

# Effective Strategies for Enhancing Medication Adherence and Compliance to Improve Patient Outcomes

Adinarayana Andy, Pharmacy Manager  
Weatherwax Family Pharmacies Inc  
Spring Arbor, Michigan, USA  
email: adi.ramesh@gmail.com

## Abstract

In order to improve patient outcomes, it examines practical methods for boosting drug adherence and compliance. Medication adherence is critical to attaining intended treatment outcomes and is impacted by a number of variables, such as the nature of the medical illness, patient-related features, therapy-related complications, and the dynamics of the healthcare system. The World Health Organization highlights the significance of adherence programs in the field of public health, positing that enhanced adherence may yield greater benefits than improvements in specific medical treatments.

This review addresses the obstacles to adherence. It promotes a patient-centered care strategy that strengthens the bond between doctors and patients and invites them to actively participate in their care decisions. And also emphasizes the potential for improved medication adherence to result in better health outcomes and lower healthcare costs by putting in place customized training tools, enhancing communication tactics, and addressing systemic healthcare challenges. In the end, a multimodal strategy is necessary to get over obstacles and encourage adherence, which will enhance public health in general.

## Key words

Medication Adherence , Patient –Centered Care, Healthcare Communication, Barriers to compliance, Health Outcomes, Health Literacy, Chronic Conditions

## Introduction

Medication Adherence is essential for providing patients with quality care and attaining desired therapeutic results. The WHO reported in 2003 that improving the effectiveness of adherence initiatives has the potential to considerably enhance public health—possibly even more so than improvements in individual medical treatments [1].

The WHO defines *adherence* as “the extent to which the persons’ behavior (including medication-taking) corresponds with agreed recommendations from a healthcare provider [1],[2].

Ensuring proper adherence not only improves individual patient outcomes but also reduces the overall burden on healthcare systems by preventing complications and hospital readmissions. Despite its importance, non-adherence remains a widespread issue, with factors such as forgetfulness, misunderstanding of instructions, and complex medication regimens contributing to the problem. Healthcare providers play a vital role in identifying barriers to adherence and working with patients to overcome them through education and support. Incorporating patient-centered approaches and fostering strong physician-patient relationships are key strategies in promoting adherence. By prioritizing medication adherence, healthcare teams can drive more effective treatment outcomes and enhance overall public health [3].

## **Factors effecting Medication Adherence**

A patient's ability and willingness to follow recommended therapies are influenced by a number of factors, which can be broadly divided into four primary areas: factors related to the patient, the therapy, the healthcare system, and the conditions [1], [4], [5].

### **1. Patient-Related Factors**

These elements center on the unique traits and situations of the patient, impacting their disposition and capacity to adhere to recommended treatment regimens [1].

- **Health literacy, beliefs, and attitudes toward medication:** People with low health literacy levels could find it difficult to understand the significance of their prescription regimen. Adherence can also be badly impacted by personal ideas about medications, such as a suspicion of their efficacy or a fear of becoming dependent on them [4].
- **Socioeconomic status and psychological factors:** Lack of education, Limited access and financial constraints can affect a patient's ability to purchase and take proper drugs for adherence [4], [1].

### **2. Therapy-Related Factors**

The way patients follow their recommended regimen might also be influenced by the features of the treatment itself.

- **Complexity of medication regimens:** Complicated treatment regimens, particularly those involving many medications or doses at different times, can be difficult for patients to follow. Simple routines have a higher chance of being adhered to regularly [3], [4].
- **Side effects and duration of treatment:** Medication side effects might discourage patients from following their prescribed course of treatment, especially if they become unpleasant. Patients may experience difficulties adhering to treatment regimens that call for long-term or lifetime adherence because they eventually become fatigued or lose desire.

### **3. Healthcare System-Related Factors**

The available arrangements with the health system can also be an important factor in following medication pattern.

- **Accessibility to healthcare and physician-patient communication:** Easy access to common healthcare services can have a higher impact with effective communication with the patients this allows the patients to follow the medication given and they could feel supported on the treatment procedure.
- **Quality of the healthcare system and follow-up mechanisms:** A well-functioning healthcare system that ensures consistent follow-ups and monitoring of patients can significantly improve adherence. Lack of routine checks or poor patient engagement can lead to lapses in medication routines.

### **4. Condition-Related Factors**

The nature of the patient's condition influences adherence, as different diseases require different approaches to treatment.

- **Nature and severity of the disease:** Individuals who are suffering from serious or potentially fatal illnesses could feel additional pressure to follow their prescription schedule. On the other hand, if their symptoms don't significantly interfere with everyday living, people with milder diseases might not completely understand the need of careful adherence.
- **Chronic vs. acute conditions:** It can be challenging to maintain long-term, frequently lifetime adherence to medicines for chronic illnesses like diabetes or hypertension. Acute conditions, on the other hand, might require shorter treatment periods, which would encourage higher adherence because of the lesser time commitment [4].

### Effective strategies to enhance medication adherence

Medication adherence largely falls within the patient's responsibility. Given that patients often remember only about 50% of what is discussed during a typical medical consultation, effective education should be tailored to the individual and provided through various methods and settings beyond the doctor's office. A crucial element in enhancing adherence is patient education which is clearly depicted in Table no 1.

Category	Subcategory	Description	Link
Patient-Related Factors	Knowledge on well being	Videos demonstrating the teach-back method to enhance understanding	acpfoundation.org
		Encourages patients to ask vital questions using the Ask Me 3™ tool	npsf.org/askme3
		Educational videos that explain medical topics in a clear, visual format	medlineplus.gov
		Podcasts providing healthcare information in an easy-to-understand audio format	healthcare411.ahrq.gov
		A toolkit offering strategies to address health literacy challenges in patients	ahrq.gov/qual/literacy
		A tool for patients to organize their medication details for safe and effective use	safemedication.com
	Intellectual Health	Informative videos from the National Institutes of Mental Health (NIMH)	nimh.nih.gov
		Access to support via the National Alliance on Mental Illness helpline	nami.org
	Patient Contribution	Resources for establishing a patient-centered medical home to improve care	aafp.org, acponline.org
	Financial Issues/Access to Care	Websites providing financial assistance for obtaining prescription medications	needymeds.org, rxassist.org, pparx.org, togetherrxaccess.org

Table no -1: Non Cost resources aiming to overcome patient related barriers

Adopting a patient-centered care approach, which promotes active patient participation in medical decision-making, is one of the most effective strategies physicians can use to improve adherence. As with any relationship, effective communication is essential for building a good physician-patient bond which is depicted in Table no 2. The significantly better adherence seen in patients who have a strong relationship with their physician highlights the critical role doctors play in promoting medication adherence [5].

Category	Subcategory	Description	Link
Physician-Related Factors	Mindfulness	Resources to help healthcare professionals provide traditionally sensitive care	ethnomed.org
		Tool for rapidly estimating adult health literacy levels	ahrq.gov/populations/sahlsatool
		Test for assessing literacy and understanding in medical contexts	adultmededucation.com
		Videos highlighting physician-patient communication techniques	acpfoundation.org
	Communication	Cultural competency training videos to improve communication in diverse settings	thinkculturalhealth.org
		National resources for educating patients about medication safety and usage	talkaboutrx.org
		Communication tips and resources for healthcare professionals from the American Academy on Communication in Healthcare	aachonline.org

Table no -2: Non -Cost resources aiming to overcome physician related barriers

### Health System

Improving patient outcomes heavily depends on the health system in which a doctor practice. Medication adherence must be prioritized in healthcare systems since it is essential to better health. System modifications are required to guarantee that adequate time is allotted for talking about adherence. Putting in place a team-based care model that trains non-physician staff to perform duties that doctors typically manage can free up doctors to concentrate on talking with patients about medication adherence. This strategy could include, without increasing the duration of the doctor's visit, having administrative staff remind patients to bring their medications to appointments or using pharmacists and case managers for follow-ups and education [6].

The physician's time limits can be addressed with the use of non-cost resource which could help in implementing patient centric home models and particular training on the use of medical devices which could have apposite effect in medication adherence depicted in table no 3.

Category	Subcategory	Description	Link
Health System/Team Factors	Time Limits	Resources on implementing patient-centered medical home models to address time challenges	acponline.org, medicalhomeinfo.org, pcpc.net
		Lack of Care Coordination	Information on improving care coordination among multiple healthcare providers
		Guidelines for accurate medication reconciliation during patient transitions	Guidelines for accurate medication reconciliation during patient transitions
	Lack of Computerization	Tools and resources for implementing and optimizing electronic health records (EHR) systems	americanehr.com, getrxconnected.org, healthit.ahrq.gov, centerforhit.org, thecimm.org

Table no -3: Non -Cost resources aiming to overcome Health system based barriers

### Digital Health applications on Medication Adherence

Digital solutions including emails, social media platforms, wearable and ambient sensors, smartphone applications, SMS notifications, and interactive websites are essential to many aspects of our life in today's technology-driven world. The use of digital tools on mobile devices is known as mobile health, and it has grown to be an essential component of healthcare delivery. These mobile health apps help collect patient data, provide health information, and support a range of healthcare technologies. They not only improve the management of a variety of chronic conditions but are also reasonably priced and easy to use. By serving as medicine reminders, tracking consumption, providing clinical decision assistance, delivering feedback from healthcare providers, helping with appointment scheduling, and enabling data sharing with healthcare professionals, these applications enhance adherence. For instance, apps for managing diabetes can be useful which could alert the patient when there is some alleged consumption of sugar foods or when it's the time for medicine intake [3],[10].

Feature	Description
User-Friendly	Mobile apps are accessible at any time, offering patients 24/7 availability.
Medication Reminders	Many mobile applications remind patients of upcoming doses and alert them to any missed doses.
Monitoring and Documentation	These apps can track and record various activities such as heart rate, blood pressure, glucose levels, sleep quality, and dietary choices.
Clinical Decision Support	Mobile apps can assist patients with the proper use of medications, provide feedback from healthcare providers, and facilitate easy communication with physicians for meetings.
Cost Reduction	Utilizing mobile apps is linked to decreased healthcare expenses.
Health Information	These apps deliver health education and information tailored to the patient's specific clinical conditions and needs.
Data Sharing	A key feature of mobile health applications is the ability to share patient data easily with relevant healthcare specialists and, if desired, with family members.

Table 4: Positive features with the use of digital applications

## **Recent Advancements in Medication Adherence**

### **Medication Event Monitoring System (MEMS)**

Traditional techniques like pill counts and personal interviews cannot guarantee proper adherence and thus the use of electronic techniques provide researchers and medical personnel with the ability to monitor drug adherence over time in "real-time," providing comprehensive dose-by-dose information for every patient. With the use of statistical models like mixed-effect models and Kaplan-Meier analysis, these techniques allow for the independent investigation of treatment implementation and persistence across time. While it's sometimes condensed into a single number (days with proper dosage), electronic monitoring captures the precise time and date of each drug bottle opening. However, this method oversimplifies the rich, dynamic data that is available.

Adherence and clinical outcomes have been shown to positively correlate, thanks to this technology. Research has shown that, especially in lipid-lowering medication, electronic monitoring predicts clinical outcomes more precisely than self-reported adherence or pill counts (Dunbar-Jacob et al., 2013) [11]. It can also record variations in adherence over time, pinpointing the causes of non-adherence. Medication Event Monitoring Systems (MEMS) are the gold standard for tracking adherence, however if cost is the main consideration, they might not be the best choice [13].

### **Electronic Health Records**

EHRs, or electronic health records, have revolutionized patient information management in the medical field by offering a digital substitute for conventional paper charts. This has improved patient safety, streamlined clinical workflows, and improved care coordination. Prescription tracking, which enables healthcare practitioners to obtain thorough medication histories, monitor adherence, and reduce drug errors, is an essential component of electronic health record (EHR) systems. EHRs allow for real-time access to prescription records by centralizing patient data, which helps physicians make educated prescription decisions and notifies them of potential drug interactions and contraindications. Through personalized medication education, this electronic method not only increases patient empowerment and care team communication but also promotes improved health outcomes and higher drug adherence. Integrating EHRs with other digital health tools is essential for providing appropriate care as technology advances [7].

### **Smart pill bottles and reminder systems**

This is a sustainable advancement which could help the needy mostly the geriatric population and patients who require reminder to take medications such as Alzheimer patients who needs a push now and then.

A truly helpful smart pillbox needed to be able to be quickly integrated with the sweeping smart technologies of the present. At the same time, the ease of use had to be implemented in a way that was appropriate for the elderly and their limited knowledge and experience. We also have to be mindful of the essential factors of size and portability [5], [9].

Patients can also gain a great deal from the data gathered through electronic health records. Their medication adherence from one appointment to the next can be understood with the help of this data. Patients can determine which components of their daily routines may have affected their medication-taking behavior by looking through their electronic records [8].

Giving patient this kind of feedback is an effective way to establish communication, gain insight into their perspectives, support long-lasting behavioral changes, encourage the development of new habits, and promote independent medication management. In order to maximize the effectiveness of this input, healthcare practitioners must ensure that patients offer informed consent for their involvement, demonstrate empathy during conversations, and provide guidance on the proper use of electronic equipment and the interpretation of outcomes. Additionally, it is critical to emphasize the need of gathering precise data by guaranteeing a robust association between the act of opening the medication vial and the actual ingestion of the medication. To improve adherence & lessen bias, patients should be told to take their medication as soon as the vial is opened [10].

## Barriers in implementing Adherence strategies

Implementing adherence techniques is hampered by a number of important factors that affect patient outcomes. Patient-related obstacles include personal problems like mental health disorders and a lack of social support, as well as insufficient health literacy, which can result in misconceptions regarding prescription instructions. Barriers from healthcare providers also come into play; for example, time restraints during consultations might prevent patients from engaging in meaningful ways, and poor communication skills can make it difficult to build therapeutic partnerships [13].

The coordination of therapy and the tracking of adherence data are complicated by systemic hurdles, such as poor electronic health record systems and fragmented care. Patients are additionally disinclined to adhere to their prescribed regimens due to financial obstacles, such as high prescription costs and restricted access to reasonably priced healthcare resources [14].

Adherence might also be hampered by external circumstances, such as the accessibility of medications and problems with transportation, especially for people living in remote or underdeveloped locations. A multifaceted strategy is required to effectively address these barriers, with a focus on patient education, enhanced communication, collaborative care, and taking economic and environmental factors into account to create a supportive environment that encourages medication adherence and improves overall health outcomes [4], [12].

## Conclusion

Improving drug adherence is a complex task that necessitates a thorough comprehension of the different obstacles that patients encounter. Patient adherence to recommended regimens is strongly impacted by a number of factors, including financial constraints, inadequate health literacy, social support, and mental health difficulties. Adherence attempts are further complicated by systemic problems in the healthcare system, such as time constraints during consultations and inadequate communication. In order to overcome these obstacles, a cooperative strategy involving patient education, enhanced communication between patients and healthcare professionals, and technology integration to enable more effective drug tracking and management is required.

In the end, promoting a patient-centered care paradigm is critical to enhancing drug compliance and, in turn, patient outcomes. Healthcare professionals can foster more robust therapy connections and promote active patient engagement in treatment decisions by empowering patients via education and support. Adherence-promoting conditions will be established through the application of patient-centered techniques and systemic enhancements in healthcare delivery. The objective stays constant as we look for new and better ways to provide treatment, which is to improve health outcomes for every patient.

## Reference

1. Berg KM, Arnsten JH. Practical and conceptual challenges in measuring antiretroviral adherence. *J Acquir Immune Defic Syndr*. 2006;43(Suppl 1):S79–87.
2. Hearnshaw H, Lindenmeyer A. What do we mean by adherence to treatment and advice for living with diabetes? A review of the literature on definitions and measurements. *Diabet Med*. 2006;23(7):720–8.
3. Velligan DI, Lam YW, Glahn DC, Barrett JA, Maples NJ, Ereshefsky L, et al. Defining and assessing adherence to oral antipsychotics: a review of the literature. *Schizophr Bull*. 2006;32(4):724–42.
4. Pratt SI, Mueser KT, Driscoll M, Wolfe R, Bartels SJ. Medication nonadherence in older people with serious mental illness: prevalence and correlates. *Psychiatr Rehabil J*. 2006;29(4): 299–310.
5. Chia LR, Schlenk EA, Dunbar-Jacob J. Effect of personal and cultural beliefs on medication adherence in the elderly. *Drugs Aging*. 2006;23(3):191–202.
6. Andrade SE, Kahler KH, Frech F, Chan KA. Methods for evaluation of medication adherence and persistence using automated databases. *Pharmacoepidemiol Drug Saf*. 2006;15(8):565-74.
7. Horne R, Weinman J, Barber N, Elliott RA, Morgan M. Concordance, adherence and compliance in medicine taking: a conceptual map and research priorities. London, National Co-ordinating Centre for NHS Service Delivery and Organisation NCCSDO; 2005.

8. Kreslake J.M. Use of Mass Communication by Public Health Programs in Nonmetropolitan Regions. *Prev. Chronic Dis.* 2019;16:E96. doi: 10.5888/pcd16.190014.
9. Belaiche S, Décaudin B, Caron A, et al. Medication non-adherence after allogeneic hematopoietic cell transplantation in adult and pediatric recipients: a cross sectional study conducted by the Francophone Society of Bone Marrow Transplantation and Cellular Therapy. *Fundam Clin Pharmacol.* 2021;35(2):435–445. doi: 10.1111/fcp.12593
10. Lonergan PE, Washington Iii SL, Branagan L, et al. Rapid utilization of telehealth in a comprehensive cancer center as a response to COVID-19: cross-sectional analysis. *J Med Internet Res.* 2020;22(7):e19322. doi: 10.2196/19322.
11. Dunbar-Jacob J, Mortimer-Stephens MK. Treatment adherence in chronic disease. *J Clin Epidemiol.* 2001 Dec;54 Suppl 1:S57-60. doi: 10.1016/s0895-4356(01)00457-7. PMID: 11750211.
12. Kvarnström K, Airaksinen M, Liira H Barriers and facilitators to medication adherence: a qualitative study with general practitioners *BMJ Open* 2018;8:e015332. doi: 10.1136/bmjopen-2016-015332
13. Harris PA, Taylor R, Minor BL, et al. The REDCap consortium: building an international community of software platform partners. *J Biomed Inform.* 2019;95:103208. doi: 10.1016/j.jbi.2019.103208
14. Urquhart J. Patient non-compliance with drug regimens: measurement, clinical correlates, economic impact. *Eur Heart J.* 1996;17(suppl A):8-15.