significant learning curve. Moreover, the iClinicSys has built-in tools that provide aid to the user either in navigation or performing a specific task. This means that healthcare providers can navigate the platform easily to suit their practice and workflow, making it more efficient and convenient.

The iClinicSys serves as a central repository, consolidating health information

Participant 6 was able to establish her impression that “mayad kay may Sistema nan organisado na paagi nin pagfile san health records”. (There is a system that is organized to file health records.) The iClinicSys serves as a central repository, consolidating health information. This aggregation aids in comprehensive assessments, especially for chronic conditions or long-term care. Many of the respondents agreed that whether in the clinic or during outreach programs, health workers can access critical patient data instantly. This accessibility enhances continuity of care and reduces redundant tests. One of the main benefits of iClinicSys is its ability to aggregate and store all patient information in one secure database. This includes medical history, current medications, lab results, imaging reports, and other important health data. With this centralized system, healthcare professionals can easily track a patient's health status and monitor any changes in their condition. This is particularly beneficial for patients with chronic conditions who require continuous monitoring and management.

Besides, iClinicSys also allows for real-time data sharing, which is crucial for efficient healthcare delivery. Whether in the clinic or during outreach programs, healthcare workers can access critical patient data instantly. This accessibility enhances continuity of care and reduces redundant tests. For instance, if a patient has already undergone a certain test in another healthcare facility, the results can be easily retrieved through iClinicSys, eliminating the need for a repeat test. This not only saves time but also reduces unnecessary costs for patients.

In addition to its function as a central repository, iClinicSys also offers other features that further aid in the management of patient information. This includes the ability to generate reports, track patient progress, and set reminders for follow-up appointments or medication refills. These features not only streamline the workflow of healthcare professionals but also improve the overall patient experience. The survey also highlighted the user-friendly interface of iClinicSys. This is an important aspect as it ensures that healthcare workers can easily navigate and utilize the platform, especially in a fast-paced environment. The system also offers built-in tools, allowing healthcare facilities to adapt and navigate the platform to their specific needs and preferences. With the increasing use of telemedicine, iClinicSys has also adapted to this trend by offering a mobile application. This allows patients to access their health information, schedule appointments, and communicate with their healthcare providers remotely. This is particularly beneficial for patients in rural or remote areas who have limited access to healthcare facilities.

Furthermore, they said that Through efficient record management, the electronic format ensures efficient record storage and retrieval. Searching for specific patient data is quicker, promoting streamlined workflows. However, they also observed that iClinicSys shows promise, but its impact on healthcare efficiency remains inconclusive due to the absence of claims rendered to rural health units (RHUs). EHRs also have a significant impact on the speed and accuracy of record retrieval. In traditional paper-based systems, healthcare providers had to manually search through piles of patient files to find the necessary information. This process was not only time-consuming but also prone to human error. With EHRs, searching for specific patient data is much quicker and more accurate, promoting efficient workflows. This is especially beneficial in emergencies where time is of the essence.

Still, despite these advantages, the impact of EHRs on healthcare efficiency remains inconclusive, especially in rural areas. According to a study by the Philippine Institute for Development Studies (PIDS), the implementation of EHRs, particularly the iClinicSys, in rural health units (RHUs) has shown promise, but its impact on healthcare efficiency is still unclear due to the absence of claims rendered to RHUs. The study also highlighted some challenges faced by RHUs in implementing EHRs, such as the lack of necessary

infrastructure and resources, limited technical support, and insufficient training for healthcare personnel. These factors can hinder the full utilization of EHRs and affect their overall impact on healthcare efficiency. Moreover, the study also pointed out that the effectiveness of EHRs in promoting healthcare efficiency in rural areas depends on various factors, such as the size and type of the health facility, the level of integration with other healthcare systems, and the availability of reliable internet connection.

Further evaluation of the system is necessary. There is a need to support and scaffold the system for Rural Health Centers, iClinicSys functions as an online data memory, supporting RHUs' operations. It aids in beneficiary management, resource allocation, and planning. In general, the impression of the respondent regarding the iClinicSys represents a pivotal step toward enhancing healthcare delivery in rural areas, but ongoing assessment and utilization are essential for realizing its full potential.

The initial impression of the respondents regarding the iClinicSys has been largely positive. Many healthcare providers in rural areas have reported an improvement in the quality of care they can provide to their patients. With access to real-time patient data, healthcare providers can make more informed decisions and provide timely and accurate treatment. This has led to an overall improvement in the health outcomes of patients in these areas.

Also, the iClinicSys has been praised for its user-friendly interface and ease of use. In rural areas, where healthcare providers may not have extensive technology training, this is a crucial factor. The system is designed to be simple and intuitive, making it easier for healthcare providers to adapt to it quickly. This has led to a higher adoption rate of the system, which is essential for its success.

Nevertheless, it is essential to note that the iClinicSys is still in its early stages of implementation in many rural areas. As with any new technology, there are bound to be challenges and obstacles that need to be addressed. Ongoing assessment and utilization of the system are crucial for identifying these challenges and finding solutions to overcome them.

One of the major challenges faced by the iClinicSys is the lack of reliable internet connectivity in rural areas.

The system relies heavily on an internet connection to function, and in areas with poor connectivity, it may not work optimally. This can lead to delays in accessing patient records and even loss of data. To overcome this challenge, efforts must be made to improve internet infrastructure in these areas.

Another crucial aspect that needs to be continuously assessed is the security of patient data. With the rise of cyber threats, ensuring the confidentiality and integrity of patient information is of utmost importance. The iClinicSys must have strict security measures in place to protect patient data from unauthorized access or breaches.

Likewise, continuous training and support for healthcare providers using the system are essential. As the system evolves and new updates are introduced, it is crucial to ensure that healthcare providers are well-trained and equipped to use it effectively. This will not only improve the utilization of the system but also enhance patient care.

In terms of the challenges that Rural Health Units (RHUs) encountered during the adoption and integration of iClinicSys, the following results were revealed during the formal interview conducted. Foremost the 18 participants univocally agreed that RHUs faced significant challenges related to internet connectivity. According to the 18 participants, in remote areas, where infrastructure is limited, establishing a stable and reliable internet connection proved difficult. Slow or intermittent connectivity hindered seamless data exchange and telemedicine consultations. They also claimed that implementing the iClinicSys required training staff members on its functionalities. As observed by them, RHUs often grappled with limited manpower, making it challenging to allocate time for comprehensive training sessions. The learning curve for adopting a new system impacted operational efficiency. Most of them observed that despite rigorous testing, RHUs encountered unexpected system errors. These glitches disrupted daily workflows, leading to frustration among healthcare providers. Frequent troubleshooting and technical support were necessary to address these issues promptly.

A respondent said that regular system maintenance is essential for optimal performance. However, scheduled server downtime affected RHUs' operations. During these periods, access to patient records and data entry

was temporarily unavailable, causing delays in service delivery. They further stated that RHUs operate with limited resources—both financial and human. Allocating funds for technology adoption and hiring additional staff for system management posed challenges. Balancing existing responsibilities with iClinicSys implementation strained available resources. On the technical aspect, one encoder responded that RHUs often relied on hard-copy records, and transferring information from RHUs to the City Health Office (CHO) faced logistical hurdles. These delays impacted data accuracy and completeness and there is also a need for iClinicSys to undergo continuous updates and bug fixes. While essential for system stability, these enhancements occasionally caused delays in data encoding.

RHU staff had to juggle between system maintenance and their primary responsibilities. Oftentimes according to participant 15, they could not definitively measure iClinicSys's impact on healthcare efficiency. The absence of claims rendered to RHUs limited conclusive evidence. Further evaluation is necessary to gauge its effectiveness.

The iClinicSys needs a Support System. RHUs recognized iClinicSys as a valuable support system. It served as an online data repository, aiding beneficiary management and resource allocation. However, its full impact remains contingent on sustained utilization and addressing existing challenges. In summary, while iClinicSys holds a guarantee, addressing connectivity issues, enhancing training programs, and ensuring timely technical support is crucial for maximizing its benefits in rural healthcare settings.

The iClinicSys plays a pivotal role in enhancing patient care and health outcomes in remote communities through several key mechanisms: Several encoder respondents that "lain magastos sa papel nan diyot an samok". (It is not paper intensive hence not expensive.) They said by transitioning to a paperless system, iClinicSys ensures easy access to patient's medical records and historical data. Healthcare providers can swiftly retrieve essential information, leading to more informed decision-making during consultations. In addition, they noticed that the system minimizes paperwork, allowing healthcare professionals to focus on patient care rather than manual record-keeping. Gathering and generating reports become streamlined, freeing up valuable time for direct

patient interactions. Participant 14 also said that iClinicSys provides a centralized repository for patient data. Whether a patient visits a rural health center or participates in outreach programs, their health history is readily available.

This accessibility promotes continuity of care and informed treatment plans. They also recognized that with access to patient information, healthcare workers can monitor chronic conditions, track progress, and identify trends easily. Regular follow-ups become more effective, leading to improved health outcomes.

The respondents are aware that the system generates standardized reports at both local and national levels. This consistency aids health authorities in assessing community health, identifying prevalent conditions, and allocating resources strategically.

They realized that iClinicSys streamlines processes, ensuring a systematic approach to managing patient records. From initial consultations to referrals and prescriptions, the platform enhances overall healthcare delivery and patients benefit from quicker service, reduced waiting times, and accurate diagnoses. iClinicSys contributes to a more patient-centric experience, especially crucial in remote areas with limited healthcare facilities.

As RHUs adopt iClinicSys, health centers become better equipped to handle the patient load, track health indicators, and respond to emergencies. Ultimately, this contributes to building stronger and more resilient health facilities in rural communities.

They proposed the use of email accounts and iClinicSys accounts per barangay as an important strategy that was employed to ensure the successful implementation and sustained use of iClinicSys in Rural Health Units (RHUs): Improved Connectivity Infrastructure: RHUs prioritized enhancing internet connectivity. Faster internet speeds and reliable connections were crucial for seamless data exchange within the iClinicSys platform. Additionally, ensuring PC availability at the barangay level facilitated efficient usage.

The RHU's should invest in training programs to empower employees with the necessary skills to navigate iClinicSys effectively. Properly trained staff members could maximize the system's capabilities and

contribute to its successful adoption. Focused Training for System Usage: Specific training sessions targeted iClinicSys usage. Workers received guidance on data entry, record retrieval, and troubleshooting. This specialized training ensured that staff members felt confident using the system. Equipping RHUs with laptops enabled mobility and flexibility.

Healthcare workers could access iClinicSys even during field visits or community outreach programs. Laptops became essential tools for real-time data management. RHUs identified key personnel who became champions for iClinicSys.

These well-trained individuals disseminated information to other team members, addressing queries and promoting system adoption. RHU's emphasized the stability of internet connections and the proper maintenance of computers and related equipment. Regular checks ensured uninterrupted system access and minimized downtime.

Recognizing the workload, RHUs hired or assigned additional data encoders.

These individuals focused solely on data entry, ensuring that patient records were consistently updated. Setting daily quotas encouraged consistent data input. RHUs aimed to achieve these targets, reinforcing the importance of timely record-keeping and system utilization. Individual by creating separate email and iClinicSys accounts for each barangay, RHU's streamlined access. This segregation allowed efficient management of local health data while maintaining privacy and security.

In summary, these strategies collectively contributed to the successful implementation and ongoing utilization of iClinicSys, ultimately improving healthcare services in remote communities. According to Debjyoti, Paul., et.al., (2021), RHUs recognized the importance of workload characterization in hiring or assigning additional data encoders is that workload characterization involves understanding the features and demands of different workloads to optimize performance which capture essential features and correlations from query plans, enabling efficient transfer learning and facilitating tasks like query latency prediction and query classification.

2. Level of implementation of iClinicSys to the RHU's

Table 1. The Implementation of iClinicSys in Rural Health Units (RHU's)

Indicators	Weighted Mean	Descriptive Rating
The RHU staff receive adequate training on using iClinicSys.	4.05	Often
The staff are comfortable with navigating the system.	3.88	Often
The RHU personnel input patient data into iClinicSys accurately.	4.05	Often
There is a process to verify the accuracy of entered information	4.22	Always
The iClinicSys efficiently handles patient registration and demographic details.	4.44	Always
The iClinicSys supports clinical documentation (e.g., medical history, diagnoses, treatment plans)	4.33	Always
The iClinicSys appointment scheduling feature is user-friendly	3.72	Often
The prescription generation process is integrated within iClinicSys.	3.88	Often
The iClinicSys efficiently integrates laboratory and test results	3.66	Often
The iClinicSys generates reports accurately. (e.g., patient demographics, patient scheduled check-up, diagnosis, and other medical interventions	4.11	Often
The RHU staff can extract meaningful insights from the data.	3.88	Often
There is a dedicated support system for iClinicSys users.	3.83	Often

Table 1 presents the level of implementation of iClinicSys in Rural Health Units (RHUs) based on the provided weighted mean and descriptive ratings: RHU Staff Training gets a Weighted Mean of 4.05 interpreted as Often. The RHU staff often receive adequate training on using iClinicSys. This is a positive sign, as proper training ensures effective system utilization. The implementation of iClinicSys in RHUs has been met with mixed reactions. While some RHUs have fully embraced the system, others have faced challenges in its implementation. One of the main reasons for these challenges is the lack of proper training for the RHU staff. Without proper training, the staff may struggle to navigate the system and utilize its features effectively.

However, the weighted mean of 4.05 suggests that the majority of the RHU staff have received adequate training on using iClinicSys. This is a significant achievement, considering the challenges that come with training staff in rural areas. It shows that the authorities responsible for the implementation of iClinicSys have made efforts to provide training to the RHU staff, and these efforts have yielded positive results.

Adequate training of RHU staff on using iClinicSys has numerous benefits. Firstly, it ensures that the system is utilized to its full potential, leading to improved efficiency and effectiveness of healthcare services. With proper training, the staff can easily access patient records, schedule appointments, and manage other

administrative tasks using the system. This saves time and reduces the chances of errors, ultimately improving the quality of healthcare services provided.

Also, proper training boosts the confidence of the RHU staff in using iClinicSys. This is particularly important in rural areas where the staff may not be as technologically savvy as their urban counterparts. According to an online post of DOH Cagayan Valley as they conducted hands-on training on iClinicSys, to achieve efficient and accurate healthcare services, the training empowered healthcare professionals with the necessary skills to utilize the advanced features of iClinicSys and integrate essential modules like Electronic Medical Records (EMR), Logistic Management, Environmental Health, Administrative Management, Financial Management, RxBox, and PhilHealth Claims for enhanced patient care and streamlined administrative processes. Attended by healthcare professionals, including DMOs, doctors, nurses, and administrative staff/IT encoders from various healthcare facilities, said activity concluded with an agreement to work together to achieve Universal Health Care, ensure equitable healthcare, improve health outcomes, and protect against financial risk. With adequate training, the staff can navigate the system with ease, leading to a smoother workflow and a more positive attitude towards the use of technology in healthcare.

It is also worth noting that the weighted mean of 4.05 for RHU staff training indicates that there is still room for improvement. While most of the staff have received adequate training, there may be some who require further training or refresher courses. This is important to ensure that all staff members are on the same page when it comes to using iClinicSys.

System Navigation Comfort (Weighted Mean: 3.88 - Often): The staff often feel comfortable navigating the system. While this is generally positive, continuous training and support can further enhance their confidence. Accurate Data Entry (Weighted Mean: 4.05 - Often): RHU personnel often input patient data into iClinicSys accurately. Accurate data entry is crucial for reliable patient records. Data Verification Process (Weighted Mean: 4.22 - Always): There is a process in place to verify the accuracy of the entered information. This rigorous approach ensures data quality. Continuous training can help staff members stay updated with the latest features and functionalities of the system. It can also help them troubleshoot any technical issues they may encounter while navigating the system. This, in turn, can boost their confidence and efficiency in using the system.

Moreover, providing support to staff members who may face difficulties while navigating the system is equally important. This can be in the form of on-site IT support or having a dedicated help desk for system-related queries. By offering this support, healthcare facilities can ensure that their staff members do not feel overwhelmed or frustrated while using the system.

Another crucial aspect of efficient system navigation is accurate data entry. In the healthcare industry, accurate data entry is vital as it directly impacts the quality of patient records. Inaccurate data entry can lead to incorrect diagnoses, wrong treatment plans, and potential harm to patients. However, the good news is that RHU personnel often input patient data into iClinicSys accurately, according to recent surveys. Accurate data entry not only ensures reliable patient records but also saves time and effort in the long run. It eliminates the need for healthcare professionals to manually cross-check and correct data, allowing them to focus on providing quality care to patients.

To ensure accurate data entry, it is crucial to have a robust data verification process in place. This is where the weighted mean of 4.22 for the Data Verification

Process comes into the picture. It indicates that there is a process in place to always verify the accuracy of entered information. This process can include double-checking data by a second person, using automated validation tools, or having a designated team to review and verify data. This rigorous approach towards data verification ensures that the data entered into the system is of the highest quality.

Efficient Patient Registration (Weighted Mean: 4.44 - Always): iClinicSys always efficiently handles patient registration and demographic details. Streamlined registration processes benefit both patients and health workers. Clinical Documentation Support (Weighted Mean: 4.33 - Always): iClinicSys always supports clinical documentation, including medical history, diagnoses, and treatment plans. This is essential for comprehensive patient care. User-Friendly Appointment Scheduling (Weighted Mean: 3.72 - Often): The appointment scheduling feature is often user-friendly. Improving usability can enhance efficiency. Streamlined registration processes not only benefit patients by reducing wait times and minimizing errors but also health workers who are responsible for managing patient records. With iClinicSys, healthcare professionals can easily access patient information and update it in real-time, eliminating the need for paper-based records. This not only saves time but also reduces the risk of lost or misplaced documents.

Clinical Documentation Support: A Crucial Component of Comprehensive Care

Efficient patient registration is only the first step towards providing quality healthcare. The next crucial aspect is clinical documentation support, which iClinicSys excels in. The system allows healthcare providers to document essential information such as medical history, diagnoses, and treatment plans. This comprehensive documentation is crucial for providing continuity of care and improving patient outcomes.

The iClinicSys also supports the use of built-in tools, templates, and customizable forms to ensure that clinical documentation is accurate and consistent. This feature is especially useful for healthcare facilities that have multiple healthcare providers, as it maintains a standard format for patient records. With iClinicSys, healthcare professionals can easily track and monitor patient progress, making it easier to provide personalized and effective treatment plans.

A crucial feature of any EHR system is its appointment scheduling functionality. iClinicSys offers a user-friendly appointment scheduling feature that helps streamline the patient management process. With this feature, patients can easily monitor appointments online, eliminating the need for phone calls or in-person visits. This not only saves time for both patients and healthcare professionals but also reduces the risk of appointment errors.

Nevertheless, while iClinicSys' appointment scheduling feature has a high satisfaction rating, there is always room for improvement. The system can benefit from further enhancements to enhance its usability and efficiency. For instance, incorporating automated appointment reminders and waitlist management can help reduce no-shows and optimize appointment scheduling.

Integrated Prescription Generation (Weighted Mean: 3.88 - Often): The prescription generation process is often integrated within iClinicSys. Seamless integration streamlines healthcare workflows. Furthermore, **Laboratory and Test Result Integration (Weighted Mean: 3.66 - Often):** iClinicSys often integrates laboratory and test results. Further optimization can enhance data flow. **Accurate Report Generation (Weighted Mean: 4.11 - Often):** iClinicSys often generates accurate reports, including patient demographics, scheduled check-ups, diagnoses, and other medical interventions. **Reliable reporting aids decision-making.** **Data Insights Extraction (Weighted Mean: 3.88 - Often):** RHU staff can often extract meaningful insights from the data. Encouraging data literacy can lead to better utilization. **Dedicated Support System (Weighted Mean: 3.83 - Often):** There is often a dedicated support system for iClinicSys users. Timely assistance is crucial for smooth operations.

One of the most significant advantages of iClinicSys is its integrated prescription generation process. This feature allows healthcare professionals to seamlessly generate prescriptions within the system itself.

This eliminates the need for handwritten prescriptions, which can often lead to errors or misinterpretations. Moreover, the integration of the prescription generation process within iClinicSys ensures a more efficient workflow, as healthcare professionals do not have to switch between different systems to generate prescriptions.

Apart from prescription generation, iClinicSys also offers the integration of laboratory and test results. This feature allows healthcare professionals to access and view patients' test results directly within the system. This not only saves time but also ensures accuracy in data interpretation. However, to further optimize this feature, iClinicSys can be enhanced to enable automatic data flow from diagnostic equipment to the system. This would eliminate the need for manual data entry, reducing the chances of errors.

Another essential aspect of healthcare is accurate report generation. iClinicSys excels in this aspect, providing accurate and comprehensive reports for patients. These reports include patient demographics, scheduled check-ups, diagnoses, and other medical interventions. Such reliable reporting aids in decision-making for healthcare professionals, allowing them to provide better care to their patients. Moreover, these reports can also be shared with other healthcare providers, ensuring continuity of care.

The iClinicSys also offers the feature of data insights extraction, allowing healthcare professionals to gain meaningful insights from the data collected in the system. This feature is especially beneficial for Rural Health Units (RHUs) that may have limited resources. Encouraging data literacy among healthcare staff can lead to better utilization of this feature, enabling them to identify trends and patterns in patient data, leading to improved patient care.

Furthermore, iClinicSys also has a dedicated support system for its users. It is essential to have timely assistance in case of any technical issues or challenges faced by healthcare professionals while using the system. The availability of a dedicated support system ensures that users can operate the system smoothly without any hindrance, ultimately improving healthcare workflows.

Generally, while there are areas for improvement, the overall implementation of iClinicSys appears promising. Consistent training, user support, and data accuracy are key to maximizing its benefits in RHUs. The strategies employed were important for the effective delivery of health services to their clientele.

The assessment of iClinicSys highlights both its potential and challenges. While there are opportunities for enhancement, the system shows promise in

supporting health services delivery. Here are some key takeaways: Consistent Training: Ensuring that all users receive adequate training is crucial. A well-trained workforce can maximize the system's benefits. User Support: Providing ongoing technical assistance and addressing user queries promptly will contribute to smoother adoption and utilization. Data Accuracy: Accurate data entry and maintenance are essential. Regular quality checks can help maintain reliable health

records. Effective Strategies: The employed strategies play a pivotal role in achieving efficient health service delivery.

These strategies should be continually evaluated and adjusted as needed. Overall, iClinicSys has the potential to significantly impact health services in RHUs. With continuous improvement and commitment to best practices, it can better serve its clientele.

Table 2. The Gaps and Issues in the Implementation of iClinicSys

Gaps and Issues	Sum of Ranks	Overall Rank
There are not enough staff/IT personnel and encoders to input patient demographics in iClinicSys	25	1
There is no regular feedback from healthcare professionals and patients which is essential for refining iClinicSys and addressing gaps.	35	2
Regular maintenance, bug fixes, and system upgrades are not done which results in outdated features and security vulnerabilities.	51	3
There is no regular feedback from RHU's IT personnel and encoders which is essential for refining iClinicSys and addressing gaps.	75	4
There are Delays in resolving issues in the utilization and efficiency of iClinicSys that can impact patient care.	98	5
Implementing and maintaining iClinicSys is expensive	117	6
The system's interface is NOT intuitive and NOT user-friendly which leads to poor usability and can lead to errors and inefficiencies.	126	7
A lack of standardized protocols can hinder data sharing and collaboration.	136	8
Lack of compliance with privacy regulations, and preventing unauthorized access are ongoing concerns.	167	9
Resistance to change and lack of familiarity with the system can hinder adoption.	170	10

Table 2 presents the results regarding the gaps and issues related to iClinicSys: Not Enough Staff/IT Personnel and Encoders (Rank 1): The most critical issue identified is the lack of sufficient staff and IT personnel to input patient demographics into the system. This deficiency is ranked first, with a sum of ranks of 25. Addressing this gap is crucial for efficient data management and accurate patient records. Lack of Regular Feedback from Healthcare Professionals and Patients (Rank 2): The absence of consistent feedback from healthcare professionals and patients is the second-ranked issue, with a sum of ranks of 35. Regular feedback is essential for refining iClinicSys, improving its functionality, and addressing any gaps. The success of any electronic medical record system relies heavily on the accuracy and completeness of patient data. With insufficient staff and IT personnel, the process of inputting patient demographics into the system becomes a daunting task, leading to delays and errors in data entry. This deficiency can have severe consequences,

such as incorrect patient information, delayed diagnosis, and treatment, all of which can jeopardize patient care.

Moreover, the shortage of staff and IT personnel also affects the maintenance and updating of iClinicSys. As technology continues to evolve, it is essential to have a dedicated team to keep the system up-to-date and ensure its smooth functioning. With inadequate resources, iClinicSys may become obsolete and unable to keep up with the ever-changing healthcare landscape.

The second-ranked issue in Table 2 is the lack of regular feedback from healthcare professionals and patients, with a sum of ranks of 35. While iClinicSys aims to enhance healthcare processes, it is imperative to have consistent feedback from those who use it. Regular feedback from healthcare professionals can provide insights into the system's functionality, identify any gaps, and suggest improvements.

Similarly, patient feedback is crucial in identifying any issues or concerns they may have with iClinicSys. Patients are the end-users of the system, and their input can help refine iClinicSys to better cater to their needs. Without regular feedback from both parties, it becomes challenging to address any issues and improve the system's functionality.

Neglected Regular Maintenance, results also pointed out that Bug Fixes, and System Upgrades (Rank 3): The third-ranked issue pertains to the lack of regular maintenance, bug fixes, and system upgrades. This results in outdated features and security vulnerabilities, with a sum of ranks of 51. Timely maintenance and updates are crucial for system reliability and security. No Regular Feedback from RHU's IT Personnel and Encoders (Rank 4): The absence of feedback from the Rural Health Unit's (RHU) IT personnel and encoders is ranked fourth, with a sum of ranks of 75. Involving RHU staff in the system's improvement process is vital for addressing gaps and enhancing usability.

Furthermore, Delays Impacting Utilization and Efficiency (Rank 5): The fifth-ranked issue highlights delays in resolving utilization and efficiency issues related to iClinicSys. These delays can directly impact patient care, with a sum of ranks of 98. Costly Implementation and Maintenance (Rank 6): Implementing and maintaining iClinicSys is expensive, ranking sixth with a sum of ranks of 117.

Balancing cost-effectiveness with system functionality is crucial. Non-Intuitive and Unfriendly Interface (Rank 7): The system's interface is not user-friendly, leading to poor usability and potential errors. It ranks seventh, with a sum of ranks of 126. Improving the interface design is essential for user satisfaction and efficiency. Lack of Standardized Protocols (Rank 8): The absence of standardized protocols hinders data sharing and collaboration. This ranks eighth, with a sum of ranks of 136. Establishing clear protocols can enhance system interoperability.

Privacy and Unauthorized Access Concerns (Rank 9): Lack of compliance with privacy regulations and preventing unauthorized access is an ongoing concern, ranking ninth with a sum of ranks of 167. Addressing security and privacy issues is critical. Resistance to Change and Adoption Challenges (Rank 10): Resistance to change and unfamiliarity with the system hinder adoption. This issue ranks tenth, with a sum of ranks of

170. Overcoming resistance and promoting familiarity are essential for successful implementation. These rankings provide valuable insights for prioritizing improvements and addressing critical gaps in iClinicSys.

V. CONCLUSIONS AND RECOMMENDATIONS

Based on the preceding findings, the researcher concludes that the implementation of iClinicSys in Rural Health Units is perceived to be effective as it is implemented with the following; Ease of Information Retrieval, Accuracy of Information, Efficient Record Generation and Report Consolidation, Comprehensive Data Input, User-Friendliness of the System, and iClinicSys serves as a central repository, consolidating health information. The level of implementation of iClinicSys in RHUs is highly effective.

The main gaps and issues identified are not enough staff/IT personnel and encoders to input patient demographics in iClinicSys as the most crucial problem, and there is no regular feedback from healthcare professionals and patients which is essential for refining iClinicSys and addressing gaps, as well as regular maintenance, bug fixes, and system upgrades, are not done which results in outdated features and security vulnerabilities.

The solutions offered by the respondents are hiring or assigning additional encoders as well as investing in training programs to empower employees with the necessary skills to navigate iClinicSys effectively, regular feedback from healthcare professionals and patients that can provide insights into the system's functionality, identify any gaps, and suggest improvements, and timely maintenance and updates.

Finally, the researcher offers the following recommendations based on the findings and conclusions made: (1) Achieving all indicators of implementation for continuous effectivity of iClinicSys in Rural Health Units. (2) Integrating all information systems of electronic health records for the enhancement of the integrated clinic system (iClinicSys). (3) Solutions that are recommended for the improvement of the implementation of iClinicSys in Rural Health Units be effected.

REFERENCES

- [1] Banzon, et al. (2013). Philippine Journal of Development. Public-Private Partnership Options

- Towards Achieving Universal Health Coverage in the Philippine Setting. Retrieved from: <https://pidswebs.pids.gov.ph/CDN/PUBLICATIONS/pidspd13-ppp%20options.pdf>
- [2] Bernstein, Corinne. (2021). TechTarget. Digital Health (Digital Healthcare). Retrieved from: <https://www.techtarget.com/searchhealthit/definition/digital-health-digital-healthcare>
- [3] Cassion, Cesar. (2016). GOVPH. Department of Health. Center for Health Development – Caraga. ICLINICSYS, IS THE RIGHT TOOL FOR YOU! Retrieved from: <https://caraga.doh.gov.ph/programs-and-projects/352-iclinicsys-the-right-tool-for-you>
- [4] Deloitte Insights. (2023). Integrating digital health tools to help improve the whole consumer experience. Retrieved from: <https://www2.deloitte.com/us/en/insights/industry/health-care/digital-health-always-on-care.html>
- [5] Innab, Nisreen. (2021). Availability, Accessibility, Privacy and Safety Issues Facing Electronic Medical Records. Retrieved from: <https://airconline.com/ijstpm/V7N1/7118ijstpm01.pdf>
- [6] Lutkevich, Ben. (2020). TechTarget. HIPAA (Health Insurance Portability and Accountability Act). Retrieved from: <https://www.techtarget.com/searchhealthit/definition/HIPAA>
- [7] Orange Health Consultants. (2021). Health Care in the Philippines. Retrieved from: <https://www.rvo.nl/sites/default/files/2021/0/Healthcare-in-The-Philippines.pdf>
- [8] Precedence Research. (2023). Digital Health Market Size, Growth, Trends, Report by 2032. Retrieved from: <https://www.precedenceresearch.com/digitalhealth-market>
- [9] Sher, M., et al. (2017). How can hospitals better protect the privacy of electronic medical records? Perspectives from staff members of health information management. Health Information Management Journal, 46(2), 87-95.
- [10] Sutner, Shaun. (2017). TechTarget. Patient Protection and Affordable Care Act (PPACA, ACA, or Obamacare). Retrieved from: <https://www.techtarget.com/searchhealthit/definition/Affordable-Care-Act-ACA>
- [11] World Health Organization. (2019). UHC Act in the Philippines: a new dawn for health care. Retrieved from: <https://www.who.int/philippines/news/feature-stories/>