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Development of Online Prenatal Appointment System for St. Paul Hospital

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Abstract: This project addressed the problem of slow and unorganized prenatal appointment scheduling at St. Paul Hospital, where staff used paper forms that caused delays, missing records, and long waiting times. The main goal of the project was to create a simple online tool that helps the hospital manage high-risk prenatal check-ups in a faster and more organized way. The group developed a web-based and mobile responsive Online Prenatal Appointment System to help staff schedule appointments, track patient records, and send reminders. The Waterfall Model was used to guide the development process step by step, from planning to testing. The system was built using Laravel, PHP, MySQL, HTML, Tailwind CSS, ReacJS and an SMS API for reminders. The main users are midwives, OPD staff, and administrators. Key features include appointment scheduling, digital pregnancy tracking forms, patient record management, and automated SMS reminders. After testing and evaluation, the results showed smoother scheduling, fewer missing records, and better coordination among staff. Users shared positive feedback, saying the system was easy to follow and made their work more organized. Overall, the system helped improve prenatal care workflow and showed potential for more features in the future, such as patient access and offline support.

Keywords: *Prenatal System, Scheduling, SMS Reminders, Laravel, MySQL, Healthcare Records, Waterfall Model.*

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I. INTRODUCTION

The rapid development of digital healthcare changed the way prenatal care was accessed, giving expectant mothers more opportunities to connect with medical professionals. Traditional prenatal appointment systems often required physical visits, which were difficult for pregnant women with mobility limitations, those living in remote areas, or those balancing other responsibilities. An online prenatal appointment system designed to address these challenges by providing an alternative method for scheduling consultations with healthcare providers. According to Ramalingam et al. (2024), mobile healthcare applications with appointment booking features improved access to healthcare services, especially for patients who faced barriers such as distance and time constraints. It discussed how digital systems simplified scheduling and communication between patients and healthcare providers. The project is particularly relevant to healthcare institutions that aim to transition from paper-based processes to a more efficient digital system. This system is particularly beneficial for hospitals that handle high-risk pregnancies and emergency cases. By eliminating manual scheduling, hospital staff could manage appointments, reducing administrative workload and minimizing scheduling conflicts. According to Mark (2024), hospitals that transition to online scheduling systems report up to a 50% reduction in administrative workload, leading to more accurate patient records and improved patient flow management. Digital scheduling also ensured better coordination among hospital staff, reduced paperwork, and optimized appointment management, making it an essential upgrade for modern healthcare facilities.

The project was implemented at St. Paul Hospital, a healthcare institution specializing in maternal and child healthcare services. The hospital relied on a manual, paper-based system for managing prenatal appointments, which required physical documentation for patient records and scheduling. St. Paul Hospital accommodated only high-risk and emergency prenatal cases, accepting 20–25 patients from Monday to Friday. Given the critical nature of these cases, a paperless system was introduced to ensure record-keeping and organized appointment management for healthcare providers. By adopting an online prenatal appointment system, the hospital replaced paper-based processes, supported administrative tasks, and assisted in coordinating among

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medical staff in managing prenatal care for high-risk patients. In line with this, a clear hierarchy of urgency would be implemented in scheduling. Emergency cases will receive immediate priority regardless of the daily limit. Patients instructed to return within the week or on specific weekdays will also be prioritized and must be included in the 25-slot daily limit. Since follow-up and continued care are essential, these return cases would be treated as part of the high-priority group to ensure timely and consistent medical attention. Only after these categories are accommodated will the remaining slots be made available for new consultations.

The hospital relied on a manual, paper-based system for managing prenatal appointments. Before scheduling an appointment, pregnant women were required to first visit their respective Barangay Health Centers, where they received a tracking form as proof of their initial check-up. This form served as a referral, particularly for those experiencing pregnancy complications or classified as high-risk. Although this traditional method had been in place for some time, it involved extensive paperwork and manual record-keeping, which increased the administrative workload and made it difficult to maintain an organized archive of patient records. Patients also experienced long waiting times, with no guarantee of being accommodated due to the hospital's first-come, first-served policy, which added to their inconvenience. Since the hospital only accommodated high-risk and emergency prenatal cases, manually handling appointment records was time-consuming for staff, especially when managing a daily patient limit of 20–25 high-risk cases. Additionally, retrieving past appointment records, updating patient information, and ensuring seamless coordination among healthcare providers became increasingly challenging without a centralized automated system. The proposed solution is an Online Prenatal Appointment System specifically designed for high-risk and emergency prenatal cases.

This system transitioned the hospital from a manual, paper-based scheduling process to a digital and automated approach. According to Sukyung Chung et al. (2024), implementing digital appointment systems has been shown to improve patient access to care, reduce scheduling conflicts, and enhance overall efficiency. The system includes an online interface where midwife can input the patient's tracking form details after the initial check-up. Once the pregnant woman had attended the Mother Class seminar, the OPD staff reviewed the referral and scheduled the appointment. The OPD Staff and Admin had access to a centralized dashboard to manage schedules, monitor appointment availability, and send automated reminders via SMS. Automated reminders had been proven effective in reducing missed appointments. According to DeNicola et al. (2020), telehealth and digital tools, including automated scheduling and reminders, significantly improved maternal health outcomes by ensuring continuity of care and timely appointments.

Moreover, the system integrated a patient record database, allowing healthcare providers to track patient history and ensure continuity of care, particularly for high-risk pregnancies. By computerizing the appointment process, the system simplified scheduling, improved coordination between patients and healthcare providers, and reduced reliance on manual paperwork. Automated reminders helped reduce missed appointments and promoted better patient engagement.

The implementation of the project incorporated various IT principles by using a relational database such as MySQL to store and manage patient records and appointment details. This structure maintained data integrity and facilitated data access for authorized hospital staff. The system was designed to be web-based and mobile-responsive. It utilized PHP (Laravel framework) for back-end development and HTML, ReactJS and Tailwind CSS for the front-end interface. This setup allowed healthcare providers and administrators to manage appointments and ensure organized scheduling of prenatal services. An SMS Notification API was integrated into the system to automate appointment reminders for patients. This functionality addressed scheduling coordination and enhanced communication between patients and healthcare staff. The system applied database management, cloud computing principles, cyber security practices, and API integration in the design and implementation of the appointment scheduling and management process.

By leveraging modern technology, this project contributed to the continuous improvement of maternal healthcare by providing a more efficient, accessible, and patient-centered approach to prenatal appointments. The adoption of this system not only reduced administrative burdens for healthcare providers but also enhanced maternal outcomes, making it a valuable innovation in the field of obstetrics.

II. RESEARCH METHODOLOGY

In this chapter, the researchers used the Waterfall Model to develop the Online Prenatal Appointment System, following a step-by-step process in which each phase was completed before proceeding to the next. This model helped the researchers maintain organization and ensured that each stage of development was carefully planned, created, tested, and maintained.

The Waterfall Model consisted of the following sequential phases—Planning, Analysis, Design, Implementation, Testing, Evaluation, and Maintenance—which were carried out in a linear order. This approach allowed the system to be developed with a clear structure and well-documented requirements, minimizing the need for major revisions during later stages. The process began with the planning and analysis through consultations with midwife, OPD staff, hospital nurses, and staff who assisted pregnant women and expectant mothers, in order to identify key system needs. The design and implementation phases followed, during which system components were fully specified and then developed using the selected technologies.

Testing was conducted after development was completed to ensure that all features met functional expectations and that any issues were identified and resolved before deployment. Once the system passed all test cases, it was deployed for

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actual use, accompanied by the necessary user training and technical support.

According to Rosmani and Mokhtar (2023), the researchers employed the classical Waterfall Model to implement the Veterinary Online Appointment Booking System (VOAS), emphasizing that the model was particularly suited for "clear and straightforward requirements." Their project progressed through distinct phases without revisiting previous ones, and usability testing revealed that "93.8% of the respondents state that the system is very good" (Rosmani & Mokhtar, 2023, p. 24), confirming that a phase-based and structured model could produce a reliable and usable system. Similarly, the Waterfall Model ensured that the Online Prenatal Appointment System was developed through an organized and stable process, with each step completed and validated before proceeding to the next.

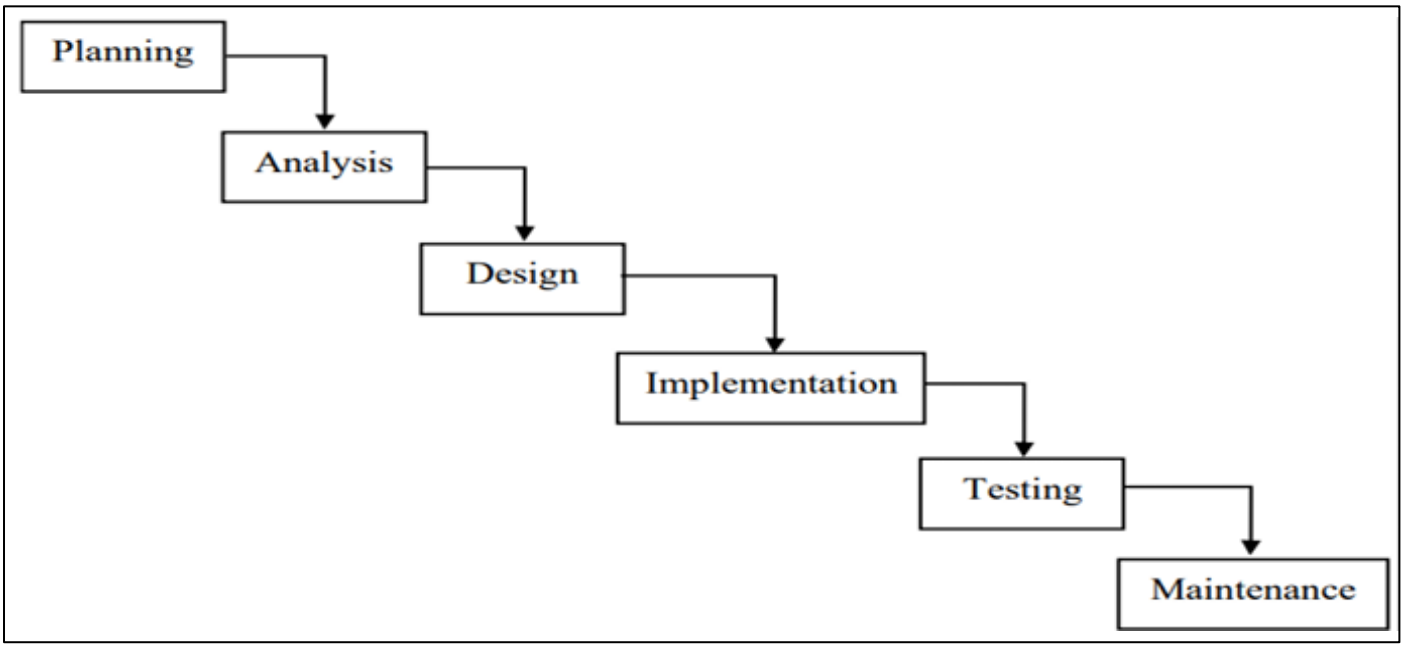

Fig 1 Waterfall Methodology (Loi and Abdullah, 2023)

➢ *Planning*

In this phase, the researchers collected all the necessary information to understand the system's required functions and objectives. Interviews and observations were conducted with OPD staff, midwife, and nurses to identify common problems in the existing manual process. The researcher found that patients experienced difficulties in booking appointments, hospital staff struggled with managing records, and there were no reminders for upcoming check-ups. To gather comprehensive and reliable information, a group interview was recorded to ensure that no details were missed.

According to Bisland and Siebert (2024), walking interviews, compared to sit-down interviews, offered richer contextual data by capturing participants' experiences within their natural environment. Based on these discussions, the researchers identified the main system features required: online appointment booking, patient record management, SMS reminders, and pregnancy tracking. The information gathered during this stage helped define clear system requirements.

The researchers also reviewed the tools and technologies to be used, including Laravel for system development, MySQL for data storage, and Tailwind CSS for responsive design. Standards and best practices were established to ensure that the system was secure, user-friendly, and functioned effectively. According to Subhi et al. (2023), these tools were selected for their versatility, functionality, and compatibility with the system's requirements.

➢ *Analysis*

In the Analysis Phase, the researchers reviewed and organized the information gathered during the planning phase to understand the specific needs of the users and the problems in the existing system. The main objective of this phase was to define what the system should accomplish to address these issues. To gain deeper insights, the researchers conducted group interviews with OPD staff, midwife, and nurses. These interviews helped identify how the manual system caused delays and confusion, particularly in booking appointments, managing patient records, and sending check-up reminders. Observations conducted during hospital visits supported these findings. The researchers focused on analyzing the daily tasks of the users to determine which system features were necessary to make their work more efficient and organized.

Based on the data collected, the researchers developed a detailed list of system requirements. These included the ability to book appointments online, manage patient and pregnancy records, and send SMS reminders automatically. Each feature was evaluated to ensure that it aligned with the real needs of the OPD staff and patients. The researchers also identified potential challenges that might arise during system use and proposed preventive measures to address them.

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The expected outcome of the analysis phase was a complete and well-documented list of system features and technical requirements. This documentation served as a guide for the design and development stages. A clear understanding of these needs enabled the researchers to create a system that was useful, reliable, and beneficial for both hospital staff and patients.

➢ *Design*

In the design phase, the researchers focused on planning how the system would work before starting to build it. They created diagrams to show how users would interact with the system and how the data flowed. A Context Level Diagram was created to give a simple view of how information moved between users like patients, midwife, and OPD staff, and the system itself. A Use Case Diagram was also made to show what each user could do inside the system—such as booking appointments, approving schedules, or viewing records. Use Case Diagrams helped developers and users understand what actions were possible and who could perform them. A Data-Flow Diagram represented how data moved through the system and showed the processes that transformed data. A Physical Database Design illustrated how the system's data was implemented and stored in the database management system (DBMS).

Additionally, an Entity Relationship Diagram (ERD) was created to show how data like patient details, appointments, and tracking forms were related inside the database. These diagrams helped organize all the needed parts of the system and ensured the plan was clear for the development researchers. According to Muhumure (2024), the diagram illustrated a streamlined workflow for each user type, emphasizing the system's ability to cater to different healthcare stakeholders. The complete design served as a guide for the next phase, which was implementation.

➢ *Implementation*

In this phase, the development took place. The Online Prenatal Appointment System was developed using a three-tier architecture design. In developing the platform, the researchers used various frameworks for specific functionalities: PHP Laravel for web development and MySQL for the database in the web application, which was shown in Figure 3.0.

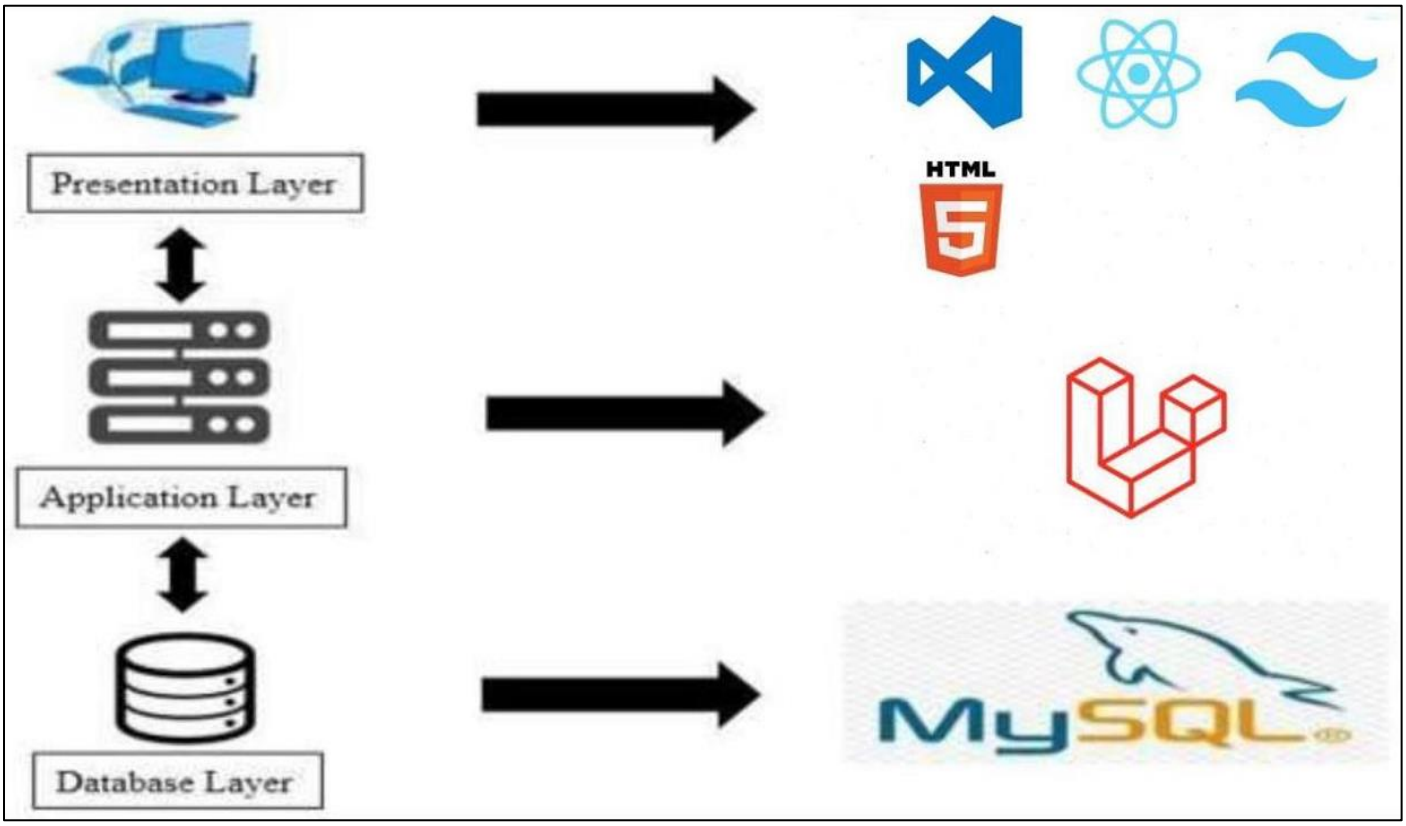

Fig 2 Tier System Architecture

Figure 3 presents the architectural design of the system. Since the platform is intended to be accessed online, a web hosting environment was configured to allow access for the midwife, OPD staff, and administrators. The front-end development is the Presentation Layer, We used HTML to create the basic structure of the pages. For the visual design, we used Tailwind CSS, a tool that helped us apply consistent and professional styling quickly across the entire system. To make the system feel fast and interactive, we used ReactJS, which allows parts of a page, like a patient list, to update instantly without needing a full page reload. ReactJS also allowed us to build reusable components, such as the main navigation sidebar, so we only had to code it once and use it on every page. ReactJS creates dynamic interfaces, Tailwind CSS ensures rapid development with consistent design (Fanghua Gu, 2024).

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Next is the Application Layer, which is the backend or the "brain" of the system that does all the work behind the scenes. We used Laravel, a powerful PHP framework, to act as the system's engine. Laravel handles all the important jobs like processing user logins, saving data from forms, and managing all the core logic securely, which is critical for a healthcare system. PHP (Hypertext Preprocessor) as a widely-used open-source server-side programming language for web development (Subhi et al., 2023). Laravel is recognized for its interactive and intuitive design, offering a wide range of features including security, password storage, password resets, encryption, and validation functions (Amini et al., 2021). This framework-based approach is faster and more secure than building everything from the ground up.

The last one is the Database Layer. MySQL is used in the data layer for storing and retrieving system data. According to Stonik et al. (2023), MySQL is a popular database system because it supports easy record management (such as adding, deleting, and sorting data), offers reliable security, and provides a free license. The development tools and technologies mentioned are integrated to create a user-friendly and maintainable system aligned with the specific requirements of the Online Prenatal Appointment System.

- *Testing*

In the testing phase, the researchers tested the Online Prenatal Appointment System to ensure it worked correctly and met all the system requirements. Several types of testing were conducted to make sure the system was reliable and ready for use. Functional testing was carried out to check if key features such as appointment booking, patient record management, and SMS notifications worked properly. Usability testing was performed to determine if the system was easy to use for midwife, OPD staff, and admin. Compatibility testing was conducted to ensure the system worked well on different devices like smartphones and computers, and across various web browsers. Security testing was included to protect the private information of patients from unauthorized access or data loss. According to Muhumure (2024), proper testing ensured the system was safe, functional, and easy to use. Any problems found during this phase were fixed right away. Feedback from users was also collected and used to improve the system before launching.

The outcome of this phase was a stable and fully working system that helped reduce waiting times, improved record handling, and made scheduling prenatal appointments easier and more organized for everyone involved.

- *Evaluation*

In the evaluation phase, the system was carefully reviewed after the testing was completed. This step was important to ensure the system worked well and met the needs of its users. OPD staff and midwife used the system in real situations to check if all the features functioned properly. They tested the system's speed, reliability, and ease of use. The development researchers observed how users interacted with the system and gathered feedback. This feedback helped the researchers find any issues or parts of the system that could be improved. The system was also checked for user satisfaction, accuracy of information, and how well it helped users perform their daily tasks. The expected outcome of this phase was to confirm that the system was stable, easy to use, and ready for full deployment in the healthcare center. It made appointment booking faster, reduced manual errors, and improved communication with patients through features like SMS reminders. If the system passed the evaluation, it was considered ready to be used by all intended users.

Although the traditional Waterfall Model did not always include a distinct "Evaluation" phase, this study adopted an extended approach by incorporating evaluation after testing. This method aligned with the process used by Loi and Abdullah (2023), who conducted post-testing evaluations involving user feedback to assess system performance and usability. Including this phase helped ensure that the system was not only functional but also practical and effective in real-world use.

- *Maintenance*

In the maintenance phase, the researchers focused on keeping the Online Prenatal Appointment System running smoothly after it was deployed. This involved regular checks for bugs or errors, collecting feedback from users, and updating the system based on new needs or suggestions. If any technical issues were found, they were fixed immediately to avoid problems for users. As the system continued to be used, the researchers made improvements to ensure it remained secure, efficient, and up-to-date with current healthcare and technology standards. Features like SMS reminders and patient tracking were checked regularly to ensure they continued to work properly. This phase helped guarantee that the system stayed useful and reliable for medical staff over time, supporting the goal of improving prenatal care services in the community.

III. RESULTS AND DISCUSSION

This chapter presented the results and discussion based on the phases of the Waterfall Model used in this study. The discussion followed the sequential phases of the model, starting with Planning, followed by Analysis, and System Design, where important system diagrams were created. It then proceeded to the Implementation phase, where the system was built and implemented, the Testing and Evaluation phase, where the system's functionality, usability, and reliability were assessed, and finally, the Deployment phase, which showed how the system transitioned into actual use. Each phase was presented to reflect the structured and systematic approach of the Waterfall Model in this study.

- *Planning*

The first activity carried out in the study was the preparation of a formal letter addressed to the Chief of Hospital Office. The purpose of this letter was to request access to relevant documents and to seek permission to interview selected personnel. A copy of the approved letter was provided in Appendix A. This approval served as the official authorization for the researchers to proceed with data collection, ensuring that all information obtained was valid and ethically acquired. Furthermore, in contrast to informal

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requests that might have lacked accountability, the approved letter made the project more credible and provided an organized way to obtain the needed records.

The second activity was the conduct of interviews with OPD staff, nurses, and administrative staff. Several recurring issues were identified. The administrative officer's main concern was the hospital's reliance on a manual, paper-based system for managing prenatal appointments. Pregnant women were first required to secure a tracking form from their Barangay Health Center before scheduling at the hospital, which served as a referral, especially for high-risk cases. The two OPD staff emphasized the heavy paperwork and manual record-keeping, which resulted in increased administrative workload and challenges in keeping patient records organized. The nurse pointed out that patients often faced long waiting times due to the first-come, first-served policy, with no assurance of being accommodated.

Administrative and OPD staff also found it time-consuming to manage appointment records for the daily limit of 20–25 high-risk cases. Furthermore, retrieving past records, updating patient details, and ensuring smooth coordination among healthcare providers proved difficult in the absence of a centralized automated system.

The third activity was the collection of different paper forms used for keeping patient records. Scanned copies of these forms were presented in Appendix C. One form was the Prenatal Visit Form, which asked for personal details, emergency contact, doctor's name, and health information such as weight, blood pressure, and the baby's heartbeat during each trimester. Next was the Outpatient Record Sheet, which recorded the patient's name, age, address, contact number, doctor's name, main complaint, and vital signs. Then there was the Pregnancy Tracking Form, which was used to follow pregnant women in the community. It included details such as age, address, last menstrual period, expected date of delivery, number of pregnancies, health risks, and delivery outcome. Lastly, the Immunization Record Form was used to track vaccines like tetanus and COVID-19, including the date given and the return date. The study showed that since all information was written by hand, problems such as unreadable names, repeated records, missing details, and mistakes were common. Paper forms were also easy to lose or damage, which made patient records incomplete or inaccurate.

The Planning Phase identified significant challenges in the hospital's manual record-keeping system. Official approval ensured that data collection was valid and credible. Interviews with OPD staff, nurses, and administrators revealed inefficiencies in scheduling, reporting, and managing patient records. The review of paper forms also showed issues such as unreadable handwriting, missing information, duplicate entries, and the risk of loss or damage. Overall, these findings confirmed the limitations of the manual system and justified the need for a centralized automated solution to improve accuracy, efficiency, and coordination in patient care.

- *Analysis*

This presented the results of the data gathered during the analysis phase. The information came from interviews with OPD staff, a midwife, and nurses, as well as from observations made during hospital visits. The purpose of this phase was to show the real problems in the existing manual system, the daily tasks of the hospital staff, and the system features that could help solve these issues. It also discussed possible problems that might have occurred when the new system was used and how they could be prevented.

Based on the interviews and observations, the manual system that was used in the hospital created several challenges for both staff and patients. Many OPD staff members experienced delays and confusion when handling patient information. One of the most common problems was the difficulty in booking and tracking appointments, since schedules were written by hand and often disorganized. Patient records were also hard to manage because they were stored manually, which increased the risk of misplaced files and incomplete data. Another challenge was the absence of a proper reminder system, which led to patients forgetting their check-up schedules. These problems affected not only the workflow of the hospital staff but also the overall quality of service that patients received.

OPD staff, nurses, and the midwife performed many important tasks every day, but the manual process made their work more time-consuming and stressful. OPD staff spent a lot of time writing down schedules in logbooks and checking them one by one when patients inquired about appointments. Nurses struggled to locate patient records quickly because they had to search through piles of paper files. The midwife also found it difficult to monitor pregnancy records when some information was missing or misplaced. These daily challenges highlighted the need for a better and more organized system that could reduce their workload and improve efficiency.

From the information gathered, the researchers identified several important features that the new system should provide. The first was an online appointment booking system that could make scheduling faster, more accurate, and less prone to double bookings. Another feature was a patient and pregnancy record management system that ensured all records were safe, complete, and easy to access whenever needed. The last key feature was an automatic SMS reminder system, which helped patients remember their check-up schedules and reduced the number of missed visits. These features were carefully chosen because they directly addressed the problems experienced by hospital staff and patients, and they were expected to make the workflow more efficient

Although the system offered many advantages, the researchers also considered possible problems that might have occurred during its actual use. For example, system downtime could have caused delays in service, so regular system maintenance needed to be done to keep it running smoothly. Some staff members might also have found it difficult to use the new system at first, which was why proper training and orientation were necessary before full implementation. Another possible concern was the risk of data security

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breaches, which could be prevented by applying password protection and strict access control for users. Thinking ahead about these possible problems helped ensure that the system could be reliable and safe once it was in place.

The analysis phase showed that the current manual system caused delays, confusion, and inefficiency in handling appointments and patient records. OPD staff, nurses, and the midwife faced difficulties in scheduling, retrieving records, and keeping patients reminded of their check-ups. To solve these issues, the system needed to include online appointment booking, patient and pregnancy record management, and automatic SMS reminders. The researchers also identified possible problems such as downtime, lack of user training, and data security risks, along with preventive measures to address them. These findings served as the foundation for the next phase, which was the design and development of the system.

➢ *Design*

The design phase focused on turning the identified requirements into a clear plan for how the Online Prenatal Appointment System would work. At this stage, the researchers created diagrams and models to show the flow of information, the roles of different users, and the relationships between data. Tools such as the Context Diagram, Data Flow Diagram, Use Case Diagram, Logical Entity-Relationship Diagram, and Physical Database Diagram were developed to give a visual guide of how the system was intended to function. This phase was important because it served as the blueprint for building the actual system, ensuring that all the needs of the midwife, OPD staff, and administrators were properly addressed before moving to development.

➢ *Implementation*

The implementation phase showed how the planned design was transformed into a working system that could be tested and improved further.

The functional testing aimed to verify that each feature of the Online Prenatal Appointment System worked according to the required specifications. The table of functional test cases contained details about the modules tested, the purpose of each test, the expected outputs, the actual outputs, and whether each test passed or failed. A total of 31 functional test cases were conducted, and all 31 test cases passed with no failures. Overall, the results showed that all functional test cases passed after retesting. All functions including login, referral form submission, appointment updates, generate reports, activity logging, and user or health-station management performed exactly as expected. These results also showed that the system followed the project objectives because it helped make the scheduling process more organized, supported sending reminders to patients, allowed staff to manage patient records clearly, and showed that the system is usable and reliable based on the successful tests. The system consistently validated user input, prevented incomplete submissions, and displayed accurate data that matched the stored records. These results indicate that the system meets its functional objectives and supports users in managing prenatal appointments accurately and efficiently, which connects to the objectives related to scheduling, reminders, record management, and proving that the system works smoothly during testing.

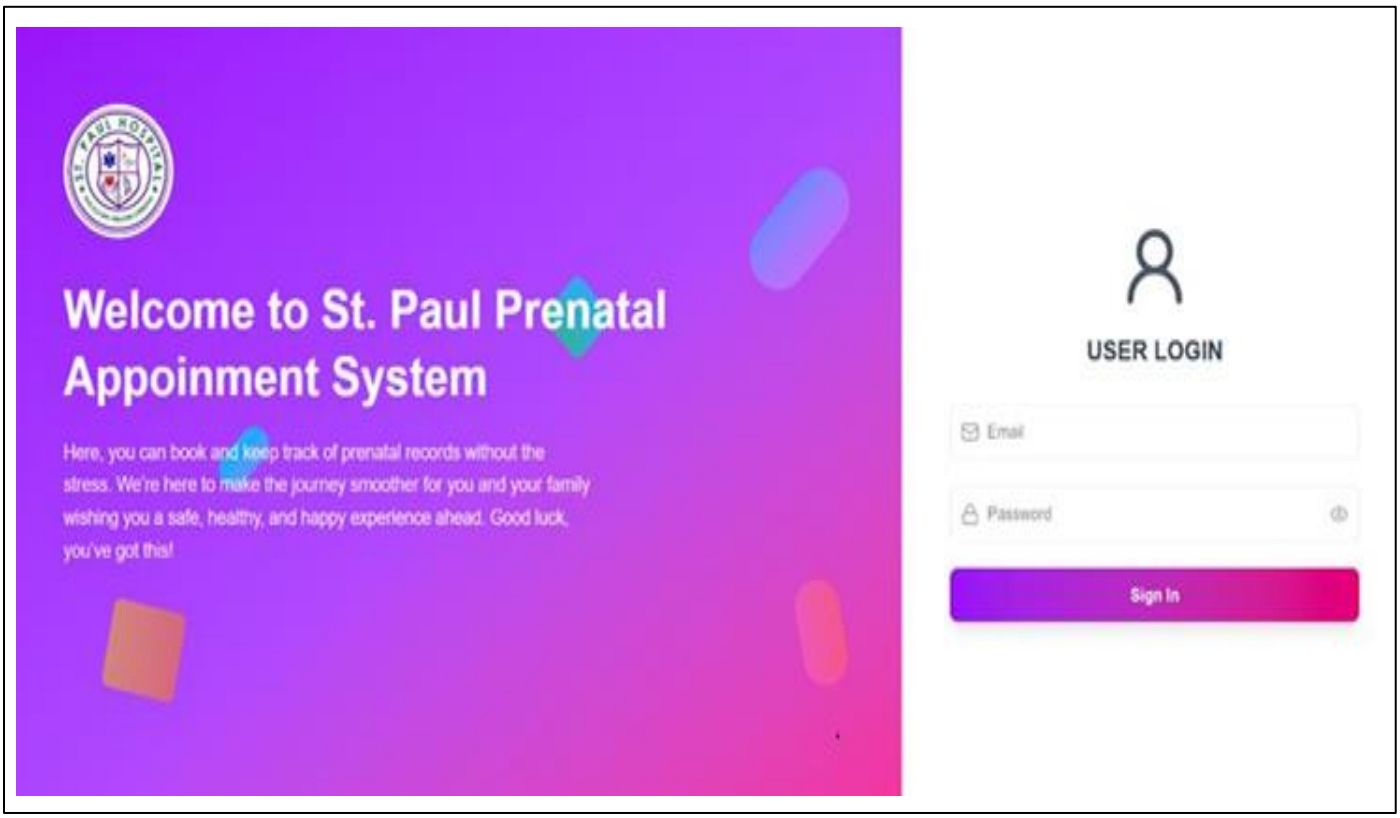

Fig 3 Login Page

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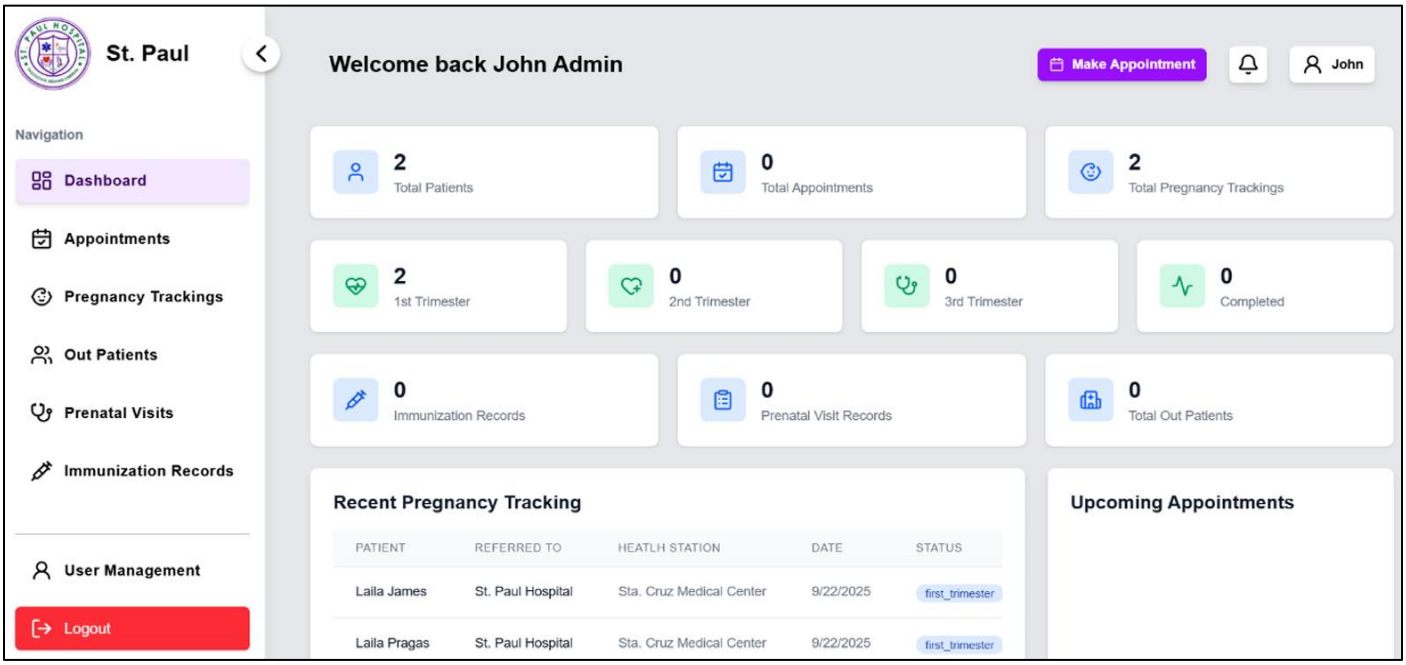

Fig 4 Dashboard

Table 1 SUS Score Computation

	Participants										
Item #	**Development of Online Prenatal Appointment System**	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**	**P10**
1	I think that I would like to use this system frequently.	4	4	4	3	3	2	2	1	4	4
2	I found the system unnecessarily complex.	3	4	3	2	1	1	3	2	1	4
3	I thought the system was easy to use.	4	4	4	3	4	3	3	2	4	4
4	I think that I would need the support of a technical person to be able to use this system.	4	0	3	1	0	0	3	2	1	3
5	I found the various functions in this system were well integrated.	4	4	4	2	3	3	2	2	4	2
6	I thought there was too much inconsistency in this system.	2	4	3	2	1	4	2	2	4	2
7	I would imagine that most people would learn to use this system very quickly.	4	4	4	3	3	3	3	2	4	2
8	I found the system very awkward to use.	4	4	4	3	2	2	4	2	3	2
9	I felt very confident using the system.	4	4	4	3	4	3	2	2	4	2
10	I needed to learn a lot of things before I could get going with this system.	4	0	3	1	1	3	3	2	3	2
Total Scores		37	32	36	23	22	24	27	19	32	27
Multiply by 2.5		92.5	80	90	57.5	55	60	67.5	47.5	80	67.5
Average		70									

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Table 1 presents the final SUS score of 70 (rounded from 69.75), which places the system at the standard usability average. This means the system is generally usable, but there are still areas that can be improved. A score of 70 shows that users can use the system, but they may experience small difficulties, especially during their first time.

A SUS score in this range suggests that the system is "good but not yet excellent." Users can complete their tasks, such as scheduling appointments and viewing patient records, but they may still need guidance at times. The score also shows that the system is not confusing overall, but more improvements can help it feel smoother, especially for staff who are not used to computers.

During the SUS activity, many participants shared that the system felt well-organized, particularly in scheduling and viewing patient records. They appreciated the simple design, the SMS reminders, and the quick access to patient information. Several users reported feeling more confident after using the system for a short time. Some participants found certain parts of the system confusing at first, especially the flow of buttons and pages. A few users noted that some functions were awkward to use or needed clearer labels. There were also comments that new users might require a brief training period before feeling fully comfortable. This helps explain why the total SUS score turned out as it did: during the SUS testing, some respondents had many questions, and some took longer because the process of completing the forms was lengthy. However, not all participants experienced difficulties; some were able to complete the forms smoothly by observing others who had tried the system first.

Overall, the SUS results showed that the system works well and supports the staff in managing prenatal appointments. The score of 70 (rounded from 69.75) means it is helpful but can still be refined. The feedback from the participants is valuable because it gives clear direction for improving the system's interface, making instructions clearer, and making the overall experience easier for all users in the future.

IV. CONCLUSION

This study developed an Online Prenatal Appointment System to improve the manual scheduling process at St. Paul Hospital. The traditional paper-based method caused long waiting times, missing records, and heavy workload for hospital staff. The new system helped solve these problems by providing a faster and more organized way to manage high-risk and emergency prenatal appointments.

The system was developed using the Waterfall Model and modern web technologies such as Laravel, MySQL, ReactJS, and an SMS notification API. Testing and evaluation showed that the system improved appointment scheduling, reduced record errors, and made coordination among midwives, OPD staff, and administrators easier. Automated SMS reminders also helped reduce missed appointments.

Overall, the system improved the workflow of prenatal services and supported better patient care. Future improvements may include patient access, offline features, and additional system reports to further enhance usability and service delivery.

REFERENCES

[1]. R. Ramalingam, S. Kannan, and P. Subramanian, "Mobile healthcare applications and their impact on appointment scheduling efficiency," *International Journal of Healthcare Information Systems*, vol. 12, no. 1, pp. 45–53, 2024.
[2]. M. Mark, "Digital appointment scheduling systems in hospitals: Reducing administrative workload and improving patient flow," *Journal of Health Information Management*, vol. 18, no. 2, pp. 101–109, 2024.
[3]. S. Chung, J. Lee, and H. Park, "Improving patient access through digital appointment systems in healthcare facilities," *Healthcare Technology Letters*, vol. 11, no. 3, pp. 210–217, 2024.
[4]. M. DeNicola, R. Grossman, and A. Marko, "Telehealth interventions and maternal health outcomes: A systematic review," *American Journal of Obstetrics and Gynecology*, vol. 223, no. 4, pp. 547–558, 2020.
[5]. R. Rosmani and S. Mokhtar, "Veterinary online appointment booking system using the waterfall model," *Journal of Information Systems Engineering*, vol. 9, no. 1, pp. 18–26, 2023.
[6]. L. Loi and M. Abdullah, "Evaluating extended waterfall models in healthcare system development," *International Journal of Software Engineering Applications*, vol. 14, no. 2, pp. 33–41, 2023.
[7]. F. Gu, "ReactJS-based dynamic user interfaces for healthcare web applications," *International Journal of Web Development*, vol. 7, no. 1, pp. 55–62, 2024.
[8]. A. Subhi, N. Hassan, and M. Khalid, "Secure web application development using Laravel and PHP frameworks," *Journal of Computer Science and Information Security*, vol. 21, no. 3, pp. 88–96, 2023.
[9]. S. Stonik, V. Petrov, and L. Ivanov, "MySQL database systems for healthcare record management," *International Journal of Database Systems*, vol. 10, no. 2, pp. 64–72, 2023.
[10]. J. Muhumure, "Usability and reliability testing of healthcare information systems," *African Journal of Health Informatics*, vol. 6, no. 1, pp. 12–20, 2024.