WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

MediCare+ – Smart Healthcare Management System

Sasikala P[#1], Harshini K[#2], Harris Roni D[#3], Harshine R[#4], Haritharan G[#5]

[#1] Assistant Professor, Department of Computer Science and Engineering,Sri Shakthi Institute of Engineering and Technology, India.
[#2] Student, Department of Computer Science and Engineering, Sri Shakthi Institute of Engineering and Technology ,India.
[#3] Student, Department of Computer Science and Engineering, Sri Shakthi Institute of Engineering and Technology ,India.
[#4] Student, Department of Computer Science and Engineering, Sri Shakthi Institute of Engineering and Technology, India.
[#5] Student, Department of Computer Science and Engineering, Sri Shakthi Institute of Engineering and Technology, India.

ABSTRACT :

Healthcare services often rely on manual appointment booking, paper-based records and separate communication channels, making it difficult for patients to find suitable doctors, manage prescriptions and access their medical information. This paper presents MediCare+, a proposed smart healthcare management system that brings patients, doctors and hospitals into one digital platform. Patients can book online or offline appointments, upload reports, view prescriptions, receive medicine reminders, explore general diet guidance and find nearby healthcare facilities. Doctors can manage appointments, review authorized patient histories and create prescriptions. Hospital staff can manage doctors, patients, appointments and billing operations. The system follows a role-based architecture with a frontend, backend and database, with access restrictions for sensitive information. The proposed scope includes hospital and pharmacy billing, medicine ordering and emergency contact information. The system's effectiveness and safety require functional, security and usability testing; no measured results are claimed here. Future extensions may include video consultations, electronic payments, multilingual support and integration with participating healthcare providers.

Keywords: MediCare+, Healthcare Management System, Patient Records, Appointment Booking, Prescription Management, Medicine Reminders, Hospital Billing, Digital Health

I. INTRODUCTION

Healthcare is an essential service, but routine activities can be difficult when appointments, prescriptions, reports and billing are managed through separate systems or paper records. Patients may have trouble finding an appropriate doctor, locating nearby hospitals and pharmacies, remembering medication schedules and maintaining records from different providers. Doctors and hospital staff also need reliable ways to coordinate appointments, patient information, prescriptions and charges.

The problem addressed by MediCare+ is the fragmentation of common healthcare activities. Manual workflows can cause delays, duplicated records, difficulty retrieving medical history and limited visibility of appointment status. Patients may not have a single place to review reports or prescriptions, while providers may spend additional time on administrative tasks.

This paper presents MediCare+ – Smart Healthcare Management System, a proposed web-based platform for organizing patient services and healthcare operations. Its main objectives are:

1) To provide a unified platform for patients, doctors and hospital staff.
2) To support online and offline appointment booking and appointment-status management.
3) To maintain digital prescriptions, medical reports and relevant health history.
4) To connect medication reminders to prescription instructions and schedules, and to help patients find healthcare facilities.
5) To support general diet guidance, emergency contact information, medicine ordering and authorized hospital and pharmacy billing.

The system is organized around three user groups. Patients manage their profiles, appointments, reports, prescriptions and reminders. Doctors review assigned patients and authorized records, manage appointments and create prescriptions. Hospital staff manage doctors, patients, appointment operations and billing according to their permissions. Each role has a separate dashboard, and private medical information must only be accessible to authorized users.

The remainder of the paper is organized as follows. Section II reviews the relevant system context. Section III describes the proposed methodology and architecture. Section IV outlines implementation modules and testing. Section V summarizes the intended advantages. Section VI discusses development status, limitations and evaluation. Sections VII and VIII present the conclusion and future enhancements.

II. LITERATURE SURVEY

Digital healthcare management systems combine patient-facing services with clinical and administrative workflows. MediCare+ focuses on integrating appointment booking, medical records, prescription handling, reminders and hospital operations within one role-based application.

Digital Health Records. Electronic records can help organize patient information, reports, diagnoses and prescriptions in a retrievable format. In MediCare+, patients can access records associated with their account, while doctors and hospital staff can view information only when access is authorized.

Appointment and Provider Management. Appointment systems allow patients to identify doctors, review availability and choose a suitable time. A centralized schedule can also help providers confirm, cancel, reschedule and track completed or missed appointments.

Prescription and Medication Support. A digital prescription can store medicine names, dosage, frequency, duration and instructions entered by a doctor. Linking reminders to prescription items helps ensure that schedules are based on clinician-entered instructions rather than unrelated medicine entries.

Medical Reports and Health History. Uploading laboratory, blood-test, scan and X-ray reports gives patients a convenient way to maintain documents. The system should associate each report with the correct patient and include report type and upload date.

Healthcare Discovery and Emergency Information. Hospital and pharmacy discovery can display names, addresses, contact details and distance where location data is available. Emergency information should be prominent, including India's emergency number 112 and ambulance contact information such as 108 where supported locally.

Role-Based Web Applications. A client–server architecture separates the user interface, backend rules and persistent storage. Access control, server-side validation and secure handling of uploaded documents are important because healthcare records contain private information.

Design Requirements. The proposed system therefore emphasizes a shared platform, clear role-specific dashboards, accurate patient–prescription relationships, secure records, understandable appointment statuses, dependable reminder schedules and transparent limitations for general health guidance.

III. PROPOSED METHODOLOGY

MediCare+ follows a modular application architecture in which users interact with a frontend interface, requests are processed by backend services, and healthcare information is stored in a database. The system provides separate patient, doctor and hospital workflows. Authentication and role-based authorization govern access to profiles, appointments, prescriptions, medical reports and billing records.

System Architecture. The architecture has four logical layers. The presentation layer contains the public website and dashboards. The application layer validates requests and applies healthcare workflow rules. The data layer stores user accounts, patients, doctors, hospitals, appointments, prescriptions, prescription items, reports, reminders, medicines, orders, bills and notifications. External services may provide OTP delivery, maps, location information or notifications when configured.

Workflow. The user opens MediCare+, selects Patient, Doctor or Hospital, and signs in through the appropriate authentication process. Patients can book appointments and access records. Doctors manage consultations and save prescriptions against the correct patient. Hospital staff maintain operational information and billing. Records are shown only to users with the required permissions, and medication reminders are generated from saved prescription schedules.

Patient Management. The patient module maintains profile details, contact information, address, emergency contact and relevant health information. The demonstration patient is named Thamizh. Patients can view upcoming appointments, prescriptions, reports, medical history, reminders and nearby healthcare facilities. The patient dashboard must not contain separate My Bills, Hospital Bills or Pharmacy Bills sections.

Doctor and Hospital Management. Doctor records include specialization, hospital affiliation and availability. Hospital staff can manage registered doctors, appointment slots and patients associated with their hospital. Access to patient history and reports must be limited to authorized clinical or administrative purposes.

Appointment Management. An appointment record associates a patient with a doctor, date, time, appointment type and status. Supported statuses include Booked, Confirmed, Completed, Cancelled, Missed. Online consultations and offline hospital visits use available slots, with cancellation or rescheduling allowed according to configured rules.

Data Model. The proposed database includes Users, Patients, Doctors, Hospitals, Appointments, Prescriptions, Prescription_Items, Medical_Records, Health_Conditions, Medicine_Reminders, Pharmacies, Medicines, Medicine_Orders, Medicine_Order_Items, Hospital_Bills, Pharmacy_Bills and Notifications. Relationships should ensure that each prescription and report is linked to the correct patient and that patients cannot access another patient's private information.

Security and Validation. The application should validate user input on the server, enforce role-based permissions and protect credentials and uploaded medical files. Prescription-only medicines require appropriate authorization. Medical information should not be exposed through public pages, and emergency or diet guidance must not be presented as a substitute for professional medical care.

IV. SYSTEM IMPLEMENTATION

The proposed system is divided into modules that reflect the main responsibilities of patients, doctors and hospital staff.

Development Environment. The project can be implemented as a responsive web application with a frontend, backend API and relational database. The selected technologies should support authentication, data validation, file uploads, notifications and secure database access. The exact stack depends on the final implementation.

User Interface Module. The interface uses a clean, modern and responsive green-and-white design with a simple MediCare+ logo. Navigation provides Home, About Us, role selection, dashboards, appointments, prescriptions, records, reminders, facility search, diet guidance, medicine ordering, emergency information and profile settings.

Patient Dashboard Module. The dashboard welcomes Thamizh and summarizes upcoming appointments, current prescriptions, medication reminders, recent reports and health history. It also provides access to doctor and hospital search, nearby pharmacies, emergency contacts and profile information.

Doctor Dashboard Module. The doctor dashboard displays today's and upcoming appointments, completed, cancelled and missed appointments, the patient list, prescription management and notifications. Missed appointments should use a blue status indicator rather than a green one.

Prescription and Reminder Module. Doctors select the patient and enter medicine name, dosage, frequency, duration and instructions. After saving, the prescription becomes available to the correct patient's account. Reminder schedules are generated from the prescription items and can show upcoming and completed reminders.

Medical Records and Reports. Patients can upload and view blood tests, scan reports, X-rays, laboratory reports and other documents. Each record should store the patient association, report category and upload date. Doctors can review reports only for patients whose records they are authorized to access.

Backend and Database Integration. The backend handles appointment requests, role permissions, prescription creation, reports, reminders, orders and bills. Database relationships maintain consistency between users, patient profiles, doctors, hospitals, appointments and prescription items. Sensitive operations should be checked on the server.

Hospital and Pharmacy Billing. Hospital staff can select a patient, add bill items, enter quantities and prices, apply authorized charges or discounts, calculate totals in Indian rupees, and print or save a bill. Pharmacy billing uses configured medicine prices and quantities and generates a receipt. These billing functions belong in the Hospital dashboard, not the patient dashboard.

Testing Methodology. The following tests are proposed for the completed system. They are test cases to be performed, not claims that all tests have passed.

Open the website: the home page and navigation load correctly.

Sign in with each role: the correct dashboard and permissions are displayed.

Book an appointment: the selected doctor, date, time and status are saved correctly.

Create a prescription: the prescription is associated with the selected patient.

Open patient records: only authorized reports and history are displayed.

Configure a medicine reminder: the schedule follows the saved prescription instructions.

Submit invalid form data: the request is rejected with a useful validation message.

Attempt to access another patient's record: access is denied.

Interrupt network access: the application reports the problem without corrupting saved records.

V. ADVANTAGES

1. Centralized Healthcare Information. A shared platform organizes appointments, prescriptions, reports and relevant health history.
2. Simplified Appointment Booking. Patients can review doctors and available slots and manage permitted booking changes.
3. Better Prescription Access. Saved prescriptions are linked to the correct patient and can be reviewed from the patient account.
4. Medication Reminder Support. Prescription-linked schedules help patients keep track of configured medication times.
5. Improved Record Organization. Uploaded reports and consultation information can be retrieved in a structured way.
6. Role-Specific Workflows. Separate patient, doctor and hospital dashboards organize features according to responsibilities.
7. Healthcare Facility Discovery. Hospital and pharmacy information can help users find contact details and location information when available.
8. Administrative Efficiency. Appointment management, hospital billing and pharmacy billing can reduce repetitive manual work. These are intended benefits and should be validated through testing and user feedback.

VI. RESULTS AND ANALYSIS

This section describes the proposed development status, limitations and evaluation approach. The supplied project scope does not include measured benchmark results or a completed user study, so no quantitative performance claims are made.

A. Development Status. MediCare+ is specified as an integrated healthcare management application. Its intended modules include patient, doctor and hospital dashboards, appointment booking, prescriptions, reports, reminders, facility discovery, diet guidance, medicine ordering and hospital-side billing. A verified implementation inventory and test evidence should be recorded during development.

B. Functional Analysis. Functional testing should verify registration and login, role-specific navigation, appointment status changes, report uploads, prescription creation, reminder scheduling, medicine ordering and billing calculations. Saved information should appear consistently across the screens authorized to access it.

C. Privacy and Record Analysis. Tests should confirm that prescriptions are visible to the correct patient, that doctors can only access authorized patient histories, and that hospital staff see records associated with their permitted hospital. Unauthorized requests must be rejected.

D. Performance Analysis. Response times should be examined for representative actions such as login, doctor search, appointment booking, report retrieval and bill generation. Measurements should be collected under documented conditions rather than assumed.

E. Limitations. (i) OTP delivery depends on the configured authentication provider. (ii) Nearby facility information depends on available location and listing data. (iii) Reminders depend on correct prescription instructions and scheduling. (iv) Cross-hospital history requires authorized sharing. (v) Diet guidance is general information, not diagnosis or treatment. (vi) Billing accuracy depends on configured prices and charges. (vii) Security and usability must be validated against the implemented system.

F. Proposed Evaluation Protocol. Each major component should be evaluated against defined functional, privacy and usability criteria.

Authentication: successful and unsuccessful login attempts behave as expected.

Appointment management: creation, confirmation, cancellation and rescheduling follow permissions.

Prescription management: saved prescriptions are linked to the correct patient.

Medical records: supported file types, upload dates and patient associations are correct.

Reminder scheduling: upcoming and completed reminders match configured prescription schedules.

Billing: quantities, prices, charges, discounts and final totals are calculated correctly.

Access control: authorized and unauthorized access tests confirm that private records remain protected.

Usability: representative users provide feedback on navigation, clarity and accessibility.

G. Discussion. MediCare+ addresses fragmented healthcare administration by combining patient services, clinical workflows and hospital operations in one platform. The quality of the system depends on correct data relationships, clear role permissions, reliable reminders and careful handling of sensitive medical information. Its effectiveness should be assessed through systematic functional, security and usability testing.

VII. CONCLUSION

This paper presented MediCare+ – Smart Healthcare Management System, a proposed platform that brings patients, doctors and hospitals together for appointment booking, prescription management, medical reports, reminders, healthcare discovery and billing operations.

The role-based design aims to make healthcare activities more organized and convenient. Its usefulness depends on secure access controls, accurate patient associations, reliable data and careful communication of the limits of general health guidance. The project should be considered a proposed system until its completed features and performance have been verified through testing.

VIII. FUTURE WORK

Video Consultations. Secure video consultations could allow patients to meet participating doctors remotely where supported.

Electronic Payments. Payment integration could support authorized payments for consultations, hospital services or medicine orders.

Laboratory and Hospital Integration. Participating providers could securely share laboratory results and relevant records with appropriate consent and permissions.

Multilingual and Accessible Interface. Additional languages and accessibility improvements could make the platform easier to use for a wider range of patients.

Appointment Waiting-Time Estimation. Future versions could estimate waiting times using appointment schedules and operational data, subject to validation.

Medicine Stock Management. Pharmacy inventory tracking could help authorized staff manage medicine availability and configured prices.

SMS and Reminder Enhancements. Appointment notifications and medicine reminders could be delivered through configured channels with user consent.

Security and Privacy. Further work should strengthen access-control testing, secure file storage, consent-based sharing, audit logs and appropriate retention of health information.

Automated Testing and Deployment. Automated tests can cover appointments, prescriptions, reports, reminders, orders and billing before deployment. Monitoring, backups and recovery procedures should also be planned.

IX. REFERENCES

[1]. World Health Organization. Digital health overview and resources. https://www.who.int/health-topics/digital-health

[2]. World Health Organization. Global strategy on digital health 2020–2025. https://www.who.int/publications/i/item/9789240020924

[3]. National Health Authority, Government of India. Ayushman Bharat Digital Mission. https://abdm.gov.in/

[4]. Ministry of Health and Family Welfare, Government of India. Health-related programmes and information. https://mohfw.gov.in/

[5]. OWASP Foundation. OWASP Top 10: Web Application Security Risks. https://owasp.org/www-project-top-ten/

[6]. Mozilla. MDN Web Docs: Web technology documentation. https://developer.mozilla.org/

[7]. PostgreSQL Global Development Group. PostgreSQL Documentation. https://www.postgresql.org/docs/

[8]. OpenJS Foundation. Node.js Documentation. https://nodejs.org/docs/latest/api/

[9]. React. React Documentation. https://react.dev/

[10]. World Wide Web Consortium. Web Content Accessibility Guidelines (WCAG). https://www.w3.org/WAI/standards-guidelines/wcag/

[11]. Government of India. Emergency Response Support System (112 India). https://112.gov.in/

[12]. National Health Authority, Government of India. ABDM resources and documentation. https://abdm.gov.in/

[13]. OWASP Foundation. Application Security Verification Standard. https://owasp.org/www-project-application-security-verification-standard/

[14]. Google. Google Maps Platform Documentation. https://developers.google.com/maps/documentation

[15]. Twilio. Programmable messaging documentation (for optional OTP/SMS integration). https://www.twilio.com/docs

[16]. Microsoft. Web application security guidance. https://learn.microsoft.com/

[17]. MediCare+ project scope and requirements supplied by the project authors.