ARTICLE

Supporting medication adherence for long-term conditions: challenges and opportunities to move the field forward

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Abstract

Medication non-adherence remains a persistent challenge in managing long-term conditions, despite decades of research and hundreds of randomized trials. Adherence is shaped by a complex interplay of behavioural, social, clinical, and system-level factors, making simple solutions inadequate. This paper outlines the current state of play and highlights three key opportunities to advance the field: optimizing the design and tailoring of behaviour change interventions, routinely measuring adherence in clinical care, and adopting health system-level approaches to support sustained adherence. Addressing these areas could improve outcomes, reduce costs, and enhance the integration of evidence-based adherence supports into routine practice. Meaningful progress will require ongoing innovation and collaboration across disciplines, with health psychology playing a leading role.

Key words: Health psychology, Behaviour change, Medication use, Chronic disease management, Patient-centred care, Intervention development, Health systems, Pharmacy practice

Medication adherence: what is the current state of play?

Prescription medications are the most common health intervention used to treat long-term conditions such as heart disease, diabetes, and cancer. Unfortunately, a large proportion of patients do not follow their medication regimen as prescribed, termed non-adherence, which includes altering doses, skipping doses, and/or stopping taking medications altogether. Medication non-adherence is associated with poorer clinical outcomes, increased healthcare utilization, and extra cost to health systems; in Europe alone, this is estimated to cost 125 billion euros per year (Khan and Socha-Dietrich, 2018). Over the past 60 years, health psychology scholars and the wider research community have sought to better understand the reasons why patients with long-term conditions become non-adherent and to develop and test interventions to improve rates of adherence. Global organizations such as the World Health Organization (WHO) and the Organisation for Economic Co-operation and Development (OECD) have weighed-in on the issue with whitepaper reports (Khan and Socha-Dietrich, 2018; World Health Organization, 2003), yet clear solutions to shift the needle remain elusive.

The nature of medication adherence in behavioural terms is an interesting one. Let's take the example of a person taking a pill each day to treat high blood pressure. This type of medication is typically self-administered orally, it is a relatively simple action to do, and the action is quick to complete. If we compare this to other recommended health behaviours such as eating more fruit and vegetables or increasing physical activity, taking a pill each day for high blood pressure, when taken at face value, seems a relatively simple health behaviour to enact. The reality, however, is far more complex.

Medication adherence is a highly nuanced and complicated health behaviour. Hundreds of factors have been identified as influencing medication adherence for long-term conditions. The WHO has organized these factors into five groupings: disease-, therapy-, socioeconomic-, patient-, and healthcare team/system-related factors, some of which are summarized in Table 1.

A study by Kardas and colleagues undertook a review of 51 systematic reviews covering 19 disease categories and identified 400 factors with positive, negative, or neutral associations with medication adherence spread across the five WHO domains (Kardas et al., 2013). Data showing the myriad factors associated with medication adherence highlights two things in particular. First, predicting which patients are non-adherent and the reasons why is very hard to do. Healthcare providers are likely not able to reliably generate a 'profile' non-adherent patient without actively digging into the reasons why with their patient (which is often not done). Second, it is unlikely that a 'one-size-fits-all' approach is appropriate to meaningfully address the needs of patients taking medications (Bosworth et al., 2011) meaning that further depth of thinking is required.

Hundreds of randomized-controlled trials (RCTs) of behaviour change interventions targeting medication adherence have been conducted to date along with several high-quality systematic reviews of the intervention literature. A large systematic review of 771 RCTs by Conn and Ruppar found small-to-medium effect sizes for adherence interventions versus control. Subgroup analyses revealed that habit-based interventions were more effective than cognitive-focused interventions and that the most effective interventions were delivered face-to-face, by pharmacists, and targeted patients directly (versus targeting healthcare provider clinical practice) (Conn and Ruppar, 2017). A 2014 Cochrane systematic review (due to be updated) identified 182 RCTs of interventions to improve medication adherence. Just 17/182 studies were considered to have low risk of bias, of which just five reported improvements in both adherence and clinical outcomes. The Cochrane authors commented that: "current methods of

improving medication adherence for chronic health problems are mostly complex and not very effective" (Nieuwlaat et al., 2014). An editorial piece from Molloy and O'Carroll echoes this sentiment: "despite the long-standing and voluminous research describing the problem of nonadherence, standardised, reliable and feasible evidence-based solutions remain elusive and successes have been sporadic and isolated" (Molloy and O'Carroll, 2017). As such, there are clear gaps in the evidence-base for interventions targeting medication adherence for long-term conditions. Additional frustration comes from the fact that few interventions that show promise are ever implemented into routine practice or scaled/spread at a health system level. For this to change, it is likely that health systems must adapt to enable healthcare providers to better support medication adherence over time and in a patient-centered way.

Table 1

Groups of Factors Influencing Medication Adherence for Long-Term Conditions

WHO Grouping	Example Factors Outlined by WHO (2003)	Categories of Factors from Kardas et al.'s Review (2013)
Disease	Presence of symptoms, illness severity, level of impairment	Presence of symptoms, disease severity, clinical improvement, psychiatric condition, certain diagnoses/indications, duration of the disease
Therapy	Regimen duration, complexity, the presence or expectation of side effects	Adverse effects, patient friendliness of the regimen, drug effectiveness, duration of the treatment, drug type, well-organized treatment
Socioeconomic	Patients' education, employment, socioeconomic status	Family support, family/caregiver factors, social support, social stigma of a disease, costs of drugs and/or treatment, prescription coverage, employment status
Patient	Knowledge, beliefs, habit, personality type, mood, social support, sociodemographic background	Age, gender, marital status, education, ethnicity, housing, cognitive function, forgetfulness and reminders, health beliefs, psychological profile, comorbidities, patient history, alcohol or substance abuse, patient-related barriers to compliance
Healthcare team/system	Patient-provider communication, cost and accessibility of healthcare services, gaps in healthcare	Barriers to healthcare, drug supply, prescription by a specialist, information about drug administration, healthcare provider–patient communication and relationship, follow-up

Where do opportunities lie to move the field forward?

Whilst the picture outlined so far indicates significant challenges for researchers, healthcare providers, and health systems to tackle this thorny issue, there are undoubtedly opportunities to advance the science in this area. Here are three particular areas (not an exhaustive list) worthy of renewed focus.

Opportunity 1: Optimizing the content of medication adherence interventions

There is an opportunity to optimize the development, evaluation, and implementation of behaviour change interventions to target medication adherence. For example, education-only approaches are unlikely to be effective at improving adherence meaning that multiple strategies are probably required (Anderson et al., 2020). Additionally, effective interventions will likely need some form of tailoring to match modifiable barriers to medication taking to intervention components (Allemann et al., 2016). There is growing recognition on the important role of non-reflexive mechanisms (e.g., habit) in medication-taking (Robinson et al., 2022) which sets the stage for additional focus on post-intentional techniques such as implementation intentions (Crawshaw et al., 2019; Squires et al., 2013). In terms of delivery, there is strong evidence that pharmacists (and possibly nurses) should be involved in delivering behaviour change interventions targeting patient adherence. Pharmacists have seen a shift in practice in recent years in an attempt to increase patient-facing activities (e.g., speaking to patients about their medications and any problems they might have) which should lend itself to leveraging pharmacists for delivering behaviour change interventions (Kini and Ho, 2018).

Opportunity 2: Finding ways to routinely measure medication adherence

Somewhat remarkably, medication adherence is not routinely screened for in clinical encounters which means that patients' struggles with medications can often go unnoticed. Specific issues include a lack of valid screening tools (e.g., patient-reported experience measures), inadequate integration of existing tools into electronic medical record systems, as well as time pressure and a lack of expertise to address adherence issues (Garfield et al., 2011). It is important that the roles and responsibilities of healthcare providers are clearly defined in order to quickly and easily screen for adherence issues and to act when issues come to light. For patients being cared for by multidisciplinary teams, who in the team is responsible for detecting and addressing issues with medications? How are things escalated and others notified when such issues are raised? These types of questions are important, yet often go unspoken.

Given the multitude of potential barriers to medication-taking and the need for tailored approaches, there are likely opportunities to better equip healthcare providers with a 'toolbox' of patient-oriented, behaviour change strategies to empower them to address adherence issues collaboratively with patients in routine practice. Imparting knowledge cannot be the only tool at their disposal to deal with the variety of adherence issues patients can experience.

Opportunity 3: Taking a health system-level approach

Health systems worldwide face significant challenges, including the growing burden of chronic diseases, fragmented care, funding constraints, increased wait times, staff shortages, and burnout. Despite these issues, it is crucial to support healthcare providers at the health system-level, enabling them to enhance their practices - often through advancements in technology, such as linking data via electronic health records to help identify patients at risk of non-adherence and inform conversations about medications (Khan and Socha-Dietrich, 2018). Poor medication adherence, a persistent and widespread problem, highlights the need for large-scale, population-based research methods and the use of big-data (e.g., pharmacy dispensing data) to quickly and efficiently identify adherence issues and initiate support for those in need. Furthermore, improved coordination among key stakeholders - such as prescribing clinics, dispensing pharmacies, health insurers managing drug plans, and follow-up care providers - could help close care gaps and strengthen incentivization models like pay-for-performance programs designed to address adherence challenges (Crawshaw and McCleary, 2025).

Conclusion

In summary, despite six decades of research, medication non-adherence remains a complex issue with significant implications for patients, healthcare providers, and health systems. While there is a growing emphasis on encouraging patients with long-term conditions to self-manage where possible, it is crucial for healthcare services to remain accessible and equitable to address challenges related to medication use. Advancing the field likely requires a coordinated, multi-faceted approach, ranging from enhancing conversations about medications to adapting health system infrastructure. Further in-depth discussions among health psychology scholars and the wider research community about how best to do this are most certainly warranted.

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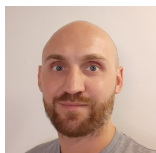
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