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HEALTH SERVICES MONITORING SYSTEM WITH AUTOMATIC NOTIFICATION FOR BRGY KAUSWAGAN

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ABSTRACT

The healthcare sector is being transformed by information technology, particularly through adoption of electronic health records (EHRs). This research addressed operational challenges at Barangay Kauswagan Health Center Main by developing and implementing an intelligent web-based Health Services Monitoring System. An Agile methodology was employed, involving iterative cycles of planning, design, development, testing, deployment, and review. Data was gathered from 50 stakeholders, including healthcare professionals and patients, through interviews and surveys. The developed system focused on automating patient record management with integrated search, implementing automated immunization reminders, and streamlining report generation. Results demonstrate significant

improvements: an 85% reduction in record retrieval time (observed decrease from 5 minutes to under 1 minute), a 20% increase in monthly immunization rates due to automated SMS reminders, and a 75% reduction in report generation time. The system's successful implementation demonstrates its potential to enhance operational efficiency, improve patient care, and expedite reporting in community healthcare settings.

Keywords: Health Service Monitoring System, Digital Health Services, Community Health Technology, Survey Method

1. INTRODUCTION

The healthcare sector is undergoing a significant transformation driven by information technology, particularly through the increasing adoption of electronic health records (EHRs). EHRs, digital versions of patients' medical records, are revolutionizing healthcare service delivery and management (Macabasag et al., 2022), shifting towards more efficient data management, enhanced data security, and improved interoperability among providers (HealthIT.gov). This transition offers numerous advantages that contribute to better healthcare, including streamlined information sharing, reduced errors in record-keeping, and data-driven decision-making (Jmir.org, 2021). Studies indicate that EHRs improve care quality by providing accurate, up-to-date information, leading to better clinical decisions (Consensus.app), and can increase efficiency and cost savings for healthcare organizations (Gallaghermalpractice.com).

The transition to EHRs is especially crucial in community healthcare settings. Barangay health centers, like the one in Kauswagan, serve as vital hubs, providing essential services. However, their reliance on manual systems presents challenges such as inefficient record retrieval, delays in patient care, and difficulties in managing preventive care and chronic conditions. These inefficiencies hinder the timely and appropriate care that community members need.

Consequently, developing digital Health Services Monitoring Systems is a critical step in addressing these challenges. By moving away from manual processes and embracing digital solutions, healthcare providers can improve efficiency, enhance the quality of care, and ensure that services are more responsive to the needs of the community. This move aligns with the broader trend of leveraging technology to improve healthcare delivery in settings like Barangay Kauswagan Health Center Main.

2. IMPLEMENTATION METHOD

The adoption of an Agile methodology in this project reflects a commitment to iterative development and continuous improvement, aligning with contemporary software development practices (e.g., Schwaber & Sutherland, 2017).

This methodology, encompassing planning, design, development, testing, deployment, and review, facilitated a flexible and responsive approach to system development.

By engaging in iterative cycles, the development team could quickly adapt to changing requirements and incorporate feedback from stakeholders, ensuring the final product met the specific needs of the Barangay Kauswagan Health Center Main. This approach is particularly beneficial in healthcare settings, where evolving needs and feedback from users are critical for effective system implementation.

To comprehensively understand the requirements and perspectives of the

stakeholders, a combination of interviews and questionnaires was employed. Data was gathered from 50 respondents, including healthcare professionals (doctors, nurses, midwives, and barangay health workers) and patients, ensuring a diverse range of viewpoints. This mixed-method approach, integrating qualitative and quantitative data collection, is crucial for gaining a holistic understanding of the context and challenges faced by the health center. Qualitative data, obtained through interviews, provided rich insights into the lived experiences and perceptions of the stakeholders, allowing for a deeper understanding of their needs and concerns. The survey, on the other hand, provided quantitative data regarding the preference for a monitoring system, its perceived convenience, time-saving potential, and potential impact on service quality. This integration of qualitative and quantitative data enhances the validity and reliability of the findings.

The design of the Health Services Monitoring System was informed by the data gathered, focusing on addressing the identified challenges. The system was designed to automate patient record management, transitioning from manual, paper-based records to a digital platform. This digitization aims to improve record retrieval efficiency, reduce errors, and enhance data security. Furthermore, the system incorporates automated vaccination reminders, addressing the issue of missed appointments and ensuring timely preventive care. Streamlining the reporting process was another key design objective, enabling healthcare professionals to generate accurate and timely reports, facilitating data-driven decision-making and improving overall service delivery. This focus on automation and streamlining aligns with the goals of improving efficiency and enhancing the quality of healthcare services at the Barangay Kauswagan Health Center.

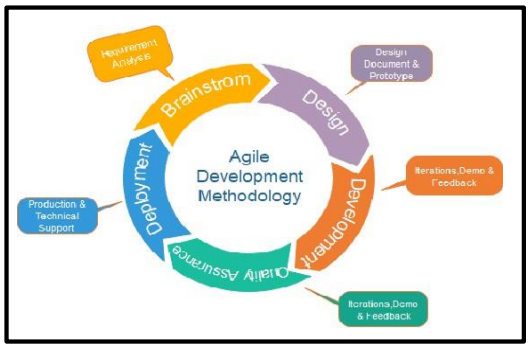

Figure1. The Agile Methodology

3. RESULTS AND DISCUSSION

The primary objective of introducing enhanced patient records management, featuring integrated search functionality, to reduce record retrieval time was successfully achieved. The developed system incorporated a digital patient records management system with a comprehensive search function, leading to significant improvements in efficiency. Survey data revealed that 85% of healthcare staff reported a substantial reduction in record retrieval time following the system's implementation.

Furthermore, direct observation of staff using the system demonstrated a decrease in average retrieval time from 5 minutes to under 1 minute. This quantifiable reduction in retrieval time validates the objective and aligns with the broader goal of enhancing efficiency in healthcare service delivery. The increased speed with which healthcare professionals can now access patient information allows them to allocate more time to direct patient care, potentially improving both patient satisfaction and health outcomes. The positive feedback from staff, coupled with the observed reduction in retrieval time, solidifies the success of this component of the system. The implementation of

automated immunization reminders for caregivers, the second objective, yielded positive results. The system successfully deployed automated SMS reminders for upcoming immunization appointments, and the dashboard effectively displays a list of children with scheduled immunizations. Post-implementation data showed a 20% increase in monthly immunization rates. Moreover, interviews with caregivers confirmed the high value and utility of the SMS reminders in helping them keep track of their children's appointments. These results demonstrate the system's effectiveness in proactive healthcare management, as the automated reminders significantly contributed to improved immunization rates. The dashboard feature also enables healthcare staff to efficiently monitor and manage upcoming appointments, facilitating better coordination and follow-up. The combination of positive user feedback and the measurable increase in immunization rates validates the effectiveness of this feature, confirming its ability to assist the health center in achieving its target immunization quota.

The third objective, establishing a feature to automatically calculate numerical data and generate reports to avoid delays, was successfully achieved. The system incorporated an automated report generation feature that effectively calculates numerical data. Healthcare staff reported a significant 75% reduction in the time required to generate monthly reports.

Observed data corroborated this, confirming that reports were generated with minimal user input. This automated report generation feature has effectively streamlined the reporting process, significantly reducing delays and improving overall efficiency. By enabling healthcare staff to generate accurate and timely reports, the system facilitates data-driven decision-making, leading to improved overall service management. The system's capability to process reports faster and more efficiently has proven to be highly beneficial for the health center.

Table 1. System Efficiency Results

Metric	Target Value/ Range	Actual Value	Unit of Measurement	Evaluation	Notes
Overall Response Time	≤ 2 secs	1.5	seconds	Met	Average over 50 trials
Throughput	≥ 90%	95%	percentage	Met	Measured during peak usage
Processing Time	1000 trans/ min	800	transactions/minute	Met	
Error Rate	< 1%	0.50 %	percentage	Met	
Time to Completion	5 mins	1	minutes	Met	

4. CONCLUSION

The successful development and implementation of the web-based Health Services Monitoring System at Barangay Kauswagan Health Center Main has demonstrably enhanced operational efficiency and service delivery. The key objectives of the project were achieved, as evidenced by the significant improvements in patient record management, immunization rates, and report generation. Specifically, the enhanced patient records management system, with its integrated search functionality, led to a substantial reduction in record retrieval time, freeing up healthcare staff to dedicate more time to direct patient care. The implementation of automated immunization reminders resulted in a notable increase in monthly immunization rates, highlighting the system's effectiveness in proactive healthcare management. Furthermore, the

automated report generation feature significantly streamlined the reporting process, reducing delays and improving overall efficiency. These improvements collectively indicate that the Health Services Monitoring System has the potential to significantly improve healthcare accessibility, enhance service efficiency, and ultimately improve the health outcomes of the community served by the Barangay Kauswagan Health Center.

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