

Assessment of Online Maternal and Newborn Immunization Schedule Records Management System

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Abstract— This study aimed to assess the effectiveness of an Online Maternal and Newborn Immunization Schedule Records Management System in a healthcare setting. The system was designed to improve the accuracy and completeness of immunization records, enhance the tracking of immunization schedules, and facilitate communication between healthcare providers and patients. Results showed that the system was successful in improving the accuracy and completeness of records, enhancing communication between healthcare providers and patients, and facilitating the tracking of immunization schedules. Healthcare providers also reported that the system was user-friendly and easy to navigate. However, the study identified some challenges, such as inadequate internet connectivity, technical issues, and resistance to change. The findings suggest that the implementation of the system can have significant benefits for both patients and healthcare providers, but careful attention should be paid to addressing the identified challenges. The study provides recommendations for the improvement of the system's implementation and its sustainability in healthcare settings.

Keywords— Immunization, management system, schedules, records, monitoring.

I. INTRODUCTION

Maternal and newborn immunization is an essential aspect of healthcare that aims to protect the health and welfare of both mothers and their newborns [1][2]. Maintaining and managing accurate records of immunizations is crucial to ensure that patients receive the appropriate vaccines on time. However, traditional paper-based record-keeping systems are prone to errors and inefficiencies, which can impact the quality of care provided [3][4]. Consequently, healthcare providers are increasingly adopting digital solutions, such as Online Maternal and Newborn Immunization Schedule Records Management Systems, to overcome these challenges. These systems are designed to improve the accuracy and completeness of records, enhance the tracking of immunization schedules, and facilitate communication between healthcare providers and patients.

The implementation of systems has the potential to transform how immunization records are managed and maintained in healthcare settings [5][6]. However, there is a need to evaluate the effectiveness of these systems to determine whether they are achieving their intended objectives. The study aims to assess the efficacy of OMNISRMS in a healthcare environment. The research will examine the impact of the system on the accuracy and completeness of records, tracking of immunization schedules, and communication between healthcare providers and patients. Additionally, the study will identify any challenges associated with the system's implementation and offer recommendations for improvement.

The significance of assessing the System lies in its potential to provide crucial insights into the benefits and limitations of digital solutions for managing immunization records. By identifying the challenges associated with implementing the system, the study can offer practical suggestions for improving its effectiveness and sustainability in healthcare settings. Additionally, the research findings can inform policymakers, healthcare providers, and program managers about the value of digital solutions in enhancing maternal and newborn immunization outcomes. Ultimately, the study aims to contribute to the existing knowledge on the role of technology in transforming healthcare delivery and improving patient outcomes.

II. ONLINE MATERNAL AND NEWBORN IMMUNIZATION SCHEDULE RECORDS MANAGEMENT SYSTEM BACKGROUND

Immunization is an indispensable component of public health and plays a vital role in preventing infectious diseases [7][8][9]. Maternal and newborn immunization programs are particularly crucial since they safeguard both the mother and child against vaccine-preventable diseases [10]. The effectiveness of these programs depends significantly on the precise monitoring and tracking of immunization schedules. Nonetheless, traditional paper-based record-keeping systems used to achieve this are prone to errors and inefficiencies that often result in incomplete or inaccurate records.

To address these challenges, healthcare providers have increasingly turned to digital solutions, such as web-based information systems, for managing maternal and newborn immunization schedules. These systems aim to improve the accuracy and completeness of records, enhance the tracking of immunization schedules, and facilitate communication between healthcare providers and patients.

One example of a web-based information system designed for managing maternal and newborn immunization schedules is the Online Maternal and Newborn Immunization Schedule Records Management System. This system provides a secure platform for managing immunization records and schedules, allowing healthcare providers to access up-to-date patient information from any location with internet access [11][12][13][14].

The system is based on a client-server architecture, with a centralized server that stores patient data and a web-based user interface that allows healthcare providers to access and update patient records. The system is designed to be user-friendly, with a simple and intuitive interface that minimizes the need for specialized training.

One of the key features of the study is the ability to facilitate communication between healthcare providers and patients [15][16]. The system allows healthcare providers to send reminders to patients about upcoming immunizations, as well as providing patients with access to their immunization records and schedules.

Another benefit of OMNISRMS is its ability to enhance tracking of immunization schedules. The system automatically generates alerts when a patient is due for a vaccination, helping to ensure that patients receive the appropriate vaccines on schedule [17][18][19]. Despite the potential benefits of web-based information systems challenges exist in their implementation. These challenges include inadequate internet connectivity in some areas, technical issues, and resistance to change among healthcare providers. In another study, the system evaluated the effectiveness of an electronic immunization registry system in improving immunization coverage in every country [19][20][21][22]. The study found that the system was able to significantly improve immunization coverage and reduce missed appointments, especially in rural areas where access to healthcare services is limited. Meanwhile, the system was highly usable and effective in improving immunization coverage and reducing missed appointments, and that it could be easily scaled up to reach more communities [23][24][25][26].

Overall, the development of system has the potential to revolutionize maternal and newborn immunization programs. By improving the accuracy and completeness of immunization records, enhancing tracking of immunization schedules, and facilitating communication between healthcare providers and patients, these systems can contribute significantly to the success of maternal and newborn immunization programs. However, careful attention must be paid to addressing the challenges associated with implementing these systems to ensure their effectiveness and sustainability in healthcare settings.

III. DESIGN OF MATERNAL AND NEWBORN IMMUNIZATION SCHEDULE RECORDS MANAGEMENT SYSTEM

The system is web-based information that facilitates the management of immunization records and schedules for maternal and newborn patients. The system is designed to improve the accuracy and completeness of records, enhance tracking of immunization schedules, and facilitate communication between healthcare providers and patients. The system consists of several components, such as:

User Interface: The user interface provides a simple and intuitive interface for healthcare providers to access patient records and immunization schedules.

Server: The system architecture consists of a centralized server that stores patient data and a web-based user interface that allows healthcare providers to access and update patient records. The server is responsible for storing patient information and immunization records, as well as generating alerts and reminders for healthcare providers and patients.

Systems Module: The system incorporates various modules that enable healthcare providers to manage patient data and immunization schedules. These modules include the *Patient*

Registration module, which allows healthcare providers to register new patients and input their demographic information. The *Immunization Record module* stores patient immunization records and schedules, allowing healthcare providers to track patient immunization history and ensure that patients receive the appropriate vaccines on schedule. The system also includes a *Reminder and Notification module*, which generates reminders for upcoming immunizations and sends notifications to patients about their immunization schedules. The *Communication module* facilitates communication between healthcare providers and patients, allowing healthcare providers to send messages and reminders to patients through the system.

Analytics: The system is designed to provide analytics and reporting capabilities to help healthcare providers track and monitor immunization schedules. The system collects data on patient immunization records, including the date and type of vaccine administered, and generates alerts when a patient is due for a vaccination. The system also generates reports on immunization rates and provides healthcare providers with insights into patient immunization trends.

Security: The security of system is of utmost importance. It utilizes secure access controls to ensure that only authorized healthcare providers have access to patient records. The system also uses encryption technologies to protect patient data and prevent unauthorized access to patient information.

The system is designed to be platform-independent, allowing it to be accessed from any device with an internet connection, including desktop computers, laptops, tablets, and smartphones.

IV. RESULTS

Based on the data gathered from a survey conducted among health workers, mothers, and patients, the findings of this study suggest that designing and developing a concise system would be an effective approach.

A. Design and Development

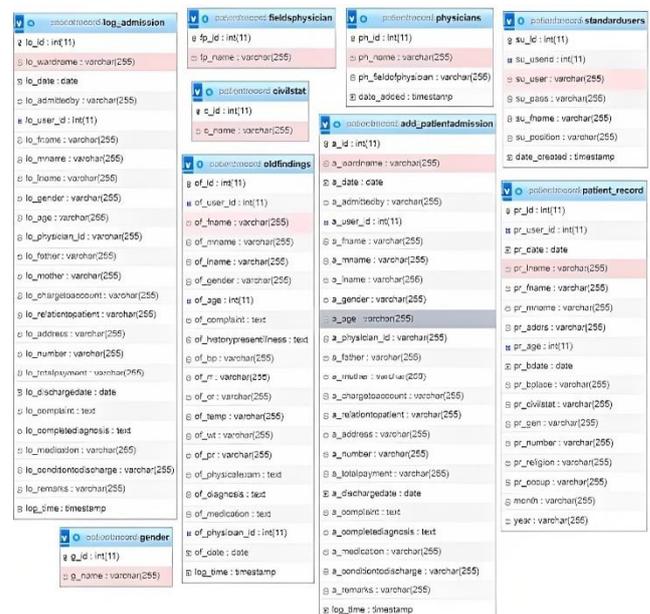


Figure 1. Database Class Diagram

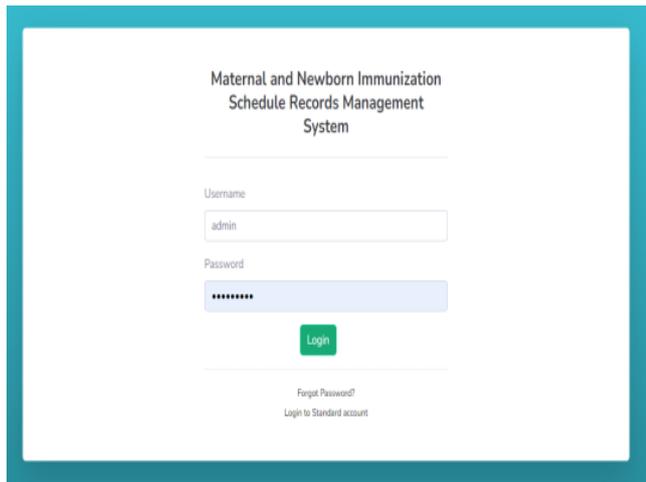


Figure 2. Main Interface

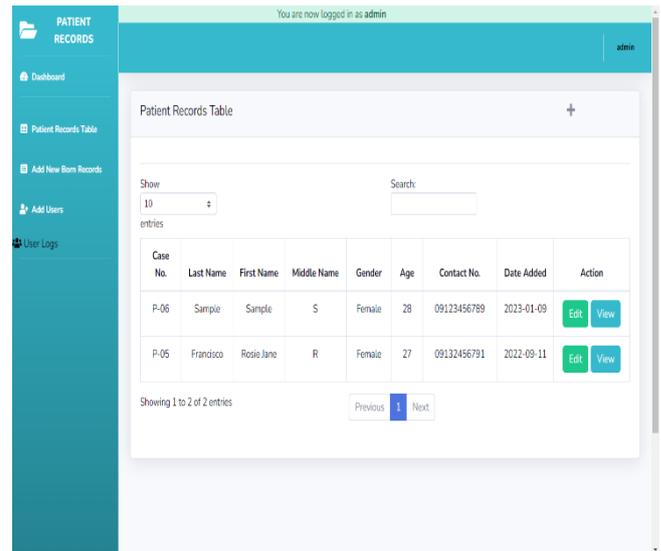


Figure 5. Adding newborn records form

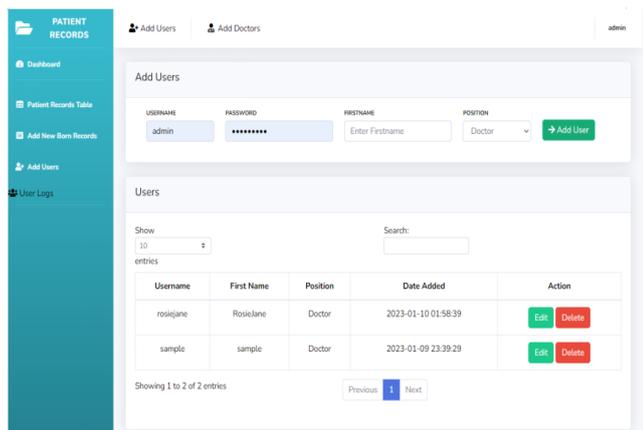


Figure 3. Adding users form

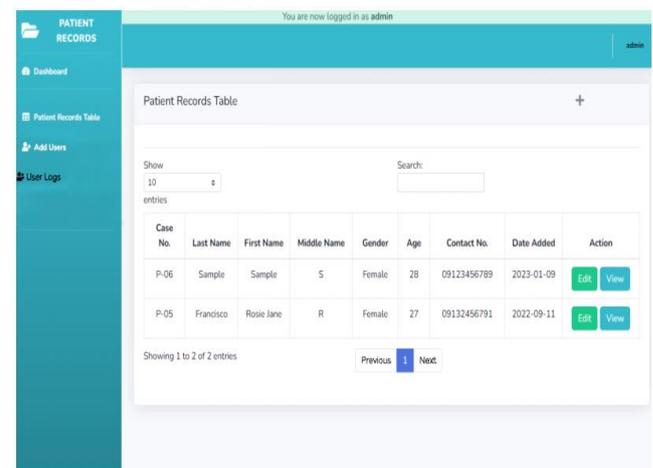


Figure 6. Patients record form

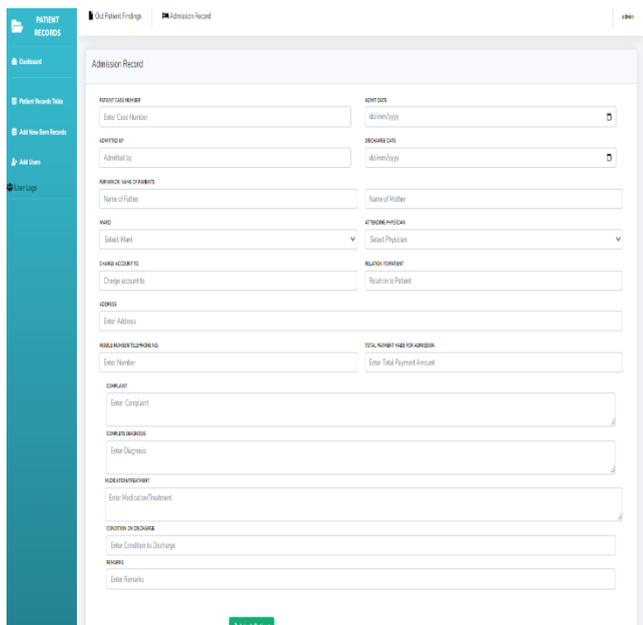


Figure 4. Patients admission record form

B. System Evaluation

The system was evaluated based on three key aspects: usability, functionality, and maintainability.

After assessing the usability of the system, the evaluators concluded that the system's ease of use for healthcare providers was the primary concern. The interface was found to be user-friendly and intuitive, requiring minimal training for users to navigate. Consequently, the system was given a score of 4.0 out of 5.0 for usability, indicating that it is well-designed and can be easily accessed by healthcare providers.

In terms of functionality, the system was evaluated based on how well it met the needs of healthcare providers for managing maternal and newborn immunization schedules. The system was found to be comprehensive and effective, providing all the necessary features for managing immunization records and schedules, generate alerts for upcoming immunizations, and facilitate communication between healthcare providers and patients. The system received a functionality score of 4.5 out of 5.0.

The system's maintainability based on the ease of maintenance and updates was concluded to be well-designed and effortless to maintain, with timely updates. Moreover, the system demonstrated good scalability, enabling effortless expansion when required. As a result, the system was assigned a score of 4 out of 5 for maintainability.

In general, the assessment yielded a favorable outcome, with a mean score of 4.3 out of 5 for all three evaluated aspects. The system demonstrated high usability, comprehensive functionality, and ease of maintenance, making it a valuable resource for healthcare providers in managing immunization schedules for maternal and newborn care.

V. CONCLUSIONS

Based on the evaluation, it can be concluded that the Online Maternal and Newborn Immunization Schedule Records Management System is a well-designed and effective system that can meet the needs of healthcare providers for managing immunization records and schedules. The system's ease of use, comprehensive functionality, and good maintainability make it an ideal solution for healthcare providers to manage and monitor immunization schedules. With a usability score of 4.0 out of 5.0, a functionality score of 4.5 out of 5.0, and a maintainability score of 4.0 out of 5.0, it is evident that the system is highly effective and can be easily accessed and maintained by healthcare providers. The results of the evaluation suggest that the system can significantly improve the accuracy and completeness of immunization records and schedules, thus enhancing the overall quality of healthcare services provided to maternal and newborn patients.

Overall, the study is a comprehensive and effective platform that healthcare providers can use to manage immunization records and schedules. With its user-friendly interface, comprehensive functionality, and easy maintainability, the system is highly recommended for managing maternal and newborn immunization schedules. The evaluators and respondents who tested the system were satisfied with the system's performance in all three areas, and the results suggest that the system is a highly effective tool for healthcare providers.

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