The Maternal Care System

Minzu Khaing Htun, Khin Thri San
Student, 5th Year, B.C.Sc.
University of Computer Studies, Hinthada

Supervised By
Daw Wint Kyu Kyu Ko
Faculty of Computer Science
University of Computer Studies, Hinthada

Abstract: Maternal health is a vital component of public health, with direct implications for the well-being of both mothers and newborns. Despite global efforts to improve healthcare access, many women, especially in rural and low-resource settings, continue to face challenges during pregnancy, childbirth, and the postpartum period. This project presents the development of a Maternal Care System, a technology-driven solution aimed at enhancing maternal healthcare services through continuous monitoring, timely information delivery, and improved communication between patients and healthcare providers. The implementation of this system is expected to reduce maternal and infant mortality rates, promote early detection of pregnancy-related risks, and empower women with knowledge, and support throughout their maternity journey. Overall, the Maternal Care System contributes to safer pregnancies and healthier outcomes, aligning with national and global maternal health goals.

Keywords: child health, childbirth, maternal care, postpartum period, pregnancy, pregnancy-related-risks.

INTRODUCTION

Maternal health remains a critical aspect of public healthcare, particularly in developing countries where access to timely and quality maternal services is often limited. Pregnant women require regular monitoring and follow-up to ensure both their own health and the health of the unborn child. Antenatal care (ANC) and postnatal care (PNC) are essential components of maternal healthcare, as they help detect complications early, provide health education, and ensure safe delivery and recovery. However, manual systems for managing maternal care are often inefficient, prone to errors, and unable to provide real-time insights into patient needs. In response to these challenges, the Maternal Care System was developed as a digital solution to streamline the management of maternal health services. This system enables healthcare providers to track individual mothers from registration to postnatal care using key data points such as the Last Menstrual Period (LMP) and Expected Date of Delivery (EDD). It automatically calculates and schedules the recommended 8 antenatal and 4 postnatal visits in alignment with global maternal care standards. Furthermore, the system allows healthcare staff to identify high-risk pregnancies based on recorded medical profiles and flag them for referral. Nurses can view daily schedules of mothers expected to visit or deliver, while mothers can log into view their care schedules and fill birth preparedness form. By enhancing coordination and reducing missed visits, this system contributes to improved maternal and child health outcomes.

PROBLEM

Maternal care services are still limited in many areas, leading to delayed check-ups, poor monitoring, and preventable maternal and child health issues. Paper-based records make tracking difficult, and there is a lack of digital systems to support timely care, appointment

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reminders, and risk detection. This highlights the need for a technology-based solution to ensure continuous and accessible maternal healthcare. Many pregnant women lack timely access to skilled health professionals, adequate prenatal monitoring, and emergency obstetric care. Gaps in communication between expectant mothers and healthcare providers, delayed identification of high-risk pregnancies, and poor continuity of care after delivery contribute to preventable complications such as hemorrhage, preeclampsia, infections, and neonatal mortality.

APPROACH

The maternal care system approach is a step-by-step, continuum approach to providing safe, effective care to pregnant women from conception to postpartum. It starts with education, pre-conception health screening and family planning, and continues with regular antenatal care during pregnancy. Deliveries are carried out in designated facilities by skilled health workers, and a referral system is established to ensure safe delivery, if necessary, to an appropriate hospital. Postpartum care continues with maternal health care, breastfeeding education and maternal nutrition support, and postpartum family planning. It also includes capacity building for health workers to improve training, health information collection and data-based monitoring & evaluation systems to improve service quality. All these approaches aim to improve maternal health through collaboration between government, the private sector and the community.

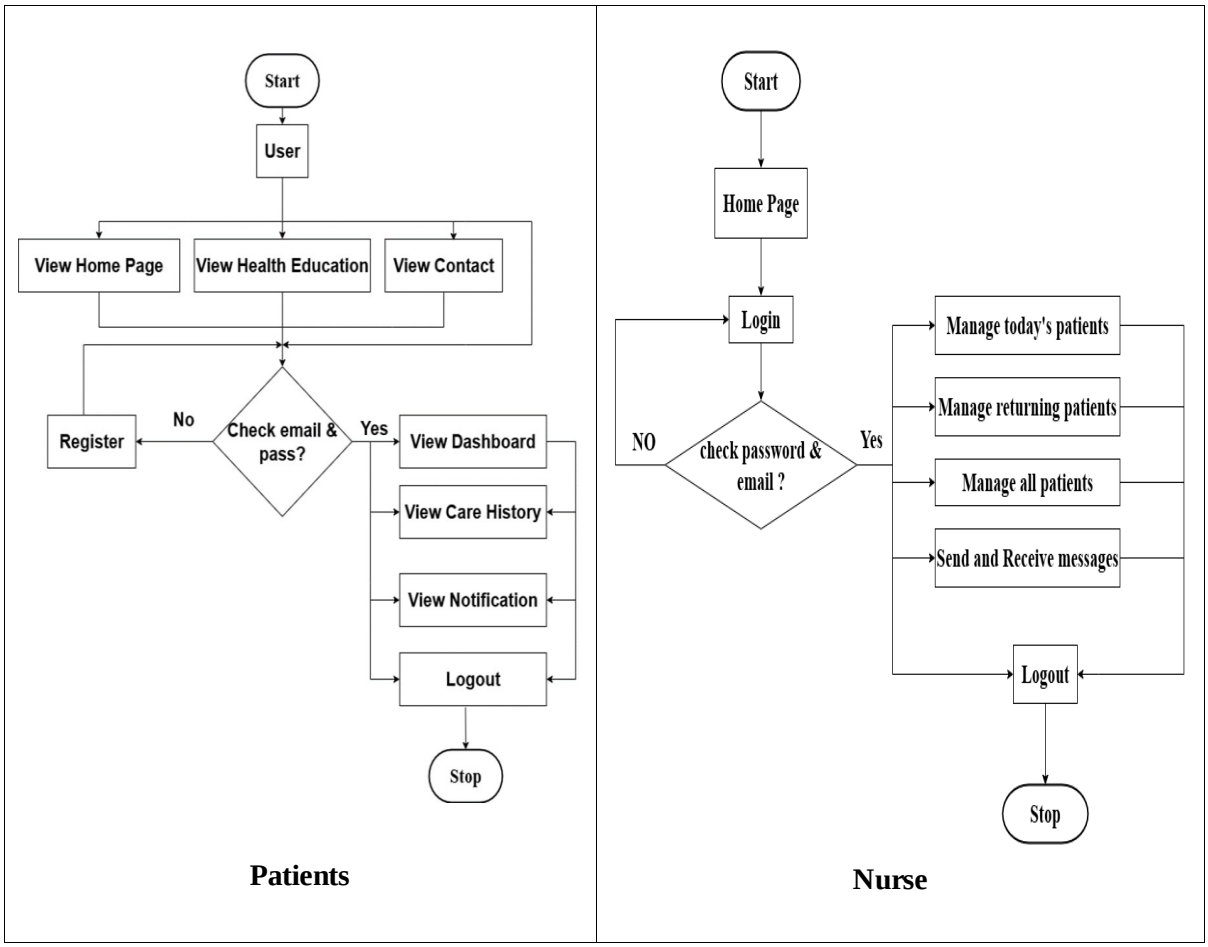

Figure 1: System Flow Diagram for Patients and Nurse

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Figure 1 shows the workflow of the system user and the system administrator. User (Patient) can register and log in to the system, and use the Medical Dashboard, Care Info, Notification, etc. Admin (Nurse) can log in and manage Health Education, Patient Profile, Appointment and Resources. This diagram shows the overall operation of the system and clearly identifies the functions for the patient and nurse.

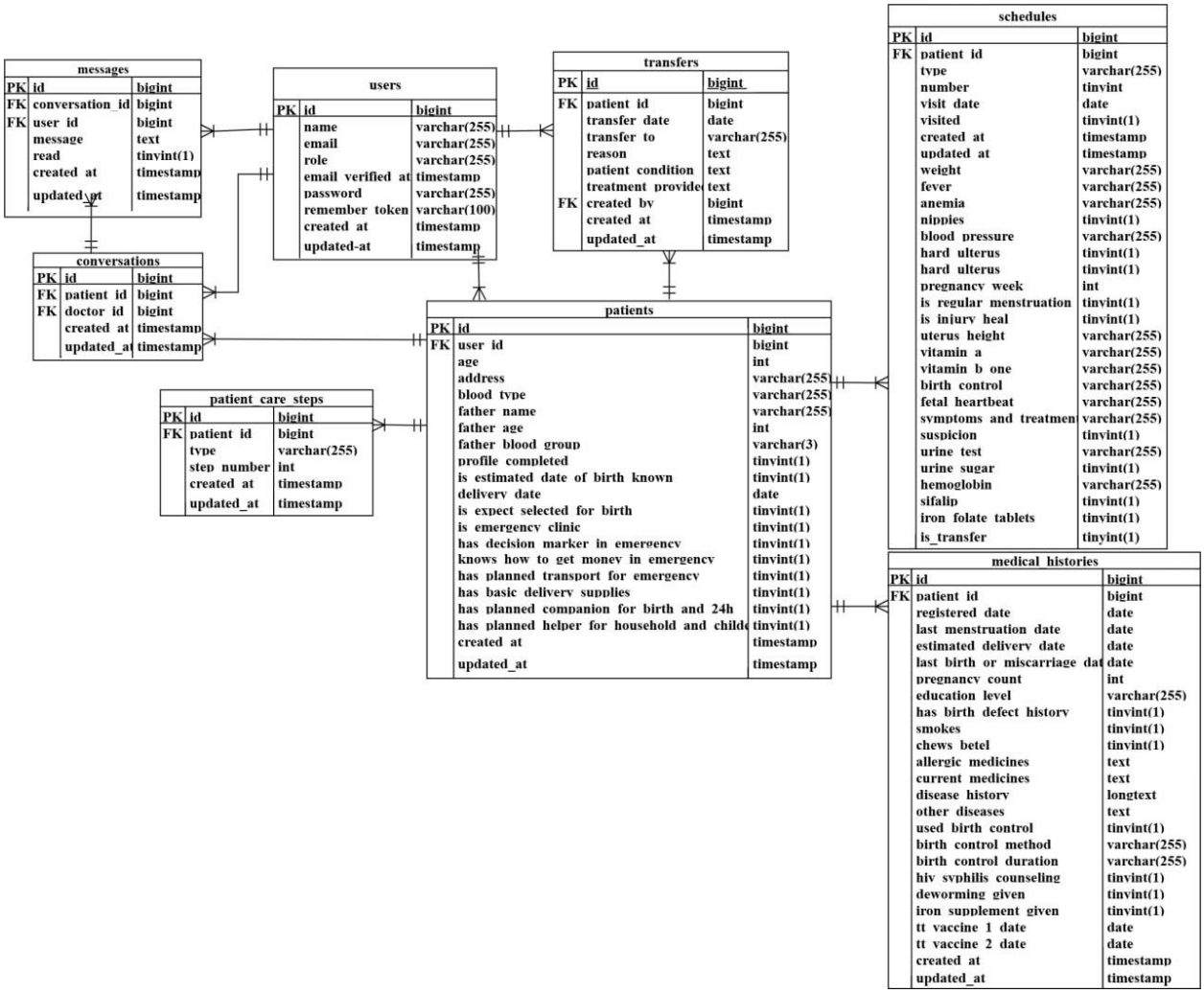

Figure 2: Database Design

Entity Relationship (ER) Diagram is a method of visualizing the structure and relationships of information in a single page, which is mainly used in database design. It shows the entities (objects), attributes (data), and relationships (relationships) in a separate diagram, so that can be easily understood how the data is related to each other. To use it is necessary to define the entities firstly that will be included in the database, and describe the attributes and primary keys of each of them. Then, it is necessary to define the types of relationships between the entities, there are seven data tables for the administrator and five data tables for the user. The tables are schedules, messages, patient_care steps, conversations, transfers, users, medical_histories, and patients. The figure 2 shows database design for all the data tables and their relationship of the database.

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RESULTS

The platform is developed using PHP, MySQL, HTML/CSS, and Bootstrap for a responsive front-end design. The maternal care system plays a critical role in improving maternal and neonatal health outcomes. Effective implementation of antenatal, intrapartum, and postnatal care services has been shown to reduce maternal mortality, prevent pregnancy-related complications, and ensure safe deliveries. Access to skilled birth attendants, timely medical interventions, and health education for mothers contributes to higher rates of institutional deliveries and improved maternal satisfaction. Additionally, the system strengthens community awareness, encourages early detection of high-risk pregnancies, and supports comprehensive follow-up care, ultimately enhancing the overall quality of maternal healthcare. The figure 3 shows a weight chart for a pregnant woman from her first clinic visit until she gives birth.

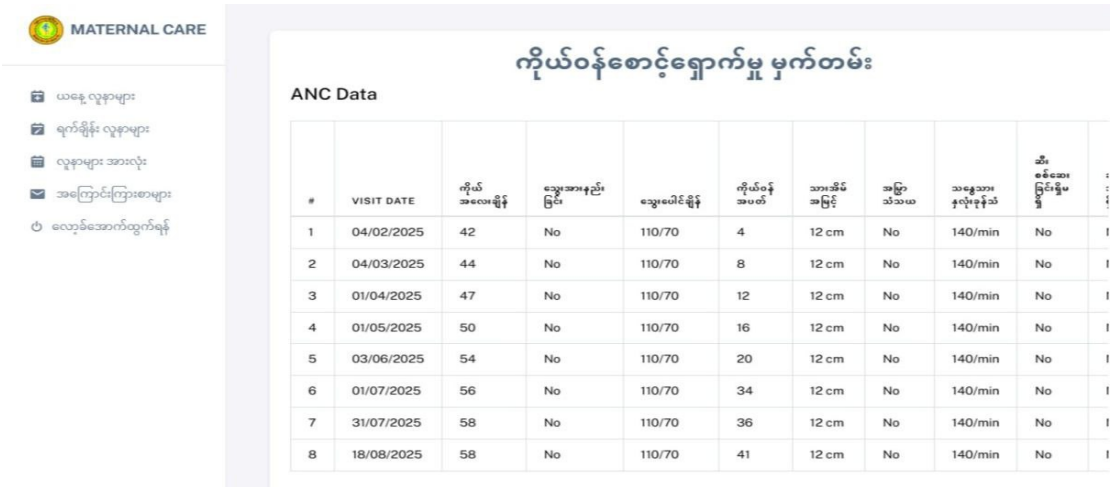

Figure 3: AN (antenatal) Care record for pregnant women

Figure 3 shows a comprehensive document used to track and monitor the health of pregnant women throughout their pregnancy. It includes personal information, medical history, vital signs, laboratory test results, and details of scheduled antenatal visits. The record helps healthcare providers identify potential risks, provide timely interventions, and ensure that women receive proper care during their pregnancy. Maintaining accurate AN care records is essential for improving maternal health outcomes and supporting safe deliveries.

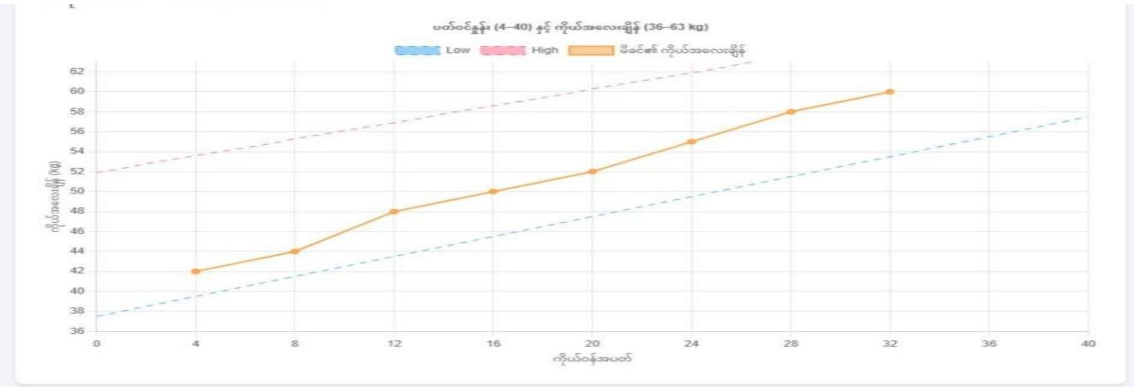

Figure 4: weight chart for pregnant women

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Figure 4 shows a pregnancy weight chart, the weight gain from the time the woman first visited the clinic until the day she gave birth.

CONCLUSION

The maternal care system plays a vital role in ensuring the health and well-being of mothers and their babies throughout pregnancy, childbirth, and the postpartum period. A strong and effective maternal care system requires accessible, affordable, and high-quality services, including skilled healthcare providers, adequate facilities, and ongoing education and support for mothers. Despite advancements in many regions, challenges such as inequality in access, poor infrastructure, and lack of awareness continue to hinder progress. Strengthening maternal care systems through policy reform, investment in healthcare, and community-based support can significantly reduce maternal and infant mortality rates and improve long-term health outcomes for families.

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