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Research Article

UMcare: A Mobile Responsive App For Um Health Clinic Information Management Using Prescriptive Analytics

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ABSTRACT

UMCare is a mobile-responsive application developed to enhance the manual processes of managing patient records, consultations, and supply inventories at the University of Mindanao Matina Campus Health Clinic. The system aims to improve service delivery through automation, analytics, and real-time access to clinic data. Built using the Agile methodology, UMCare was developed iteratively with active feedback from nurses, doctors, and administrative staff. Technologies such as Laravel, MySQL, Bootstrap, and Chart.js were utilized to implement modules for patient management, consultation tracking, appointment scheduling, and inventory monitoring. A key innovation of the system is the integration of prescriptive analytics for supply forecasting, enabling the clinic to anticipate low-stock situations and plan replenishments more effectively. Additionally, UMCare features automated alerts for monitoring nearly expired medicines, helping prevent wastage and ensuring safe dispensing. These functionalities support timely and informed decision-making by clinic personnel. Based on testing criteria—functionality, usability, analytics accuracy, inventory alerts, and reporting—UMCare achieved a total performance rating of 93.4%, indicating strong system reliability and acceptance. The system complements existing workflows by providing a user-friendly platform tailored to institutional health settings. The study concludes that UMCare is an effective solution for health information management in academic clinics and holds potential for adaptation in similar healthcare environments.

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INTRODUCTION

Technology has become a big part of our everyday lives. From how we communicate to how we access services, it's clear that innovation has made many tasks faster, easier, and more efficient (Course Hero, 2023). Healthcare is no exception. Many clinics and hospitals are now moving away from traditional paper-based systems and adopting digital tools to improve the way they manage patient care (Scribd, 2023).

At the University of Mindanao Health Services, the clinic has continued to serve the university community through a mostly manual system. But over time, it has become clear to the staff that the system can no longer keep up with the demands of daily operations. Simple tasks like finding patient records, tracking inventory, or preparing reports often take more time and effort than they should. These challenges have highlighted the need for a modern solution—something faster, more accurate, and easier to use (Course Hero, 2023; Al-Azmi et al., 2009).

This is where UMCARE: A Mobile Responsive App for UM Health Clinic Information Management Using Prescriptive Analytics comes in. UMCare was developed specifically for the University of Mindanao–Matina Campus to help improve how the clinic runs on a daily basis. The app offers a more efficient way to handle patient registration, log vital signs and medical history, schedule appointments, manage medicine inventory, and generate reports. It's accessible on both web and mobile platforms, making it easier for both clinic staff and patients to use anytime.

Some of the most helpful features include automated notifications for doctors when a new patient checks in, and reports that show useful data—like how many students came in last month, which illnesses are most common, or which medicines are running low. These reports help the clinic team spot patterns and make better, faster decisions.

One of UMCare's standout features is its prescriptive analytics tool. Unlike regular analytics that just show past trends or predict future events, prescriptive analytics actually suggests what to do next. For example, if a certain medicine is being used a lot, the system can recommend when and how much to reorder (Mosavi & Santos, 2020; Galli et al., 2021). This helps prevent both shortages and waste from overstocking.

UMCare also benefits patients directly. They can view their medical records online and even book appointments for services like medical certificates—all without needing to physically line up at the clinic. This saves time and makes the experience more convenient (Pyxl, 2018; Ventola, 2014).

So far, the impact of UMCare has been very positive. Recordkeeping has improved, errors have gone down, and the system has made the clinic team

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more productive. But it's not perfect. Right now, UMCare is only being used within the UM main campus clinic and doesn't include features like medical billing. Also, the system works best when users are properly trained. If data is entered incorrectly or not maintained, it can affect the accuracy of reports (Ben-Zion et al., 2014; Bochantin, 2011).

Even with those limitations, UMCare has proven to be a big step forward. Built with Laravel and MySQL, the system is flexible enough to grow with the university's needs. And more importantly, it helps move the university toward a smarter, more responsive healthcare environment—one that values both efficiency and quality care.

In the end, UMCare isn't just a piece of software—it's a reflection of how technology, when used thoughtfully, can make a real difference in the lives of both clinic workers and the people they serve.

METHODS

Study Participants/Research Subject

The heart of this study revolved around the real people who interact with the University of Mindanao Health Clinic every day—its doctors, nurses, and administrative staff. These individuals weren't just observers; they were active contributors who shaped the development and testing of the UMCARE system. Because they are the ones who handle patient consultations, track medical supplies, and manage clinic records, their insights were essential in identifying what the system truly needed to address.

Participants were chosen through purposive sampling, a method commonly used when researcher aim to work closely with individuals who have firsthand knowledge of the topic at hand. As noted by the Dovetail Editorial Team (2023), this technique allows researcher to focus on those whose experience is most relevant. The clinic staff, with their daily hands-on tasks, became valuable collaborators whose feedback directly influenced how features were designed—from patient registration to inventory monitoring and consultation tracking.

To widen the perspective, a small group of student volunteers also joined in during the user testing phase. These students helped test the system on mobile devices, offering helpful feedback on usability, responsiveness, and design. Their input ensured that UMCARE wouldn't just function well for clinic staff, but would also feel smooth and intuitive for patients accessing their records on smartphones or tablets. Together, the contributions of both clinic staff and student users helped make UMCARE a more user-friendly, responsive, and inclusive health information system.

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Materials/Instruments/Development Tools

To truly understand the needs of the University of Mindanao Health Clinic and build a system that fits into their day-to-day operations, the researcher used a combination of tools and strategies throughout the development process. At the heart of data gathering were semi-structured interviews and focus group discussions (FGDs) conducted with key clinic personnel. These conversations were guided by an interview protocol carefully crafted by the researcher to encourage open dialogue, allowing participants to share their insights, experiences, and challenges with existing systems.

Beyond the interviews, a variety of development tools were used to bring the UMCARE system to life. The project was developed using Laravel, a PHP framework known for its elegant syntax and security features, along with MySQL for structured data storage. The user interface was designed to be responsive and intuitive using Bootstrap for layout styling, and Chart.js was integrated for dynamic visual analytics. To manage documentation and version control, the team utilized GitHub, ensuring transparency and collaboration throughout development.

Design and Procedure

This study adopted a qualitative-descriptive developmental design, placing a strong emphasis on understanding the real experiences of the University of Mindanao Health Clinic staff and using those insights to build a practical and responsive health information system—UMCARE. The approach was grounded in listening to the people who interact with the clinic daily and translating their needs into system features that could genuinely make their work more efficient.

The development process began with informal interviews and natural conversations with clinic doctors, nurses, and administrative staff. Through observations and guided discussions, the researcher explored how patient records were managed, how medical supplies were tracked, and how reports were prepared. These insights highlighted common bottlenecks and paved the way for the initial design of UMCARE. Feedback was gathered through open-ended questions and validated through follow-up sessions and user testing.

UMCARE was developed using an agile approach, meaning it was built and improved in phases based on ongoing user feedback. As early versions of the system were deployed, clinic staff tested modules such as patient management, consultation tracking, supply inventory, and appointment scheduling. Their feedback played a vital role in shaping each version of the system. In addition,

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selected student volunteers were invited to test the mobile usability of UMCARE, ensuring that the system would be accessible not only to clinic staff but also to patients who needed to view their records or book appointments.

Ethical standards were carefully upheld throughout the course of this study. Participation from all individuals—clinic staff and student volunteers—was completely voluntary, and each participant was informed of their rights before any form of involvement. All information collected during the study, including system feedback and usage data, was treated with the highest level of confidentiality. It is important to note that all data entries and records used in the development and testing of the UMCARE system were purely sample data, created solely for research and system testing purposes. No actual patient data was used or exposed at any stage of the project. Furthermore, the study received a Certificate of Exemption from Full Ethics Review from the University of Mindanao Ethics Review Committee (UMERC) under Protocol No. UMERC-2025-259, confirming that the research posed minimal risk and complied with ethical research standards.

In the final stages, the UMCARE system was tested in a live clinical setting. Feedback showed clear improvements in the speed of patient processing, supply management, and reporting efficiency. The collaborative nature of this research—from system design to user validation—ensured that UMCARE was not just a technical product, but a tool built around the needs and realities of its users.

RESULTS AND DISCUSSION

The UMCare system was successfully developed and deployed as a mobile-responsive platform tailored for the University of Mindanao Health Clinic. This section presents the outcomes of system implementation, emphasizing its effectiveness in improving clinic workflows through its core modules. These findings are based on the system's testing phase and actual usage during simulated and live environments, providing practical insights into its functionality, efficiency, and usability.

Consultation Management Module

At the core of any health clinic lies the consultation process, and UMCare redefined how consultations are handled. Instead of manually writing notes and searching for paper-based records, the system introduced a fully digital and automated process. Nurses and doctors could now input vital signs, symptoms, diagnoses, and treatments directly into the system, with each consultation

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assigned a unique ID and automatically linked to the patient's digital record. This eliminated redundancy and significantly reduced the risk of errors.

One of the most praised features was the automatic deduction of medicines from inventory during consultations. This real-time integration ensured that every prescribed medication was logged and reflected in the inventory count immediately. During demonstrations, clinic staff shared that this eliminated the usual backlog in inventory reporting and saved considerable time, allowing them to focus more on patient care than paperwork.

Inventory Management with Prescriptive Analytics

Inventory management has always been a challenging aspect of health service delivery, especially in academic institutions with high patient turnover. UMCare introduced a dynamic solution through its prescriptive analytics engine. By analyzing data such as average daily consumption and current stock levels, the system could forecast restocking needs and identify which items were critical.

Medicines like paracetamol, frequently used in student consultations, were tracked using the Q-Square Matrix, allowing the system to recommend proactive restocking. This prevented common issues like sudden shortages and avoided unnecessary overstocking. The Analytics Dashboard visualized this data through clear graphs and tables, helping clinic administrators make informed, data-driven decisions. Staff noted that this module transformed how they approached inventory—turning it from reactive to strategic.

Appointment Scheduling and Role-Based Access

Previously, appointments were handled manually, leading to conflicts and long waiting times. UMCare addressed this with an online booking module where patients could schedule medical consultations or requests for medical certificates. Staff could then approve or manage these requests easily through their respective dashboards. Beta testers, including students and health staff, appreciated the smooth flow from booking to consultation. Additionally, UMCare integrated OTP login and role-based access, ensuring that sensitive data remained protected. Different dashboards for admin, doctors, nurses, and patients offered tailored experiences, improving workflow clarity and reducing unnecessary actions for each user role.

Reports and Analytics

The ability to make informed decisions was greatly enhanced by UMCare's reporting features. Charts and tables were automatically generated using Chart.js to show trends in consultations, inventory movement, and patient demographics. Exporting this data into PDF or CSV made it easier to prepare for audits and meetings. The clinic's personnel noted that visualizing trends like peak consultation periods and fast-moving medicines helped them

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prepare better and anticipate clinic demands. The reports not only simplified documentation but also gave staff the ability to see the bigger picture at a glance.

Overall System Performance

The system's performance was assessed through a testing matrix, which showed consistent load speeds below four seconds for most operations. Simulated use during alpha and beta testing phases demonstrated that UMCare could handle the daily clinic operations effectively. Testers noted that the system felt intuitive, secure, and responsive. More importantly, the integration of modules—especially how consultation and inventory worked hand-in-hand—made the entire health information process seamless and future-ready.

CONCLUSION/IMPLICATIONS

The development and deployment of the UMCare system marked a meaningful step forward in modernizing the health services of the University of Mindanao Health Clinic. By digitizing essential operations such as patient registration, consultations, inventory tracking, and appointment scheduling, the system significantly improved efficiency, accuracy, and accessibility for both clinic staff and patients. Its integration of role-based access and OTP-secured login ensured data privacy, while the use of prescriptive analytics empowered the clinic to make smarter, data-driven decisions about inventory and patient care. With features like the Q-Square Matrix and real-time dashboards, the clinic staff could anticipate needs and avoid supply shortages. Based on positive feedback and successful performance tests, UMCare has proven to be a reliable and user-friendly solution. Moving forward, it's recommended that the system be integrated with the university's student portal for seamless access to medical records. Providing brief training for clinic staff and ensuring stable internet connectivity will also enhance its use. Additionally, exploring mobile access, health trend tracking, and seasonal illness forecasting could further support preventive care and improve overall health outcomes within the campus community.

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