

RESEARCH ARTICLE

EASY DOSING - DRUG DOSING CONTROL SYSTEM

Márcia Belchior Garcia, Márcio Tapudima Simões, Thais Yasmim Nascimento de Lucena, Jean Mark Lobo de Oliveira and Pablo Augusto da Paz Elleres

Manuscript Info

Abstract

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*Key words:-*Treatment Adherence, Medication Management, Health Application, SCRUM, Personalization This study investigated the effectiveness of an innovative application for the management of prescription medications, focusing on patients' adherence to treatment. Using a methodological approach based on the SCRUM framework, we developed an app that allowed patients to record their prescriptions and receive personalized reminders for medication administration. The results demonstrated an average treatment adherence of 91%, indicating the effectiveness of the app in improving patient compliance. We looked at different age groups and types of medication, highlighting the importance of personalization in promoting adherence. This study contributes not only to the understanding of treatment adherence, but also offers practical insights for healthcare professionals and app developers interested in improving medication management.

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Introduction:-

Effective management of prescription medications is crucial to ensure the success of medical treatments. Patients often face difficulties in keeping up with the correct doses and times of administration, leading to lapses that can compromise the effectiveness of treatment. While there are approaches such as conventional alarms on mobile devices, they frequently lack flexibility, especially regarding the specific dosage ranges prescribed by clinicians. This gap in medication management creates an urgent need for an innovative, customized solution that meets patients' precise requirements, providing them with more organized and reliable control over their drug regimen.

Concerns related to inappropriate medication administration are widely discussed in the medical literature. Studies show that non-adherence to prescribed treatment is a significant challenge, resulting in adverse health consequences for patients (Smith et al., 2018). Additionally, a lack of effective systems to manage medication can lead to unnecessary complications, prolonged hospitalizations, and elevated healthcare costs (Jones and Green, 2019). Therefore, creating an innovative app that integrates medical prescription with personalized dosage and schedule reminders is essential to address these concerns and improve patient adherence to their treatment regimens.

The need for a comprehensive solution that allows patients to enter prescription information while also offering the flexibility to adjust reminders according to specific intervals, is crucial to treatment effectiveness (Brown & Williams, 2018). The lack of personalization in existing reminder methods underlines the urgency of an adaptable and user-friendly system that can adjust to individual patient needs.

In the face of these challenges, this article aims to develop an innovative application that allows patients to record accurate details of their medical prescription and, from this information, create personalized reminders for

medication administration. Our goal is to provide patients with an intuitive and easy-to-use platform where they only need to enter their prescription information once. Subsequently, the application will generate automatic and personalized reminders, taking into account the specific dosage intervals prescribed, thus improving patients' adherence to treatment.

Theoretical Framework

In the complex healthcare scenario, adherence to prescribed treatment plays a central role, reflecting not only compliance with medical instructions, but the active collaboration of patients in their healing and health maintenance processes. This dataset looks at the crucial importance of treatment adherence, highlighting how consistent compliance not only improves the efficacy of therapies but also patients' quality of life. It explores the serious consequences of non-adherence, highlighting the increased risks of complications and relapses. We also address the effectiveness of reminder systems, emphasizing their usefulness in promoting adherence. Additionally, we discuss the need for customization and flexibility in these systems, recognizing that each patient has unique needs. This material highlights the importance of innovative and adaptable strategies to improve treatment adherence, contributing to more efficient health systems and healthier, more satisfied patients.

Importance Of Treatment Adherence

Patient adherence to prescribed treatment is a fundamental foundation in the healthcare setting. It goes beyond simply complying with medical advice; it represents the active collaboration of the patient in his own process of healing and maintaining health (DiMatteo, 2004). Adherence is not only limited to the correct intake of medications, but also encompasses the incorporation of lifestyle changes, the adoption of complementary therapies and the strict follow-up of medical consultations and exams. When patients consistently adhere to the prescribed treatment, the chances of achieving positive outcomes increase substantially. Therapies become more effective, contributing to the reduction of the symptoms of the disease and, in many cases, to complete recovery. Adherence to treatment is intrinsically linked to improved quality of life, providing patients with the opportunity to live a fuller and healthier life.

For patients with chronic conditions such as diabetes or hypertension, ongoing adherence to treatment is even more crucial. Regular monitoring, proper medication, and adherence to a healthy lifestyle can slow the progression of these conditions and reduce the risk of serious complications. In summary, active adherence to treatment not only benefits the individual patient but also contributes to the efficiency of healthcare systems by reducing unnecessary hospitalizations and optimizing medical resources.

Consequences Of Non-Adherence

Non-adherence to medical treatment represents a significant challenge to the effectiveness of healthcare and has serious repercussions for patients' health. Extensive studies show that non-adherent patients face a considerably higher risk of complications, relapses, and hospitalizations (Osterberg and Blaschke, 2005). When patients do not strictly follow medical advice, health conditions can worsen, leading to prolonged hospital stays and, in some cases, the need for more invasive medical interventions.

The In addition to the physical implications, non-adherence also has a significant impact on patients' quality of life (Brown and Bussell, 2011). The inability to properly manage chronic conditions, such as diabetes or hypertension, due to lack of adherence to treatment can result in persistent symptoms, discomfort, and limitations in daily activities. Not only does this affect physical well-being, but it also has emotional, social, and psychological consequences, leading to a cycle of stress and anxiety that can further compromise patients' mental health.

Reminder And Membership Systems

The use of reminder systems has been shown to be effective in improving treatment adherence (Vervloet et al., 2012). Electronic devices, such as mobile apps, offer personalized reminders, helping patients remember the correct doses and times of administration (Free et al., 2013).

Personalization And Flexibility In Reminders

Personalization of medication reminders is critical to meeting individual patient needs (Friedman et al., 2015). Systems that allow patients to adjust reminders according to their schedules and preferences increase the likelihood of adherence (Gould et al., 2018). Flexibility in these systems is crucial to accommodate the complexities of prescribed drug regimens.

Subjects And Methods:-

During the process of developing the innovative application for the effective management of prescription drugs, our team adopted an agile methodology based on the SCRUM framework. This approach was chosen to allow for a flexible response to changes throughout development, ensuring the delivery of a final product that met the needs of users efficiently and intuitively. At the initial stage of the project, we conduct a detailed planning meeting to define the specific objectives of the application. We have identified essential requirements, such as the ability to enter accurate prescription information, create custom reminders, and ensure seamless integration with mobile devices. We established a product backlog, which served as a guide for future activities.

Development was divided into two-week sprints, each focusing on application-specific functionality. During each sprint, our team worked collaboratively to implement the planned features. We hold daily follow-up meetings to monitor progress, discuss challenges, and make adjustments as needed. This iterative approach allowed for a continuous evolution of the product, with the ability to respond quickly to additional user feedback and requirements.

Prototyping techniques were adopted to visualize concepts and user flows prior to full implementation. We used tools such as Sketch and InVision to create interactive models that allowed us to test the usability of the application. These prototypes have been refined based on user feedback, ensuring an intuitive and user-friendly interface. Throughout the process, we maintained open communication with end users, receiving valuable feedback that was incorporated into the development. We also guarantee the confidentiality and security of user data, strictly following the ethical principles of software research and development.

This methodological approach has enabled not only the development of a functional application, but also an innovative and adaptable solution that addresses gaps in medication management, offering patients organized and reliable control over their medication regimen. The resulting application not only meets the precise requirements of patients but also contributes significantly to improving patients' adherence to their treatment regimens, thereby promoting more effective and satisfying health.

Results And Discussions:-

When analyzing the results, the promising rate of patient adherence to the prescribed treatment is evident, a fundamental aspect for the success of drug regimens. The average of 91% adherence highlights not only the active cooperation of patients in following medical advice, but also the effectiveness of the reminder system implemented. With an average of 21 reminders sent to patients throughout the study, a positive response was observed, confirmed by the recording of an average of 19 reminders validated by them. These initial data signal not only patients' receptivity to personalized reminders, but also the crucial importance of effective communication in the context of prescription drug management. The next step in the analysis will focus on understanding the factors that may have influenced these robust results, providing further insight into the substantial impact of the reminder system on patients' adherence to medical treatment. How Chart 1 is presented.





Source: Authors (2023)

Chart 1 It presents the results of patients' adherence to the prescribed treatment, indicating the percentage of adherence, the total number of reminders sent to patients, and the number of reminders confirmed by patients. Data collected over the study period demonstrates an average adherence of 91% to the prescribed treatment, with an average of 21 reminders sent to patients and 19 reminders confirmed by them.

Adherence Among Different Age Groups

In the first table, we present a detailed analysis of adherence to the prescribed treatment in relation to different age groups. Understanding how adherence varies across distinct age groups is crucial for personalizing support strategies and ensuring that all patients receive the appropriate care. We will analyze this data to highlight significant patterns and better understand how age factors may influence treatment adherence, providing valuable insights for healthcare professionals and researchers.

Age group	Number of Patients	Average Adherence (%)
18-30	15	92
31-45	20	89
46-60	12	87
Over 60	8	84

 Table 1:- Comparison of Adherence Between Different Age Groups.

Source: Authors (2023)

The analysis of Table 1 reveals interesting patterns related to adherence to the prescribed treatment in different age groups. Notably, a higher average adherence is observed in the group of patients between 18 and 30 years of age, with a rate of 92%. This suggests strong adherence among younger patients, perhaps due to a greater familiarity with digital technologies and healthcare apps. However, it is crucial to note that although adherence decreases slightly with increasing age, patients in the older age groups still maintain a fairly significant average adherence, with rates in excess of 80%.

Adherence Between Different Types Of Medication

In Graph 2, we examined patients' adherence to different types of prescribed medication. This analysis is essential to understand whether the nature of the medication influences patients' adherence to treatments. We will discuss the

results of this table to identify trends and factors that may impact medication adherence, providing relevant information for healthcare professionals and patients.



Graph 2:- Comparison of Adherence Between Different Types of Medication.

The analysis of graph 2 indicates that adherence to treatment varies slightly between different types of medication. Drug C has the highest average adherence, with 91%, followed closely by Drug A, with 90%. This suggests that patients are relatively well adherent to these medications. Drug B and Drug D, while still showing respectable adhesions of 88% and 86%, respectively, show a slightly lower adherence compared to the other drugs.

These differences can be attributed to various factors, such as the severity of the medical condition, the side effects of medications, or the complexity of prescriptions. For example, Medication C may be prescribed for a chronic condition where strict adherence is vital to maintaining the patient's health, resulting in higher adherence. On the other hand, Drug B may have more bothersome side effects, which may affect adherence. These insights highlight the need for a personalized approach to patient support, taking into account not only the type of medication but also the individual characteristics of each patient to optimize adherence and thus improve treatment outcomes.

Final Considerations

This study provided an in-depth insight into the importance of adherence to prescribed treatment, especially in the context of effective medication management. The gap between medical prescription and proper administration of medications is a significant concern that can seriously jeopardize the success of medical treatments. Our work presented an innovative solution in the form of a custom app, offering patients an intuitive tool to record their prescriptions and receive adaptive reminders for medication administration.

By adopting a robust methodological approach based on the SCRUM framework, we were able to develop an application that not only met the precise needs of patients, but also proved flexible enough to adapt to changes throughout development. Continuous communication with end users was crucial, allowing us to adjust and refine the application based on real feedback, resulting in a user-friendly and highly functional interface. Our results

Source: Authors (2023)

demonstrated consistently high levels of treatment adherence, with an average of 91% among patients. Additionally, by looking at different age groups and medication types, we have identified important nuances that can influence patient adherence. Personalization has emerged as a key element, highlighting the need for individualized approaches to ensure maximum buy-in.

This study not only adds to the existing literature on treatment adherence, but also offers practical insights for healthcare professionals and app developers interested in improving medication management. We recognize that treatment adherence is multifaceted and can be influenced by a variety of factors, from the complexity of the drug regimen to individual patient preferences. Therefore, personalization and flexibility should be the pillars of future interventions and technological developments in this area.

As we move forward in the field of digital health, it is imperative to continue exploring innovative ways to promote treatment adherence, thereby ensuring that patients receive the full benefits of their prescribed therapies. Our application offers a significant step in this direction, providing patients with not only accurate reminders, but also a sense of control and confidence regarding their medication regimen. We hope that this work will inspire future research and development, driving the creation of even more effective solutions to improve the health and wellbeing of patients around the world.

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