**Introduction**

Nonadherence to pharmacotherapy can lead to reduced treatment efficacy, poorer health outcomes, and therefore increased costs associated with healthcare. Primary nonadherence, or prescription abandonment, occurs when a patient is prescribed a new medication but fails to obtain it from the pharmacy.1 Secondary nonadherence describes the extent to which individuals miss doses or discontinue therapy early and can be represented by the medication possession ratio (MPR).1 MPR is a central measure of adherence calculated using prescription refill data and takes into account the amount of time an individual has access to a medication over a period of time. MPR < 80% is an established benchmark indicative of nonadherence.

A number of factors have been found to be associated with medication nonadherence. Health literacy, income level, and history of chronic medication use are patient-related factors that can affect medication-taking behavior and initial medication procurement.2 Patients with poor health literacy may not understand how to appropriately self-administer medications, which can lead to underutilization of a medication. Medication-related factors that can affect medication-taking behavior include complexity of dosing instructions and medication cost.2 In regards to the healthcare system, patients who distrust their providers or are suspicious of diagnoses and treatment decisions have been found to have higher rates of nonadherence.2 Additionally, lack of communication between patients and providers contributes to nonadherence and represents an opportunity to develop initiatives focused on improving patient communication and education.

A variety of drug therapy problems (DTPs) can arise when new medications are prescribed. Once a prescription is received by the pharmacy, discovering and addressing DTPs can lead to interruptions and delays in the medication retrieval process. These problems can serve as a barrier to medication initiation, thereby contributing to nonadherence. Compared with medications that are refilled, DTPs associated with prescription for new medications have been found to occur at nearly twice the rate.3

Analyses of new electronic prescriptions for medications to treat chronic conditions, not preceded by use of a clinically equivalent drug, have found primary nonadherence rates to be 48% for medications used to treat type 2 diabetes, 52% for antihypertensives, and 34% for cholesterol-lowering medications.4,5 Prescribers are often unaware if a patient fails to pick up and initiate a newly prescribed medication, but with the increased use of electronic prescribing, pharmacists are in an ideal position to work with prescribers to determine how to address nonadherence for mutual patients. Additionally, pharmacists can communicate with patients to assess and address risks for nonadherence when a new medication is prescribed. Community-based pharmacists regularly interact with patients and prescribers to address DTPs, therefore, a practical intervention to address primary nonadherence and resolve problems that delay initiation of new chronic medications is necessary.

The primary objective of this research is to evaluate differences in primary and secondary nonadherence rates in patients prescribed new medications for type 2 diabetes, hypertension, or dyslipidemia following the implementation of two pharmacist interventions, one including medication education and prescriber follow-up. A secondary objective is to determine the number and types of drug therapy problems (DTPs) identified by the pharmacist that require resolution before new medications can be processed and filled.

**Methods**

This study was carried out at 4 independently owned Moose Pharmacy locations in rural North Carolina.

Moose Pharmacy utilizes a dispensing software with the functionality to generate custom care goals and patient reports based on pre-established parameters. For example, if the pharmacist wants to know which patients have new prescriptions for certain medications, the pharmacist can setup the software to trigger new care goals to be created under each patients’ profile when a new prescription is received for a specific medication class. Once the care goals exist, the pharmacist can generate a report listing all patients linked to the care goal.

For this study, in order to identify eligible patients for the pharmacist intervention, triggers were setup within the dispensing software to automatically generate care goals for patients with new electronic prescriptions for medications in eligible medication classes. Eligible medication classes included biguanides, sulfonylureas, thiazolidinediones, dipeptidyl peptidase-4 inhibitors, sodium glucose cotransporter 2 inhibitors, glucagon-like peptide-1 agonists, insulin, angiotensin converting enzyme inhibitors, angiotensin 2 receptor blockers, calcium channel blockers, diuretics, beta blockers, and statins.

Patients were included in this prospective evaluation of a pharmacist intervention if they were 18 years or older with a new electronic prescription for a medication used to treat type 2 diabetes, hypertension, or dyslipidemia. Patients were excluded if they were non-English speaking or if they had a history of taking the medication or one in the same medication class.

Every 1-2 days, the pharmacist used the dispensing software to generate reports listing patients with active study-related care goals, indicating their need to be contacted for the intervention. Prior to contacting patients on the report, the pharmacist removed patients if they picked up the medication already or if the new prescription was for a medication they were already taking. The pharmacist did not leave a voicemail if patients did not answer the phone.

After the report was filtered appropriately, the pharmacist called eligible patients with prescriptions that were processed and filled. Once the patient confirmed that the prescription was for a new medication used to treat type 2 diabetes, hypertension, or dyslipidemia, they were stratified sequentially in a 1:1 manner into two intervention groups. Patients in Group 1 were notified by the pharmacist that their prescription was ready for pickup. Patients in Group 2 received additional information and were notified of copay and provided medication education. For Group 2, if the medication was not retrieved within 5 days, the pharmacist called the patient again to remind them to pick it up and to address reasons for nonadherence. If two days later the medication was still not retrieved by the patient, the pharmacist notified the prescriber of nonadherence and requested patient follow-up. The pharmacist utilized a script to provide patient education that explained the importance of the medication for the associated disease state and providing pertinent instructions regarding medication administration. A pharmacist-developed decision-making tool was used to guide interventions that would address reasons for nonadherence.

If the pharmacist identified drug therapy problems (DTPs) during the patient phone calls, they worked with the patient and/or prescriber to resolve them. Patients with identified DTPs were not placed into either intervention group because they required additional action to resolve the problem before the prescription could be received by the patient.

Data collected include frequency of nonadherence and medication possession ratio (MPR). The primary outcome was the percentage of patients who failed to pick up their new medications. The secondary outcome measured secondary adherence and was assessed using the MPR, an automatic calculation performed by the pharmacies’ dispensing softwares. Descriptive statistics will be used for data analysis.

**Results & Discussion**

A total of 11 patients were eligible for the pharmacist intervention. There were 5 patients in Group 1 and 6 in Group 2. No patients in Group 1 failed to pick up their medication while 1 patient in Group 2 (16.7%) failed to pick up theirs. The mean medication possession ratio (MPR) in Group 1 was found to be 86.4% compared to 75.2% in Group 2. One patient in the intervention group required a second call to remind them to pick up their medication as well as subsequent provider notification when the medication was still not retrieved from the pharmacy. There were 8 total DTPs identified and resolved by the pharmacist: drug therapy duplication (n=2), prescriptions sent to the wrong pharmacy (n=2), prescriptions written for the wrong drug (n=1), prior authorization requests not received by the prescriber from the pharmacy (n=1), unclear prescription directions (n=1), and patient education needed about medication replacement/discontinuation (n=1).

The overall rate of primary nonadherence for Groups 1 and 2 was found to be 1/11 (9.1%). This rate is lower than existing data on primary nonadherence rates for electronic prescriptions received by pharmacies for medications used to treat type 2 diabetes, hypertension, or dyslipidemia. Currently, usual care for many community pharmacies includes the transmission of automated prescription ready notifications by interactive voice response (IVR), text, or email, as opposed to human-delivered notifications. Although not commonplace, there may be clinical benefit in communicating with patients about their new medication therapy prior to the point of pick up or delivery. The identification and resolution of DTPs prior to pickup can help proactively identify situations that may lead to patient harm and also assist in reducing delays that may come about when initiating new chronic therapies.

Since no additional benefit was observed with the enhanced intervention received by Group 2 vs the standard notification received by Group 1 as it relates to rates of primary nonadherence, pharmacy technicians, who’s scope of practice doesn’t include providing medication education, can assist pharmacists in communicating with patients about their new medications prior to pick up. Technicians can then work with the pharmacist to resolve any medication-related concerns when necessary.

The results of this pharmacist intervention cannot establish a cause and effect relationship. The difference in primary nonadherence between the intervention groups was difficult to measure due to small sample size. Factors contributing to small sample size were barriers to communication, since the majority of patients did not answer phone calls, and the fact that many patients picked up their medications from the pharmacy before the intervention occurred.

The short study duration limited the amount of information available about refill behavior that the pharmacy dispensing software uses to calculate MPR. Some intervention patients were not due for refills before the study concluded, which made it impossible to calculate their MPR to determine rates of secondary nonadherence.

**Conclusion**

The use of electronic prescribing and automated reports generated from pharmacy dispensing softwares can assist pharmacy staff in identifying patients with new prescriptions for chronic pharmacotherapy. Currently, patients who receive medications from the pharmacy are counseled during or after the point of sale and proactive communication is not considered conventional pharmacist care. Communicating with patients to address factors that may contribute to medication nonadherence and/or DTPs prior to the point of medication pick up or delivery may benefit the quality and coordination of patient care by reducing harm and preventing delays in medication procurement.

References

1. Adams, A. and Stolpe, S. (2016). Defining and Measuring Primary Medication Nonadherence: Development of a Quality Measure. *J Manag Care Spec Pharm*, 22(5), pp.516-523.
2. Lee, S., Raamkumar, A. and Li, J. (2018). Reasons for Primary Medication Nonadherence: A Systematic Review and Metric Analysis. *J Manag Care Spec Pharm*, 24(8), pp.778-794.
3. McDonough, R. and Doucette, W. (2003). Drug Therapy Management: An Empirical Report of Drug Therapy Problems, Pharmacists' Interventions, and Results of Pharmacists' Actions. *Journal of the American Pharmacists Association*, 43(4), pp.511-518.
4. Park, Y., Yang, H., Das, A. and Yuen-Reed, G. (2018). Prescription fill rates for acute and chronic medications in claims-EMR linked data. *Medicine*, 97(44), p.e13110.
5. Liberman, J., Hutchins, D., Popiel, R., Patel, M., Jan, S. and Berger, J. (2010). Determinants of Primary Nonadherence in Asthma- Controller and Dyslipidemia Pharmacotherapy. *Am J Pharm Benefits*, 2(2), pp.111-118.