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Standardization of the Medication Review Process in Primary Care: A Quality Improvement Project

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Abstract
Introduction: Medication review process (MRP), especially pertaining to prescription refills, poses significant challenges in primary care. If MRPs are not conducted with care, then patients come under the risk of drug-related problems (DRPs), including receiving incorrect medication or dosage, therapeutic duplications, refilling a previously discontinued medication, nonadherence, and overdosing. Aim and Research Gap: Standardized approaches to medication review are currently limited in practice. Also, reviewing and reconciling patient medications is time-consuming and contributes to practitioner burnout. Therefore, this quality improvement project aimed to incorporate simple medication review protocols into patient care, a standardized rooming experience, and updated medication refill procedures to lessen the burden of refill requests on a primary healthcare facility, and to improve patient and healthcare staff safety and satisfaction in the USA. Methods: An evidence-based method, lean process improvement approach was used. An interdisciplinary team was created to map out the medication refill process. Convenience sampling was used to collect data, including phone calls, from November 1, 2021, to November 2, 2022, from the practice's Nextgen EHR system. The names of highly prescribed medications and the frequency of these medications as being re-prescribed were quantified and the interdisciplinary team met to discuss opportunities for improvement. Results: This quality improvement project analyzed the challenges in a single United States primary care facility's medication refill process and suggested simple improvements. The facility received significantly fewer refill phone calls after streamlining communication to patients to bring their medication prescription bottles to appointments, standardizing rooming experiences, updating clinic protocols and workflows, and training staff to complete medication verification ($p < 0.001$). Discussion and Conclusion: The findings from this quality improvement project support the necessity of standardized protocols in a medication review and refill processes in primary care settings with its positive impact impacts.

Keywords: Medication Review, Re-prescribing, Electronic Health Records, Medication Protocol, Drug Related Problem, Polypharmacy, Medication Reconciliation, Attrition

1. Introduction

The medication review process (MRP) is a systematic and structured critical evaluation of a patient's medications to reach a treatment agreement, optimize medication use, minimize drug-related problems (DRPs), improve health outcomes, and reduce waste (Alghadeer et al., 2021; Assab et al., 2022). As such, MRP is one of the most critical

components of primary care. The goals of proper medication management include the reduction of errors in the process, increased safety, better outcomes, decreased provider workload, reduced burnout, and increased satisfaction for both medical teams and patients.

Primary care prescription processes, especially for re-prescribed medications, can place patients at significant risk if not undertaken with care. This can be due to the communication gap between follow-up appointments and laboratory tests. Some prescribers prefer electronic prescription refill requests, while others favor telephone requests through an office call center or front desk staff. When available, some prescribers may defer such requests to be handled by pharmacists as supported by collaborative practice agreements or clinical protocols. While professional organizations have published various guidelines in this area, there are no universal, standardized approaches in prescription processes leading to unintended effects.

Today, roughly 75% of primary care prescribing is for re-prescribed medications typically used for chronic illnesses (Alghadeer et al., 2021). One study found that about 57% of patients with re-prescribed medication have at least one drug-related problem (DRP) or medication change, including receiving the wrong medication or dosage, therapeutic duplications, refilling a previously discontinued medication, nonadherence, and overdosing (Alghadeer et al., 2021). Furthermore, one long-term surveillance study in the United States concluded a 2.8% mortality rate associated with the adverse effects of inefficient medication review processes (Alghadeer et al., 2021).

Importantly, specific populations are more prone to greater medication errors, such as the elderly and those transitioning care from an intensive care setting to a home or from one healthcare setting to another. For example, 46% to 74% of intensive care patients experience medication errors (Bourne et al., 2022). Medication-related admissions to the hospital are frequent in older adults as well (Dautzenberg et al., 2021). More than 40% of people in the United States who are older than 65 take five or more prescription medications regularly for chronic disease control or prevention (Bloomfield et al., 2020). Polypharmacy is associated with an increased risk of falls, hospitalizations, cognitive impairments, and mortality in the older adult population, making the number of medications, a person is on, one of the most important predictors of adverse effects (Bloomfield et al., 2020).

Moreover, effective medication review heavily draws upon a facility's staff and resources. These time and resource burdens are problematic in prescription refill processes. Overburden and exhaustion in healthcare practitioners is well established in the literature, including nurses and physicians, which is not only associated with attrition but also compromises the well-being of practitioners and patients alike (Dunham, 2022).

Furthermore, medication reconciliation involves obtaining a list of all medications the patient is taking. This can be performed by various healthcare team members depending on state regulations, authority guidelines, and institutional policies. Pre-visit planning is essential to medication reconciliation, whereas several opportunities become available to confirm prescriptions. There can be opportunities to ensure patient medications by various means, such as when patients make appointments, when appointments are confirmed by medical staff, before a visit via patient portals, and while waiting for the practitioner in the room. In addition, patients can bring their medications to the appointment, eliminating discrepancies in medication misspellings, dosages, and frequencies. Refill dates and other prescribing information are also readily available on the bottles.

Medication reconciliation and review are time-consuming, leading to overprescribing and perpetuation of DRPs. Furthermore, insurers have responded to the increase in prescription volumes by placing hurdles in the process, such as prior authorizations (Dunham, 2022). More than 80% of all primary care visits involve medications, and, on average, physicians refill about ten prescriptions per day for individuals who do not have in-person visits scheduled (Dunham, 2022). Electronic health records (EHRs) were thought to be a solution in alleviating the administrative burdens of healthcare and medication management. Furthermore, EHRs have not only simplified the prescription process but also have eased communications in this area leading to more prescriptions being initiated and written overall.[6] However, some studies have suggested that it contributes to exhaustion and fatigue.

There are a variety of barriers to effective medication review processes. These can be related to patient, physician, resource, regulation, qualification, and remuneration barriers (Assab et al., 2022). Additionally, poor documentation of drug changes, automated prescribing practices, dependence on patient requests, and ignorance of the medical notes are also problematic (Alghadeer et al., 2021). Patient-related challenges are a large part of issues stemming from a medication review, including knowledge of personal medication use and overall health literacy. Other challenges come from nonadherence to prescribed medications. For example, approximately 4.3 billion prescriptions are written every year, but fewer than half are taken as prescribed.[7] Proper adherence to medication regimens includes having an uninterrupted supply. Taking more than one medication at a time and keeping track of varying refill dates can present a burden.

Empirical evidence agrees that a standardized protocol must be adopted to avoid medication safety issues. A medication review can be performed by itself or with other interventions, such as patient education. Multiple trials have concluded that computerized support can greatly diminish errors in prescribing practices.[5] However, empirical evidence suggests that involving pharmacists in the medication review process allows for greater accuracy, improved efficiency, reduced error rates, and increased patient satisfaction(Alghadeer et al., 2021; Bhakta et al., 2022).. Regardless of the implementing party, strategies and interventions are vital in reducing potentially inappropriate medication prescribing in various settings.[9]

Given the burden of delivering care in a high-quality setting, strategies should be as simplistic as possible and not create additional workflows. Therefore, this quality improvement project aimed to incorporate simple medication review protocols into patient care, a standardized rooming experience, and updated medication refill procedures to lessen the burden of refill requests on a primary healthcare facility, and to improve patient and healthcare staff safety and satisfaction in the USA.

The remaining paper will discuss the methods, results, discussion and concluded with research implications.

2. Methods

This quality improvement project aimed to improve the efficiency of the medication review process in one primary care practice in the United States (U.S.) with over 16,000 encounters a year. An interdisciplinary team that included representatives from clinical operations, physician leadership, nursing, clinical pharmacy services, and patient access was created to map out the medication refill process already employed. For this, lean process was used which is a process improvement approach and evidence-based method for improving production capacity, decreasing costs, increasing satisfaction, and reinforcing leadership.[10] While this framework has been used extensively in the manufacturing sector, research suggests that when applied to healthcare, errors become more visible, increasing response and making them less frequent.[11] Therefore, the Lean framework was deemed essential to identifying possible areas in the medication refill process that could be improved.

2.1. Data Collection and Settings

After defining the medication refill process, challenges were analyzed including patient, systematic, and provider-related etiologies. Data were collected from November 1, 2021, to November 2, 2022, from the practice's Nextgen EHR system. The names of highly prescribed medications and the frequency of these medications as being re-prescribed were quantified. The interdisciplinary team met to discuss opportunities for improvement that could be easily implemented by the healthcare team and were customizable along with the rapid evaluation and feedback inherent to all quality improvement projects.

2.2. Sample and Sampling Technique

Convenience sampling was used for this study. The sample included all phone calls received by the primary care practice located in Texas, requesting medication refills from November 1, 2021, to November 2, 2022 (n = 4,029) at a healthcare practice with over 16,000 encounters a year for primary care services. The quality improvement

project only involved participants ordinarily seen by this practice. No external recruitment of participants occurred. Since this was a quality improvement project, IRB approval was not required.

2.3. Data Analysis

After determining the number of refill requests received by the practice during the study period, the number of related visit encounters was determined. The percentage of refills per encounter was calculated monthly, and temporal trends were assessed to determine if refill call volumes decreased post-quality improvement project implementation. Data were analyzed via IBM SPSS v.29. To ascertain if any statistically significant differences occurred in refill calls pre- versus post-project implementation, *t*-tests were used. All analyses were calculated with a 95% confidence interval and deemed statistically significant with a *p*-value equal to or less than 0.05.

3. Results

This study has analyzed potential challenges, suggested much needed improvements and identified the significance of this project with statistical analysis.

3.1. Analyzed Potential Challenges

The challenges analyzed by the interdisciplinary team included patient, systematic, and provider-related etiologies. For example, patients did not typically know how many medication refills remained on their current prescription, annual visits were completed without identifying their need, and patients could not operate patient portal technology for refill requests. Moreover, providers had difficulty identifying the medication refill needs during encounters due to inaccurate medication lists documented in the EHR. Furthermore, the EHR system could not support automated reminders for refills, medications due to be refilled were often overlooked during rooming, appointment reminders were made without instructing patients to bring medication bottles, and medication reconciliation needed to be consistently and comprehensively completed.

3.2. Needed Improvements

The interdisciplinary team decided upon several different simple improvements. Appointment reminders and confirmations included patient instructions to bring medication bottles to appointments. Clinic staff was trained on a standardized rooming experience with an enhanced emphasis on medication review. Practitioners inquired about medication bottles brought to the appointments. Furthermore, after identifying the high-frequency medications (Table I) most sought-after in refill requests, the primary care practice's medication refill procedure underwent revision, which was implemented by the nursing staff.

3.3. Statistical Analysis

During the study period, a total of 4,029 refill calls were included. There was a mean of 309.92 ($SD = 51.87$) refill calls received monthly, ranging from 256 to 408. There were more refill calls received before the implementation of the quality improvement project ($M = 391$, $SD = 23.64$) than after ($M = 285.60$, $SD = 24.80$), a statistically significant difference, $M = 105.40$, 95% CI [69.76, 141.04], $t(11) = 6.510$, $p < .001$ (Figure 1).

4. Discussion and Conclusion

The findings from this quality improvement project support the necessity of standardized protocols in a medication review and refill processes in primary care settings. In addition, post-implementation of the project, the number of refill calls significantly decreased, reducing the workload for healthcare professionals and potentially leading to improved patient safety and satisfaction.

One of the significant findings of this study was the decrease in the volume of refill calls after the project's implementation. This result supports existing research that suggests standardized procedures in a medication

review and refill processes can reduce the burden on healthcare professionals and potentially improve patient safety and satisfaction (Alghadeer et al., 2021; Bloomfield et al., 2020; Rantsi et al., 2022). The project introduced a systematic approach that included patient education, a standardized rooming experience, and an updated medication refill procedure, all of which aimed at improving the efficiency of medication management.

The findings align with earlier studies that emphasized the role of pharmacists and computerized systems in reducing errors in prescribing practices (Alghadeer et al., 2021; Bloomfield et al., 2020)
. In this project, the expertise of an interdisciplinary team was used, including clinical pharmacists, to revise the primary care practice's medication refill procedure. This approach could help bridge the medication management gap, a concept supported by the literature that advocates for a multidisciplinary approach in primary care settings.[8]

The decrease in refill calls post-implementation suggests that patients may have better understood their medication regimens and refill needs, possibly due to the added emphasis on patient education. This could lead to better medication adherence, which is crucial given that nearly half of all prescriptions are not taken as prescribed.[7] Furthermore, by asking patients to bring their medication bottles to appointments, healthcare professionals could reconcile their medications more accurately, reducing the risk of medication errors.

However, unexpected challenges encountered during this project included technological limitations and inaccurate medication lists in EHR. These findings align with previous literature that pointed out the complexities associated with EHR systems and the potential for these to contribute to physician burnout.[6] While EHR systems were initially expected to alleviate the administrative burdens in healthcare, they have sometimes been found to introduce new challenges (Dunham, 2022). This highlights the importance of ongoing quality improvement initiatives and constant adaptation to emerging issues.

On the other hand, this study reflects a few limitations inherent to all quality improvement projects, such as sustainability in the project, lack of buy-in from all involved, and resistance to change. However, the areas for improvement were acknowledged and created by a diverse team in which workflow was immediately impacted. Increasing ownership among the team could lead to long-term sustainability. Furthermore, confounding factors contributing to lower volumes of refill requests were not ascertained during this project, for instance, the entry and exit of patients into and from the practice. Therefore, this study cannot provide causation.

A notable decrease in refill calls post-implementation indicates a positive impact and significance of this quality improvement project. It is worth noting that the effectiveness of such interventions could vary across different settings, largely dependent on factors like available resources, staff training, and patient population characteristics. Therefore, future studies should consider investigating the applicability of similar interventions in different healthcare settings and evaluating their long-term effects.

In conclusion, this quality improvement project demonstrated the positive impact of standardizing the medication review process in a primary care setting. By focusing on patient education, standardizing the rooming experience, and updating the medication refill procedure, we observed a significant reduction in refill calls, suggesting improved operational efficiency and potentially leading to enhanced patient safety and satisfaction. This project underscores the critical need for standardized protocols in medication management and the importance of a multidisciplinary approach in primary care settings. Future efforts should address the challenges associated with EHR systems and continue to innovate and improve medication management procedures.

4.1. Research Implications

The results of this study can be used in healthcare practices of all sizes and suggest that solutions to increase patient safety in prescribing practices do not need to be overly complicated or increase the workload of already overburdened staff members. It is reasonable to consider more low-cost interventions. However, further research is required to improve prescribing practices and realize their full effect on the health and safety of patients and practitioners.

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Table I: High-Frequency Medications Added to Refill Procedures

| Sr. No.	High-Frequency Medications Added to Refill Procedures	Sr. No.	High-Frequency Medications Added to Refill Procedures
1	ACE-I/ARB Medications (-prII/-sartan)	11	Dipeptidyl Peptidase 4 Inhibitor Medications (-gliptin)
2	Alpha Blocker Medications (-azosin)	12	GABA Analog
3	Antihistamine Medications (-itidine/-ine)	13	GLP-1 Receptor Agonist Medications (-glutide)
4	Respiratory Inhalers (SABA, LABA, ICS, Anticholinergics [ACH])	14	Leukotriene Receptor Antagonist (-lukast)
5	Beta Blockers (-olol)	15	Nasal Corticosteroids (-asone/ -onide/ -olide/ -olone)
6	Biguanide Medications (i.e. metformins)	16	Omega 3 Fatty Acids (EPA/DHA)
7	Calcium Channel Blocker Medications	17	Insulin Medications
8	Diabetic Supplies	18	Proton Pump Inhibitor Medications (-razole)
9	Diuretic Medications (-thiazide/-semide)	19	Sodium-Glucose Cotransporter 2 Inhibitor Medications (-gliflozin)
10	Selective Serotonin Reuptake Inhibitors (SSRI)		
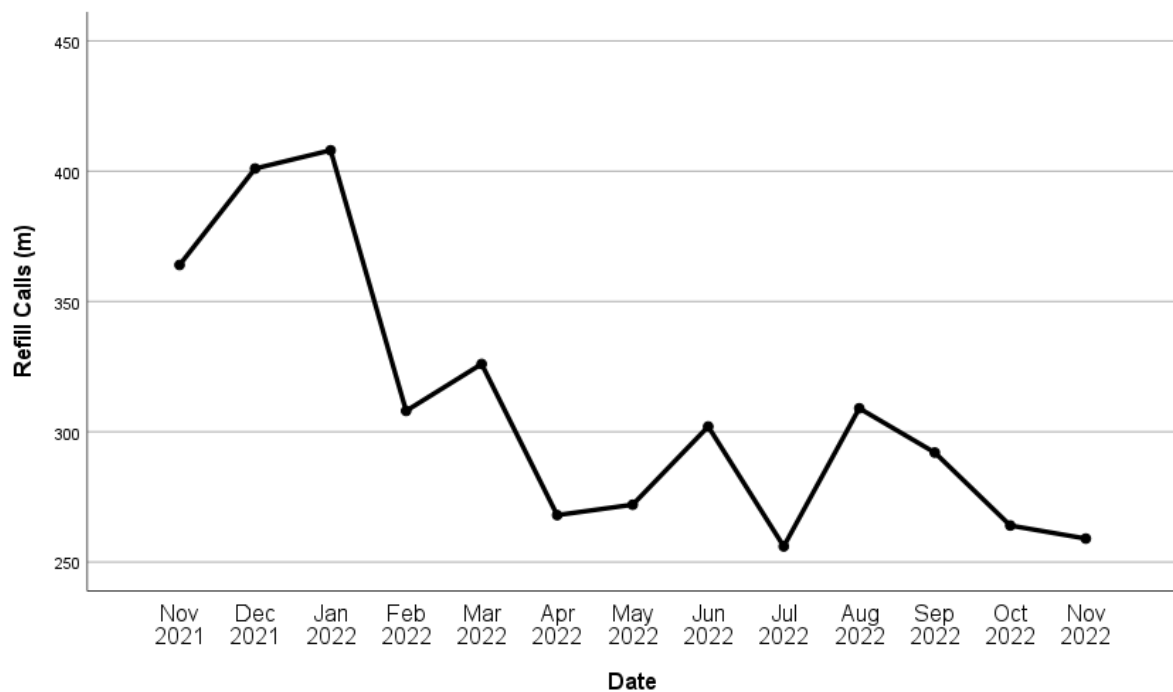
Figure 1: Mean Number of Refill Calls Received per Month