

## Patient Assistance Programs and Technology in Medication Adherence

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### Abstract

**Background:** Patient assistance programs, including medication management and counseling, have the potential to improve care in chronic disease states with complex therapies. Incorporating technology as a tool to foster adherence is becoming more commonplace in practice.

**Objectives:** The purpose of this report is to identify barriers of medication adherence and review the impact of patient assistance programs and technology on medication adherence.

**Methods:** A literature search was conducted in secondary databases, PubMed/MEDLINE and EBSCOhost of peer-reviewed systematic reviews, experimental, quasi-experimental, and observational reports published in English within the last fifteen years. Terms searched included patient assistance program, pharmacist role, technology, adherence or compliance, income and health.

**Results:** Ten studies met our prespecified criteria. Male sex, several self-reported chronic diseases, negative expectancy of treatment, engagement in polypharmacy, financial hardships and lower education level correlated with lower medication adherence. Patient care assistance programs and utilization of technology (e.g., use of a mobile application) improved medication adherence.

**Conclusions:** Patient assistance programs and technological tools, such as mobile applications, are necessary resources in improving medication adherence.

**Key words:** medication adherence, patient assistant programs, technology, pharmacy

### Background

Patient assistance programs, including medication management and counseling, have the potential to improve care in chronic disease states with complex therapies.<sup>1</sup> Financial and other socioeconomic burdens (i.e., education level) while suffering from multiple comorbid conditions can hinder patients from taking their medications as prescribed leading to further complications. In one study patients were asked why their conditions were not controlled, and the main reason reported was being unable to afford medications due to high co-pays and other medication-related costs.<sup>2</sup> Another common answer was patients did not correctly understand the treatment or diagnosed condition and were too embarrassed to ask a physician further questions.<sup>2</sup> Cultural differences and beliefs may affect adherence to effective treatment as well.<sup>3</sup>

In order to help patients receive costly medications, patient assistance programs, usually sponsored by pharmaceutical manufacturers, state programs and/or non-profit organizations, have been developed to provide economic relief. Based on pre-specified criteria for enrollment, patient assistance programs can provide coupons and discounts once individuals join the program. Ultimately, the goal of the program is to prevent further clinical complications by affording the patient the ability to obtain needed therapy, and to

improve patient access to medications for little or no cost.<sup>4</sup> Incorporating technology as a tool to foster adherence is becoming more commonplace in practice. It is predicted that 61.9 million individuals will have a smartphone in 2021.<sup>5</sup> The purpose of this report is to identify barriers of medication adherence and review the impact of patient assistance programs and technology on medication adherence.

### Methods

A literature search was conducted in secondary databases, PubMed/MEDLINE and EBSCOhost of peer-reviewed systematic reviews, experimental, quasi-experimental, and observational reports published in English within the last fifteen years. Terms searched included *patient assistance program, pharmacist role, technology, adherence or compliance, income and health*. Investigators followed the guidelines from Peer Review of Electronic Search Strategies (PRESS) to conduct this review and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) methodology to extract data (Figure 1).<sup>6,7</sup> Articles containing proposed keywords were first selected by the primary investigator by reviewing titles and abstracts. After initial review, two co-investigators further analyzed the selected reports. Any inconsistencies or ambiguities were settled through analysis with two other co-investigators until needed consent was reached. Using a standardized, pre-piloted form data were extract from the included studies to include the following categories: the role of the pharmacists in patient assistance programs, number of patients, factors that affect medication adherence, income and the use of technology in adherence and limitations.

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## Results

A total of 697 articles were found using the searched keywords. Of these, ten studies met our prespecified criteria (Table 1). Overall, individuals with lower adherence were more frequently male, had several self-reported chronic diseases, negative expectancy of treatment, engaged in polypharmacy and experienced financial hardships. Education also influenced adherence as patients with lower education levels reported not understanding their current conditions or medications more frequently and did not feel comfortable asking a prescriber questions regarding their prescriptions or disease states. As such, education is a very important predictor for adherence as poor literacy leads to a low compliance with treatment, resulting in poor health outcomes. On the other hand, satisfaction with counseling was a strong positive predictor of adherence. When a patient is not satisfied or has not received quality counseling, he/she will likely not take advice given and will not adhere.<sup>5,13</sup> Patient care assistance programs improved and was a positive predictor of medication adherence in patients experiencing economic issues. Similarly, adherence was enhanced when technology (e.g., use of a mobile application) was utilized to synchronize timing/remind patients of medication administration.<sup>1-5,8-12</sup> Technology increases patient engagement, particularly with their medications, promote health outcomes and reduce medication errors.<sup>5</sup>

## Discussion

Our findings indicated that many barriers to medication adherence exist. Unfortunate consequences of medication non-adherence include increased hospitalizations admissions/readmissions and healthcare costs.<sup>8</sup> Luckily, most predictors of non-adherence are modifiable. For instance, engaging patients when making treatment decisions and counseling can relieve patients of any uncertainty and doubts surrounding their regimen and empowers individuals to take control of their clinical conditions while educating on the dangers of polypharmacy and risk of further health complications if non-adherence occurs. Several studies noted improvement of medication adherence when pharmacists are involved on the healthcare team to assist in these efforts. Pharmacists can enhance medication adherence via education and simplification of medication regimens through services such as medication therapy management. According to a report from the National Governors Association Center for Best Practices, "The critical role that medication management plays in treating chronic diseases suggests that the integration of pharmacists into chronic care delivery teams has the potential to improve health outcomes."<sup>11</sup>

Patient assistance programs help patients afford their medications, but still could be further developed to more assist individuals overcome other barriers of adherence. Integrating technology can promote patient engagement with their medications leading to controlled chronic conditions, less clinical complications and hospitalizations and lower healthcare costs.<sup>5</sup> A study examining the benefits of technological support

in the management of medication information found improved medication adherence and reduced medication errors.<sup>11</sup> Currently, there are seven popular applications that are being marketed to improve medication adherence. These applications are: PillPack, Med Minder, Medisafe Medication Reminder, E-pill Once-a-day reminder, PatientPartner, Dosecast and My Pillbox.<sup>13</sup> Most remind patients when to take medications, but do not provide the opportunity for direct interaction with a physician or pharmacist. Additionally, none give the opportunity to request medication refills. Moreover, the majority of the applications that are available in the market have a complex navigation, have small font sizes or lack task support.<sup>5</sup> With this said, there is much that can be done in order to improve the current technology. Adding additional patient services, such as direct video-call with pharmacists or physicians, an interface that provides a user-friendly guide of what medications they are using, what they are for and what to expect, and reminder/ability to make an appointment with a healthcare provider would greatly enhance these technological resources.

## Conclusions

Several barriers of medication adherence exist including complexity of regimen and costs of medications. Patient assistance programs and technological tools, such as mobile applications, are necessary resources in improving medication adherence. Enhancements of marketed products and involvement of pharmacists on the healthcare team can promote counseling, education and improvement in medication adherence.

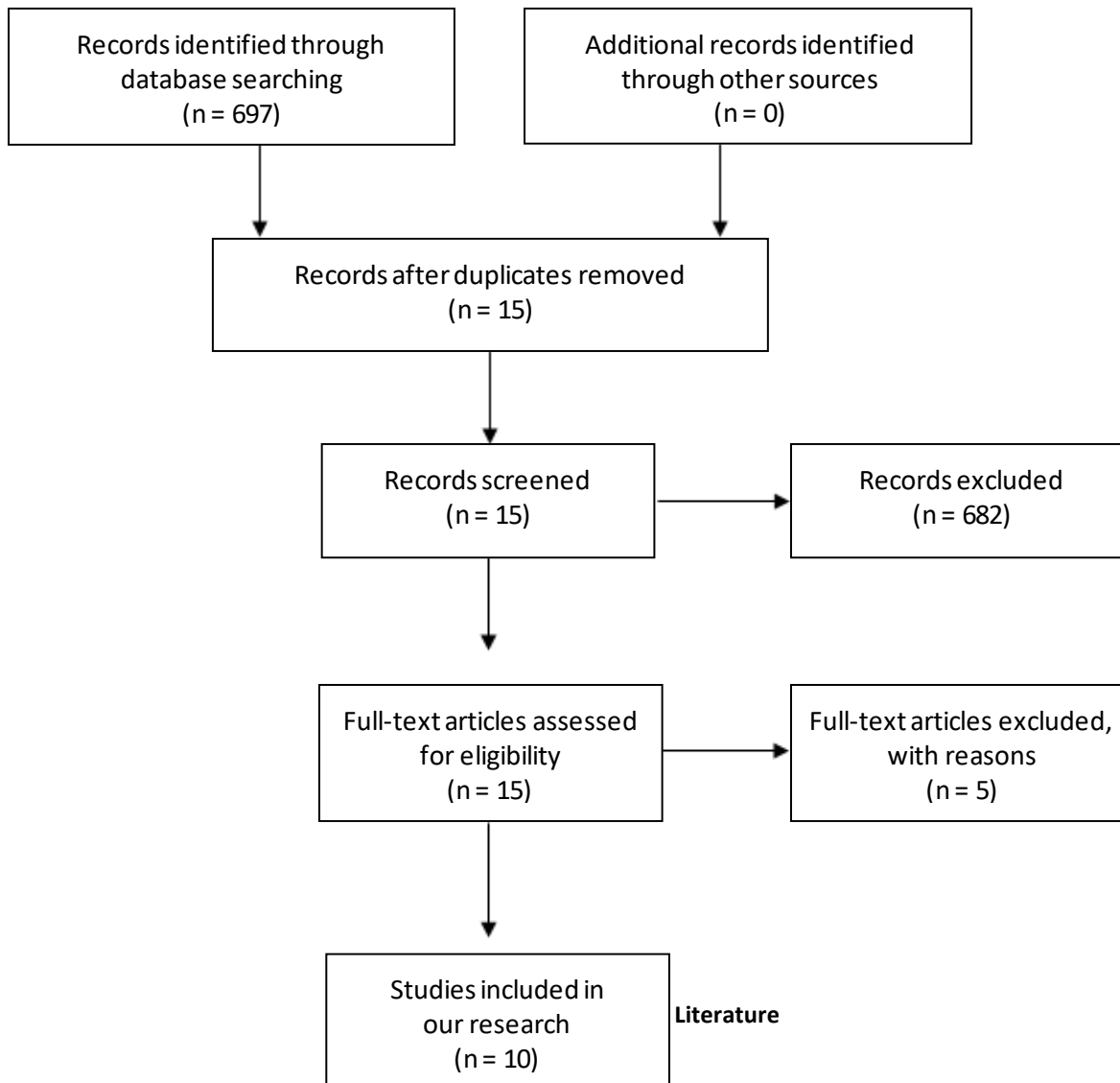
**Conflict of Interest:** We declare no conflicts of interest or financial interests that the authors or members of their immediate families have in any product or service discussed in the manuscript, including grants (pending or received), employment, gifts, stock holdings or options, honoraria, consultancies, expert testimony, patents and royalties.

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Figure 1. Methodology of Literature Review



PAP = Patient assistance programs

Table 1. Review of Literature

First Author, Publication Year	Study Design	Sample Size (n)	Findings
Ganguli et al, 2016	Systematic review	64	Medication management and counseling in PAP improve care in chronic disease states with complex therapies and have a positive impact on adherence, clinical and humanistic outcomes.
Gellad et al, 2006	Cross sectional	14,322	The doctor–patient communication is strongly associated with use of PAP as cost-related underuse of medications is common among older adults.
Felder et al, 2016	Systematic review	33	Enrollment of a patient in PAP with additional medication services (e.g., counseling) was significantly associated with improved glycemic and lipid control.
Hasting et al, 2019	Cohort study	83	A pharmacy-based referral program, the Certified Aging Resource Educated Specialist” (C.A.R.E.S.) program, affords pharmacists with the knowledge and means to provide long-term solutions for Medicare beneficiaries with limited income.
Kletas et al, 2018	Systematic review	47	Through review of a series of recommendations made by various organizations that review oncology treatments it was found that pharmaceutical PAP for unfunded cancer drugs allow patients to access medications when provincial funding is not available.
Hyekyung et al, 2016	Cross sectional	160	Medication adherence of elderly patients was associated with education level, health-related problems, dosing frequency, satisfaction with patient counseling, and explanation of medication, but no association was found with functional health literacy.
Lassarat et al, 2006	Experimental	14,500	A novel direct-to-patient PAP program, GIPAP (Glivec International Patient Assistance Program, for imatinib use in underserved patients was demonstrated to be efficient and sustainable.
Sarrafizadeh et al, 2004	Cohort study	44	Pharmacists helping patients enroll in pharmaceutical manufacturer assistance programs reduced patients’ expenses for prescription drugs.
Sedlmayr et al, 2018	Experimental	7	A novel user-friendly interface for medication management received a higher system usability Scale score, making it more favorable to competitors due to its easy to use design.
Schommer et al, 2015	Case series	Series of reports published by the American Pharmacists Association	As gaps exist in access to pharmacist-provided care, especially during transitions in care, collaborative practice with other healthcare providers would help fill these gaps but pharmacists will need to be paid for their services.

PAP = Patient assistance programs