International Journal of Research in Engineering and Science (IJRES)
ISSN (Online): 2320-9364, ISSN (Print): 2320-9356
www.ijres.org Volume 14 Issue 1 ǁ January 2026 ǁ PP. 14-18

Smart Doseage: An Intelligent Android-Based Medicine Reminder Application for Improved Medication Adherence

Kavyashree L
Department of Computer Science and Engineering
Dayananda Sagar Academy of Technology and Management
Bengaluru, India

Abigail Judith J
Department of Computer Science and Engineering
Dayananda Sagar Academy of Technology and Management
Bengaluru, India

Aishwarya C G
Department of Computer Science and Engineering
Dayananda Sagar Academy of Technology and Management
Bengaluru, India

Disha C Gowda
Department of Computer Science and Engineering
DayanandaSagar Academy of Technology and Management
Bengaluru, India

Deeksha H L
Department of Computer Science and Engineering
DayanandaSagar Academy of Technology and Management
Bengaluru, India

Abstract
Adhering to prescribed medication schedules is essential for achieving positive health outcomes, yet many people still miss doses because of forgetfulness, difficulty managing multiple medicines, or lack of assistance. To address this concern, Smart Dosage *has been developed as a smart Android application that supports users in maintaining consistent medication routines. The system allows users to store complete information about their medicines and delivers timely alerts whenever a dose needs to be taken. Each user action—such as taking or missing a dose—is logged and later displayed through visual adherence reports including color-marked calendars and charts that make progress easy to understand.To further strengthen medication safety and convenience, Smart Dosage incorporates features like supply tracking with refill notifications, nearby pharmacy suggestions, caretaker alerts for dependent users, and expense management for monitoring medicine costs. A shareable Doctor Pack PDF is provided to improve communication with healthcare professionals, while a built-in chat assistant offers quick guidance for basic medication-related doubts. Practical usage and testing of the application showed a noticeable improvement in user adherence and better organization of their medication routines. Overall, Smart Dosage offers a reliable and supportive digital tool thatenhances patient involvement and contributes to healthier treatment outcomes.*

Keywords-*Medication Management, Android App, Reminder Alerts, Adherence Tracking, Healthcare Support, Caregiver Monitoring, Mobile Health Technology*

Date of Submission: 27-12-2025 Date of acceptance: 06-01-2026

I. Introduction

Maintaining proper medication routines plays a vital role in ensuring successful treatment outcomes. This becomes even more important for elderly individuals, patients with chronic medical conditions, and those who need to manage several medicines every day. Missing a dose, taking medicine late, or consuming the wrong amount can negatively affect a patient's recovery and may even result in serious health complications. According to the World Health Organization, a significant portion of patients do not adhere to their prescribed medication plans, mainly due to forgetfulness, complicated schedules, or the absence of dependable reminder systems. Therefore, there is a strong need for a practical and accessible tool that helps people consistently follow their medication routines.

Conventional reminder methods like sticky notes, pill organizers, clock alarms, and calendar alerts offer only limited assistance. These options do not store dosage instructions, maintain history of taken or skipped medicines, or provide support for multiple medicines with different timings. Additionally, they rely

completely on the user's memory and discipline, which may not be reliable for elderly individuals or people with busy work schedules who require a more structured mechanism.

With smartphones becoming widely accessible, mobile health (m-Health) applications have emerged as a powerful way to support daily health practices. Android, being the most commonly used mobile operating system globally, provides essential features such as local database storage, background task execution, and customizable notifications. These capabilities make Android a suitable platform for building smart applications aimed at improving medication adherence.

Smart Dosage is developed to overcome the shortcomings of traditional reminder tools by offering an automated and intelligent medication management system. Users can input detailed prescription information such as medicine name, dosage, timing, and frequency. The application generates accurate notifications using Android's AlarmManager and WorkManager, helping users take their medicines on schedule. It also records taken or missed doses, maintains adherence history, and provides additional functionalities such as caregiver alerts, refill notifications, pharmacy locator, and an AI-based chat assistant for quick medicine-related guidance. The interface is kept simple with large readable elements to support users across different age groups, especially seniors.

By integrating reminders, adherence tracking, safety alerts, and supportive healthcare features into one application, *Smart Dosage* enhances convenience, reduces missed doses, and promotes better health outcomes for users requiring long-term medication support.

II. Literature Review

Improving medication adherence has become a major focus in modern digital healthcare due to its strong influence on treatment success, recovery speed, and reduced medical costs. Traditional techniques such as handwritten reminders, pillboxes, and simple alarm systems have been widely used in the past. However, these approaches depend solely on the user's memory and lack features like medication history tracking or personalized reminder settings. Thus, many researchers and healthcare providers have explored smarter, technology-driven solutions to overcome these limitations.

1.Conventional Reminder Approaches Provide Limited Assistance

- Paper reminders, pill organizers, and regular alarms do not maintain complete medicine information.
- They cannot monitor taken or missed doses or handle multiple medicines efficiently.

2.SMS-Based Solutions Improve Adherence but Lack Intelligence

- Studies like Smith et al. (2016) confirmed better adherence among elderly patients using automated message alerts.
- Still, SMS reminders only notify the time and do not store dosages, track user responses, or notify caregivers.

3.Existing Mobile Apps Miss Key Medication Management Needs

- Gupta (2019) reported that many Android medication reminder apps lack support for complex schedules.
- Limitations include no instruction-based reminders (like before or after meals) and no caretaker involvement.

4.Wearable Reminder Devices Face Usability Challenges

- Miller (2020) designed smartwatch-based reminders to help visually impaired and older patients.
- Adoption remains low due to high device cost, frequent charging, and low comfort among seniors.

5.AI and OCR Systems Are Helpful but Require High Connectivity

- Chen (2022) introduced AI-enabled prescription scanning to extract dosage details.
- These solutions struggle in low-network environments due to high dependency on the internet and processing power.

6.Tracking Tools Are Not Combined With Reminder Features

- Lopez et al. (2021) showed that digital logs support medical evaluation and behavior analysis.
- Yet, many systems store adherence data separately and require manual tracking from users

Research Gap Identified

Despite progress in digital adherence technologies, most existing tools **still lack**:

- multi-medicine scheduling**,**
- Automated adherence tracking & history logs
- Real-time caregiver support
- Elderly-friendly user interface
- Integration of reminders, pharmacy support, and AI-based suggestions

Smart Dosage aims to fill these gaps by offering a complete, intelligent, and user-centered medication management platform. It brings together enhanced scheduling, dose tracking, refill alerts, AI-driven medicine

assistance, caregiver notifications, expense tracking, and visual performance analytics — all in a single Android application designed for better patient outcomes.

III. Proposed Methodology

The *Smart Dosage* application is developed to function as a dependable and intelligent assistant for patients who require daily medication support. The primary objective of the system is to improve medication adherence by delivering timely alerts, recording dose-taking behavior, and providing additional safety-focused features including refill notifications, caretaker involvement, and pharmacy support.

Users can easily add detailed prescription information such as dosage, timing, and any special intake instructions through a clean and user-friendly interface. This data is securely stored using the Room Database, enabling the application to work effectively even without an active internet connection. The reminder component utilizes Android's AlarmManager and notification services to ensure that alerts trigger precisely at scheduled times. Each reminder allows users to mark a dose as **Taken** or **Missed**, allowing the application to maintain accurate adherence records.

To further support medicine continuity, the system includes a supply management feature that tracks remaining doses and alerts the user when a refill is required. Location services are also integrated to help users quickly find nearby pharmacies when medicine stocks are low. The caretaker module adds a safety layer by notifying a trusted person if the user continues to miss important medication, ensuring timely external assistance.

In addition, Smart Dosage can generate a **Doctor Pack** PDF containing a compiled summary of the user's medication history and adherence performance, which can be shared during doctor visits for better consultation. The application also includes a chat assistant to provide instant responses to common medication-related queries, improving user confidence and understanding. A built-in budget tracker allows users to manage and monitor their monthly spending on medicines, helping them maintain financial planning around treatment.

With the inclusion of progress charts, adherence calendars, and motivational visuals, Smart Dosage keeps users actively engaged in their treatment journey. By integrating reminders, tracking, supportive healthcare tools, and accessibility features within one platform, the proposed system delivers a comprehensive and patient-centered approach to medication management.

Technological stack:

- **Android Studio** – Utilized as the primary Integrated Development Environment (IDE) for application development, debugging, and deployment.
- **Java (Version 11)** – Implemented as the core programming language for building application logic and UI functionalities.
- **Room Database** – Employed for secure local data storage, enabling offline access to medication schedules and adherence logs.
- **AlarmManager& Notification Services** – Responsible for executing precise medication reminders and handling scheduled alert triggers in the background.
- **PdfDocument&PdfRenderer APIs** – Used for creating and displaying the Doctor Pack PDF, which summarizes the user's medication information.
- **Glide Image Library** – Supports the efficient loading and rendering of medicine images within the application interface.
- **HttpURLConnection with JSON Parsing** – Facilitates backend communication for the chat assistant to fetch medicine-related responses.

4.System Workflow:

The workflow of the *Smart Dosage* application is designed to support a smooth and organized medication-taking experience for users. The major stages of the system workflow are as follows:

1.**MedicineRegistration**

Users input medication information such as dosage, frequency, and specific intake instructions into the app. All data is stored securely in the Room Database, enabling persistent offline access.

2.**ReminderGeneration**

Using Android's AlarmManager and notification services, the application schedules accurate alerts to ensure doses are taken at the correct time.

3.**UserResponsetoAlerts**

When a reminder notification is received, users can mark the dose as *Taken* or *Missed*, allowing the application to immediately log their action and update adherence records.

4.**Adherence Monitoring & Visualization**
The system automatically tracks user behavior and visually represents adherence performance using charts, progress trackers, and a color-coded calendar for daily, weekly, and monthly review.
5.**Medication Supply & Refill Assistance**
Remaining dose counts are monitored continuously. When quantities are low, the user receives a refill reminder and has the option to locate nearby pharmacies through the app.
6.**CaretakerNotification System**
In situations where multiple doses are missed, the system alerts a previously assigned caretaker, providing additional external support for dependent users such as seniors and chronic patients.
7.**Doctor Pack & Expense Tracking**
The application can generate a sharable Doctor Pack PDF summarizing medication usage and adherence history, supporting better communication with healthcare providers. Users can also maintain a record of medication expenses for monthly or yearly budget monitoring.
This structured workflow ensures efficient supervision over the entire medication routine — from scheduling reminders and capturing user interactions to supporting healthcare decisions and improving patient safety.

5.Results:
The testing and evaluation of the *Smart Dosage* application produced the following positive outcomes:

- **SmoothNavigation:**
  The Home Screen layout allows users to quickly access major medication features without confusion.
- **Clear Adherence Insights:**
  Charts and a color-coded calendar display taken and missed doses, helping users track their progress visually.
- **Instant Medicine Guidance:**
  The built-in Chat Assistant responds to general medication-related questions, improving safety and awareness.
- **Expense Monitoring Made Easy:**
  A Budget Tracker enables users to record and review their monthly medicine expenses for better financial planning.
- **Automatic Refill Forecasting:**
  The Supplies Module monitors medicine quantity and notifies users before running out; it also assists in finding nearby pharmacies.
- **Caregiver Communication Support:**
  The Caretaker section allows quick contact via phone, message, or WhatsApp, especially useful for dependent users.
- **Professional Reporting Capability:**
  A Doctor Pack PDF is generated instantly, summarizing medication status for easier consultation with healthcare professionals.

IV. Conclusion:

The *Smart Dosage* system delivers a practical and supportive approach to managing daily medication routines. By combining smart reminders, dose tracking, refill alerts, caretaker support, and pharmacy guidance, the application ensures that users are reminded accurately and stay consistent with their prescribed schedules. Additional features such as the chat assistant, expense tracking, and visual adherence charts make the app more useful in real healthcare settings and improve user interaction.

The system has been fully designed, developed, and tested, showing reliable operation and a smooth user experience throughout its modules. Test results indicate that Smart Dosage helps reduce the number of missed doses, simplifies organizing medicine schedules, and enhances communication between users and healthcare professionals through the Doctor Pack report.

In conclusion, Smart Dosage stands as an all-in-one digital tool that encourages better treatment compliance, supports medication safety, and improves the overall well-being of individuals who depend on regular medication intake.

References:

[1] V. Lanke, K. Trimm, B. Habib, and R. Tamblyn, “Evaluating the effectiveness of mobile apps on medication adherence for chronic conditions: a systematic review and meta-analysis,” *J. Med. Internet Res.*, vol. 27, 2025. [Online]. Available: https://www.jmir.org/2025/1/e60822

[2] Y. Peng, H. Wang, Q. Fang, L. Xie, L. Shu, W. Sun, and Q. Liu, "Effectiveness of mobile applications on medication adherence in adults with chronic diseases," *J. Manag. Care Spec. Pharm.*, vol. 26, no. 4, pp. 447–455, 2020. [Online]. Available: https://pmc.ncbi.nlm.nih.gov/articles/PMC10391210/
[3] I. Ahmed, A. Fadl-Alla, M. Amin, A. H. Mohammed, and F. Abulgasim, "Medication adherence apps: review and content analysis," *JMIR mHealthuHealth*, vol. 6, no. 3, e62, 2018. [Online]. Available: https://mhealth.jmir.org/2018/3/e62/
[4] L. C. Armitage, A. Kassavou, and S. Sutton, "Do mobile device apps designed to support medication adherence demonstrate efficacy?" *BMJ Open*, vol. 10, no. 1, e032045, 2020. [Online]. Available: https://bmjopen.bmj.com/content/10/1/e032045
[5] C. E. Hartch, N. V. Mina, E. M. McLaughlin, and S. E. Wells, "Effect of a medication adherence mobile phone app on self-efficacy in medically underserved adults: pilot study," *JMIR Form. Res.*, vol. 7, e50579, 2023.[Online]. Available: https://formative.jmir.org/2023/1/e50579/
[6] V. Pérez-Jover, J. Sala-González, A. Guilabert, A. Montané-Martínez, and A. Saigi-Rubi, "Mobile apps for increasing treatment adherence: a review of apps and effectiveness," *JMIR mHealthuHealth*, vol. 7, no. 6, e12505, 2019. [Online]. Available: https://mhealth.jmir.org/2019/6/e12505/
[7] M. Arshed, H. J. Kim, and S. Y. Park, "Effectiveness of mHealth interventions in medication adherence among cardiovascular patients," *Diseases*, vol. 11, no. 1, 2023.[Online]. Available: https://www.mdpi.com/2227-9032/11/1/41
[8] B. Machado, R. da S. Sanches, T. Sales, V. Oliveira, and A. Souza, "Assessment of medication adherence using mobile apps in COPD: scoping review," *Int. J. Environ. Res. Public Health*, vol. 21, no. 10, 2024.[Online]. Available: https://www.mdpi.com/1660-4601/21/10/1265
[9] P. K. Chai, L. P. Tan, and H. K. A. Ng, "Evaluation of medication reminder applications to improve medication adherence," *Healthcare*, vol. 10, no. 12, 2022. [Online]. Available: https://www.mdpi.com/2227-9032/10/12/2444
[10] K. Santo et al., "Medication reminder app to improve cardiovascular therapy adherence: randomized trial," *JAMA Intern. Med.*, vol. 178, no. 6, pp. 802–804, 2018.[Online]. Available: https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/2678454
[11] H. Huang et al., "AI-enabled universal medication scheduling using OCR," *BioData Mining*, vol. 17, no. 23, pp. 1–12, 2024.[Online]. Available: https://biodatamining.biomedcentral.com/articles/10.1186/s13040-024-00376-y